ECONOMIC COMMISSION FOR EUROPE

POLICY REFORMS FOR ENERGY EFFICIENCY INVESTMENTS

UNITED NATIONS

ECONOMIC COMMISSION FOR EUROPE

FINANCING ENERGY EFFICIENCY INVESTMENTS
FOR CLIMATE CHANGE MITIGATION

REGIONAL ANALYSIS OF POLICY REFORMS TO PROMOTE ENERGY EFFICIENCY AND RENEWABLE ENERGY INVESTMENTS

UNITED NATIONS

Acknowledgement

This report has been prepared by Pöyry Energy Consulting (Schweiz) AG in the framework of the UNECE Financing Energy Efficiency Investments for Climate Change Mitigation Project.

Valuable contributions of the following organizations and experts are acknowledged:

- National Participating Institutions and National Coordinators from the countries participating in the project

- Project supporting institutions, namely the United Nations Foundation/United Nations Fund for International Partnership (UNF/UNFIP), United Nations Environment Programme/Global Environment Facility (UNEP/GEF), Fonds Français pour l'Environment Mondiale/Agence Français de Développement (FFEM/AFD) and European Business Congress e.V. (EBC)

- Members of the Steering Committee of the Energy Efficiency 21 Project and the Ad Hoc Group of Experts on Energy Efficiency and Renewable Energy Investments for Climate Change Mitigation

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Information cut-off date: 10 February 2010

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ACRONYMS AND ABBREVIATIONS

AAU	Assigned Amount Unit
ADEME	Agence de l'Environment et de la Maitrise de l'Energie
AEER	Alliance for Energy Efficiency and Renewables (Moldova)
AEI	Alliance for European Integration
AFD	Agence Français de Développement
AKBN	Albanian National Agency of Natural Resources
AL	Albania
AlbInvest	Albanian Foreign Investment Promotion Agency
ANRE	National Agency for Energy Regulation
ARCE	Romanian Agency for Energy Conservation
ARENA-ECO	Ukraine Agency for Rational Energy Use and Ecology
BA	Bosnia and Herzegovina
BAS	EBRD Business Advisory Services Programmes
BEERECL	Bulgarian Energy Efficiency and Renewable Energy Credit Line
BEH EAD	Bulgarian Energy Holding EAD
BG	Bulgaria
BgEEF	Bulgarian Energy Efficiency Fund
BY	Belarus
CAS	Country Assistance Strategy
CDM	Clean Development Mechanism
CEDB	Citizens for the Development of a European Bulgaria
CER	Certified Emission Reductions
CERA	Croatian Energy Regulatory Agency
CHP	Combined Heat and Power
CIDA	Canadian International Development Agency
CIF	World Bank's Climate Investment Fund
CIS	Commonwealth of Independent States
CPI	Corruption Perception Index
CTF	Clean Technology Fund
DNA	Designated National Authority
DPA	Democratic Party of Albania
EAR	European Agency for Reconstruction
EBC	European Business Congress e.V.
EBRD	European Bank for Reconstruction and Development
ECSEE	Energy Community South East Europe Treaty
EEA	Energy Efficiency Agency (Bulgaria)
EEC	Albania-EU Energy Efficiency Centre
EIA	Environmental Impact Assessment
EIB	European Investment Bank
EIHP	Energy Institute Hrvoje Požar (Croatia)

EnC	Energy Community Treaty
EPBIH	Electricity Company of Bosnia and Herzegovina
EPC	Energy Performance Contracting
EPHZHB	Electricity Company of Herzeg-Bosnia
EPRS	Electricity Company of the Republika Srpska
ERE	Albanian Energy Regulatory Entity
ERU	Emission Reduction Units
ESCO	Energy Service Company
ETS	Emission Trading Scheme
EU	European Union
EUR	Euro (common currency of the 16 European Union member states)
EPS	Electric Power Industry of Serbia
FDI	Foreign Direct Investment
FEC	Fuel-Energy-Complex (Russia)
FEEI	Financing Energy Efficiency for Climate Change Mitigation Project
FERK	Regulatory Commission for Electricity in the Federation Bosnia and Herzegovina
FFEM	Fonds Français pour l'Environment Mondiale (French Global Environment Facility)
FIPA	Foreign Investment Promotion Agency (Bosnia and Herzegovina)
FISF	Foreign Investors Support Fund (Bosnia and Herzegovina)
FREE	Romanian Energy Efficiency Fund
FTS	Free Trade Sector
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas Emissions
GIS	Green Investment Scheme
GNP	Gross National Product
HBOR	Croatian Bank for Reconstruction and Development
HEP	Hrvatska elektroprivreda (Croatian Power Utility)
HERA	Croatian Energy Regulatory Agency
HPP	Hydro Power Plants
HR	Croatia
HROTE	Croatian Energy Market Operator
IBA	Invest Bulgaria Agency
IEA	International Energy Agency
IET	International Emission Trade
IFC	International Finance Corporation
IFI	International Financing Institution
IPA	Instrument for Pre-Accession Assistance
IPP	Independent Power Producer
IRENA	International Renewable Energy Agency
ISEDC	International Sustainable Energy Development Centre

ISIC	International Standard Industrial Classification
ISO	Independent System Operator
JI	Joint Implementation
KAZINVEST	Kazakhstan Investment Promotion Center
KAZSEFF	Sustainable Energy Financing Facility in Kazakhstan
KEGOC	Kazakhstan Electricity Grid Operating Company
KESH	Korporata Energjitike Shqiptare (Albania)
KfW	Kreditanstalt für Wiederaufbau
KIDSF	Kozloduy International Decommissioning Support Fund (Bulgaria)
KM	Kyoto Mechanism
KZ	Kazakhstan
LEF	Local Enterprise Facility
LNG	Liquefied Natural Gas
LPG	Liquefied Petroleum Gas
LRP	Local Reference Prices
MD	Republic of Moldova
MEN	Ministry of Environment of the Republic of Moldova
METE	Albanian Ministry of Economy, Trade and Energy
MIEE	Industrial Energy Efficiency Network Programme (Croatia)
MIEPO	Moldovan Investment and Export Promotion Organization
MK	The former Yugoslav Republic of Macedonia
MoEFWA	Albanian Ministry of Environment, Forests and Water Administration
MoELE	Ministry of Economy, Labor and Entrepreneurship (Croatia)
MoEPPPC	Ministry of Environmental Protection, Physical Planning and Construction (Croatia)
MoF	Albanian Ministry of Finance
MoFTER	Ministry of Foreign Trade and Economic Relations (Bosnia and Herzegovina)
MoSEFF	Moldova Sustainable Energy Financing Facility
MoU	Memorandum of Understanding
MUNEE	Municipal Network for Energy Efficiency (Bosnia and Herzegovina)
NAP	National Allocation Plan
NAEC	National Agency for Energy Conservation (Moldova)
NAER	National Agency of Ukraine for the Effective Use of Energy Sources
NC	National Coordinator
NEFCO	Nordic Environment Finance Corporation
NEK	National Electricity Company (Bulgaria)
NERC	National Electricity Regulation Commission of Ukraine
NGO	Non-governmental Organization
NIA	Russian National Investment Agency
NIS	Petroleum Industry of Serbia
NPI	National Participating Institutions
OJSC	Open Joint Stock Company

OSSH	Albanian Distribution System Operator
OST	Albanian Transmission Grid Operator
PCF	World Bank’s Prototype Carbon Fund
PCRM	Party of Communists of the Republic of Moldova
PDD	Project Design Documents
PEEREA	Protocol on Energy Efficiency and Related Environmental Aspects
PPP	Purchasing Power Parity
RAEF	Romanian American Investment Fund
RAO UES	Unified Energy System of Russia
REECL	Bulgarian Residential Energy Efficiency Credit Line
RERS	Regulatory Commission for Energy of the Republika Srpska
REU	Regional Distribution System Operators
RO	Romania
RS	Serbia
RSEFP	Russia Sustainable Energy Finance Programme
RU	Russian Federation
RusDB	Russian Development Bank
SAA	EU Stabilization and Association Agreement
SEAF	Macedonian Small Enterprise Assistance Fund
SEEA	Serbian Energy Efficiency Agency
SEF	State Environmental Fund (Czech Republic)
SERK	State Electricity Regulatory Commission (Bosnia and Herzegovina)
SEWRC	State Energy and Water Regulatory Commission (Bulgaria)
SFA	State Forestry Agency (Bulgaria)
SIEPA	Serbian Investment and Export Promotion Agency
SME	Small- and medium enterprises
SMI	Socialist Movement for Integration
SPDF	Special Purpose Debt Facility
TAM	EBRD Turn-Around Management Programme
TFC	Total Final Consumption
UA	Ukraine
UCTE	Union for the Co-ordination of Transmission of Electricity
UKEEP	Ukraine Energy Efficiency Programme
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNF	United Nations Foundation
UNFCCC	United Nations Framework Convention on Climate Change
UNFIP	United Nations Fund for International Partnership
UNMIK	Interim Administration Mission in Kosovo

USAID	United States Agency for International Development
USD	United States Dollar (currency of the United States of America)
VAT	Value Added Tax
WIIW	Vienna Institute for International Economic Studies

SIGNS AND MEASURES

CO_2	carbon dioxide
Gcal	gigacalorie
GJ	gigajoule
GW	gigawatt (if not stated otherwise, always means electric gigawatt [GWe])
GWh	gigawatt hour
ha	hectare
km	kilometre
km^2	square kilometre
kg	kilogram
kgoe	kilogram of oil equivalent
ktoe	kiloton of oil equivalent (1 ktoe=42 GJ; 1 ktoe=11.6 GWh)
kV	kilovolt
kW	kilowatt (if not stated otherwise, always means electric kilowatt [kWe])
kWh	kilowatt hour
m	metre
m^2	square metre
m^3	cubic metre
Mtce	million ton of coal equivalent
$MtCO_2eq$	million ton of CO_2 equivalent
Mtoe	million ton of oil equivalent
MW	megawatt (if not stated otherwise, always means electric megawatt [Mwe])
MWh	megawatt hour
MWth	megawatt thermic
ºC	degree Celsius
PJ	petajoule
Sm^3	standard cubic metre (standard means standard temperature and pressure [STP])
tce	ton of coal equivalent
tCO_2eq	ton of CO_2 equivalent
TJ	terajoule
toe	ton of oil equivalent
TW	terawatt (if not stated otherwise, always means electric terawatt [TWe])
TWh	terawatt hour

CURRENCIES

Country	National currency	Abbreviations	Exchange rate USD 2008, period average (national currency/USD)
Albania	Albanian Lek	ALL	85.59
Belarus	Belarussian Ruble	BYR	2151.5
Bosnia and Herzegovina	Convertible Marka	BAM	1.34
Bulgaria	Bulgarian Lev	BGN	1.34
Croatia	Croatian Kuna	HRK	4.94
Kazakhstan	Kazakhstan Tenge	KZT	122.38
Republic of Moldova	Moldovan Leu	MDL	10.58
Romania	Romanian New Lei	RON	2.53
Russian Federation	Russian Rouble	RUB	24.87
Serbia	Serbian Dinar	RSD	56.14
The former Yugoslav Republic of Macedonia	Macedonian Denar	MKD	42.36
Ukraine	Ukrainian Hryvnia	UAH	5.37

Source: Oanda

EXECUTIVE SUMMARY

South-Eastern European, Eastern European and Central Asian countries are confronted with a wide range of economic and environmental problems caused by their inefficient and polluting energy systems. At the same time, their energy economies provide some of the most promising opportunities for reducing global greenhouse gas emissions. This will require the use of cost-effective energy efficiency improvements and renewable energy technologies – the main self-financing methods to implement climate change mitigation.

The investment potential for energy efficiency in these countries is so large that only the private sector can provide the capital needed to achieve meaningful results. This in turn will require a market for energy efficiency in which large investments can be made with low transaction costs at an acceptable risk-to-returns ratio and within a reasonable period of time. At present, private investors do not often finance energy efficiency projects in these countries because dedicated sources of financing are lacking and local banks are generally unfamiliar with such investments. Another obstacle in financing energy efficiency projects is the absence of policy and institutional support for their implementation. The lack of knowledge and experience on how to select and formulate energy efficiency investment projects is often a challenge for local experts.

In order to address these obstacles, in January 2008 the UNECE began implementing the Financing Energy Efficiency for Climate Change Mitigation (FEEI) Project. The project is designed to assist countries from Eastern Europe, South-Eastern Europe and Central Asia to enhance their energy efficiency and reduce air pollution and greenhouse gas emissions in order to meet international obligations under the United Nations Framework Convention on Climate Change (UNFCCC) and UNECE environmental conventions. Twelve countries from Eastern Europe, South Eastern Europe and Central Asia are included in the scope of the activities: Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Kazakhstan, Republic of Moldova, Romania, the Russian Federation, Serbia, the former Yugoslav Republic of Macedonia and Ukraine. The goal of the FEEI Project on Financing Energy Efficiency Investments for Climate Change Mitigation is to promote market formation so that self-sustaining energy efficiency and renewable energy projects can be identified, developed, financed and implemented locally in participating countries.

Funding for the project has been provided by the following supporting institutions:

- United Nations Foundation/UN Fund for International Partnerships (UNF/UNFIP);
- United Nations Environment Programme/Global Environment Facility (UNEP/GEF);
- Fonds Français pour l'Environnement Mondiale/Agence Français de Développement (FFEM/AFD);
- European Business Congress e.V. (EBC).

In-kind contributions for the project are provided by the participating countries and by the UNECE secretariat.

Goals, Scope and Approach of the Analysis

The Regional Analysis for Policy Reforms to Promote Energy Efficiency and Renewable Energy Investments is conceived as a wide-ranging regional assessment, including case studies, expert workshops and senior policymaker seminars. The main goal of the analysis is to provide recommendations addressed to the policymakers of the participating countries in order to develop and implement policy reforms that will support market formation and foster a favorable climate for investments in the sectors of energy efficiency and renewable energy sources. To achieve this goal, an interactive approach has been applied with active involvement of the designated National Coordinators (NCs) and National Participating Institutions (NPIs) from the project countries and direct contributions from experts which have been collected and consolidated in the final report.

Overview of the Energy Sector in the Project Region

The countries in the project region show huge differences in their economic development, energy supply and legislative and regulatory framework, while the common aspect appears to be the urgent need for investments in energy efficiency and renewable energy sources. While half of the reviewed countries have a per capita Gross Domestic Product (GDP) which is above the world's average, some countries, in particular the Republic of Moldova and Albania, are well below this threshold. On the other hand, Croatia and the Russian Federation are not far from reaching the average of the 27 member states of the European Union (EU), while the two new EU member states Bulgaria and Romania are still well below that indicator.

Apart from Kazakhstan and the Russian Federation, who are large energy exporters, all other project countries have significant dependency on energy imports, which can reach 86 per cent and 97 per cent in the case of Belarus and the Republic of Moldova, respectively. This fact points out that enhancing efficiency in the primary energy use and exploiting the domestic potential of renewable energy sources is the most sustainable way to reduce dependency on foreign energy imports.

All countries in the project region are in the process of deregulation and liberalization of their energy markets, with electricity markets having generally the highest degree of progress and gas and heat markets very often lagging behind. Regulations and provisions regarding the energy sector are available in all project countries, but the structure, the goals and the scope of the national legislation differ significantly between the countries.

Regarding energy intensities, all countries of the project region (with Albania and Croatia being the only exceptions), are well above the EU-27 average, with such countries as Kazakhstan, Serbia and the Russian Federation being among the countries with the highest energy intensity in the world. While a rather satisfactory situation can be observed with respect to deployment of renewable energy sources in many project countries, it must be noted that the major contribution to renewable energy sources comes from the widespread use of large hydropower stations for the generation of electricity and use of fuel wood for domestic heating purposes, while other renewable energy sources (geothermal, solar, wind and small hydropower) have only a negligible share.

Overview of the Energy Sector and Policy Framework in the Project Countries

Albania

Albania has one of the lowest per capita GDP in the project region; however, economic growth has been steady in the last five years before the financial crisis in late 2008. The Albanian economy is based more on agriculture than any other country in the project region, while the industrial sector has a rather modest contribution to GDP.

Albania has the lowest electricity consumption per capita in the project region and power generation is nearly entirely based on hydropower (98 per cent). These facts imply that energy intensity in Albania is low and the share of renewable energy sources very high; however, there are major problems of electricity supply in the country that need to be addressed with consistent investments in the energy infrastructure and therefore Albania faces the challenge of ensuring sufficient electricity supply to the population while maintaining sustainability standards.

Several policy reforms have been undertaken in Albania in recent years, mainly the implementation of the National Power Law in 2003, which led to the establishment of the National Energy Regulator, the unbundling of the power sector and the privatization of electricity distribution activities. The Concession Law of 2007 introduced a competitive and transparent concession policy, which is very favorable for development of renewable energy projects.

Belarus

Belarus is the country in the project region that has experienced the strongest economic growth in the past years, with an average yearly growth of GDP of over nine per cent between 2003 and 2008 and reaching GDP per capita above the world's average and very close to the GDP per capita of the two most recent EU members Bulgaria and Romania in 2008. The industrial sector (mainly based on heavy industry, machinery and agricultural equipment) plays a strong role in the Belarussian economy, followed by the agricultural sector. In order to stimulate the creation of private enterprises and attract foreign investors in the country, the Belarussian Government has created six free economic zones that offer tax and custom duty exemptions.

Belarus is major strong energy importer, having a deficit of primary energy sources of 86 per cent. Electricity production is entirely based on fossil fuels, in particular on gas imports from the Russian Federation. For these reasons, energy efficiency has been a top priority for the Government of Belarus since mid-1990s. The application of a combination of administrative and market measures has brought tangible results, with energy intensity being almost halved between 1997 and 2007. Examples of administrative measures are ministerial energy saving plans for state-owned companies, while the energy incentives introduced comprise preferential loans, reduced interest rates and tax exemptions. Furthermore, the Belarussian Government is improving the efficiency of the district heating system by replacing heating pipes at a rate of 1,000 km per year.

Bosnia and Herzegovina

The state of Bosnia and Herzegovina is composed of two entities, the Federation of Bosnia and Herzegovina and Republika Srpska, and the District of Brčko as set up by the Dayton Peace Agreements of 1995. The Dayton Agreements also allocated the regulatory authority to the two entities, while the state Government has more of a coordinating role. After recovery from the civil war, Bosnia and Herzegovina has seen a steady economic growth over the last five years.

The power system of Bosnia and Herzegovina was developed to supply the remaining parts of the former Yugoslavia: based on its electricity surplus and good interconnection capacities, the country still exports electricity to most of its neighbouring countries. Electricity production is based for a large part on domestic lignite reserves and for the rest on hydropower, placing the country among those with high share of utilization of renewable energy sources. Unfortunately, there are no reliable data on energy consumption in Bosnia and Herzegovina; however, overall energy intensity of the country is rather low.

Bulgaria

Bulgaria has experienced strong economic growth since the mid-1990s; successive governments have demonstrated commitment to economic reforms and responsible fiscal planning, mainly with the objective of accession to the European Union, which has been achieved in 2007. However, despite the strong economic growth and significant amounts of foreign direct investments, Bulgaria's per capita income was only 37 per cent of the EU-27 average in 2007.

Bulgaria shows a moderate energy import dependency and has an overall balanced fuel mix. However, the security of supply is highly dependent upon future political decisions regarding nuclear generation, since four out of six reactors of the Kozloduy nuclear power plant (the country's only nuclear power plant) have been decommissioned between 2003 and 2006 and the construction of a new nuclear power plant in Belene is still under discussion. Even in case of a positive decision, the original goal of commissioning the new plant by 2013 is no longer realistic and its operation will have to be postponed of at least two to three years.

Energy intensity of households is lower than in the project region and comparable with EU-27 average, while the energy intensity of the industrial sector is very high, showing the necessity of increased efforts in this sector.

Bulgaria has made good use of the EU accession process to restructure the energy sector and improve its legislative and policy framework promoting energy efficiency and renewable energy sources. This has been done mainly by the introduction of a coherent set of medium- to long-term strategies, specific legislation and concrete action plans. Particularly, the Energy Efficiency Act of 2004 has introduced tax exemptions on property tax for owners of buildings implementing energy efficiency standards (which were further developed at a later stage with the Energy Efficiency Act of 2008). This policy reform has also successfully fostered the development of professional capacity for energy audits and certification.

Croatia

Croatia has the highest GDP per capita in the project region, despite a rather modest growth of GDP in the recent years, compared to the other project countries. The Croatian economy is strongly driven by the tourism sector, thus giving the opportunity to the country to establish a successful example of environmentally sustainable tourism.

Even though Croatia has its own gas and oil resources, namely substantial production of natural gas, the dependency on imports of primary energy sources is high. Nearly half of the electricity production in Croatia is based on hydropower; at the same time, the Croatian wind power sector is growing strongly, with more than 300 wind power projects announced. The 2009 Croatian National Energy Strategy plans to implement 1,800 MW of installed electricity production capacity until 2020, based on renewable energy sources.

Croatia has adopted solid and broad energy policies with a medium-term vision of a sustainable energy system. One example of a successful policy reform is the introduction of the Physical Planning and Building Act in 2007. This law introduces mandatory energy certification for buildings and therefore will allow the improvement of existing and future building stock, while at the same time stimulating the market for energy efficiency projects and fostering the creation of new professional skills.

Kazakhstan

The economy of Kazakhstan is heavily concentrated on few commodities, such as oil and natural gas, and faces the challenge of diversification. Oil extraction and oil-related construction, transport and processing make up more than 16 per cent of the country's GDP. With booming energy prices, Kazakhstan enjoyed a strong GDP growth since 2000, averaging over nine per cent between 1999 and 2007, placing the country second only to Belarus in the project region in terms of economic growth.

Kazakhstan is the second largest producer (after Russian Federation) of oil and coal among the countries of the Commonwealth of Independent States (CIS) and has considerable reserves of coal, oil and natural gas. The country has the highest primary energy surplus in the project region (110 per cent). However, despite its vast energy resources, Kazakhstan imports significant amounts of gas and oil from neighbouring Uzbekistan, which indicates the need for modernization of its energy infrastructure that was built up within the Fuel-and-Energy complex of the former Soviet Union. 70 per cent of the total electricity generation in the country comes from thermal power plants that use coal, mainly concentrated in the two sites of Ekibastuz and Aksu. Renewable energy sources currently only play a negligible role in the overall energy balance of Kazakhstan, despite the vast potential available in the country. As in other countries with high availability of primary energy sources, Kazakhstan has high energy intensity; notably the energy intensity of the household sector has increased by 90 per cent since 1997, pointing out the need for action in this sector.

Successful policy reforms have been carried out in Kazakhstan in the 1990s, such as the reorganization of the electricity sector, which involved a restructuring and privatization programme that separated the liberalized sectors (production and consumption of electricity) from the natural monopolies (transmission and distribution). These policy reforms allowed Kazakhstan to create a competitive market environment in the electricity sector and to open the country to foreign investors. More recently, the Law on support of the renewable energy sources use was adopted by the Parliament of Kazakhstan in June 2009, introducing a feed-in tariff system for electricity generated from renewable energy sources.

Republic of Moldova

The Republic of Moldova is the country with the lowest GDP per capita in the project region. However, as a result of reforms carried out in recent years, there have been a number of positive developments and annual GDP growth averaged nearly six per cent between 2000 and 2007. Agriculture plays a very strong role in the economy, with its share of 11 per cent of GDP. The industrial sector, which has only a modest, in comparison with other countries, GDP share of 15 per cent, is mostly focused on agricultural production and food processing.

The Republic of Moldova has no domestic reserves of coal or natural gas and low hydropower potential. This has led to a very high dependence on energy imports (97 per cent); electricity generation is based nearly entirely on gas and the only large power plant is located in the Transnistrian region, on the left side of the river Dniester, which has an uncertain administrative status. Despite the high energy dependence on energy imports and the low supply of primary energy per capita (among the lowest in the project region), the Republic of Moldova has comparatively high energy intensity. Regarding renewable energy sources, the share of hydropower in the electricity generation is low (2 per cent); on the other hand, there is a significant use of biomass for heat generation and the potential for increased use of biomass and biogas is considerable.

In recent years, several policy reforms in the energy sector have been undertaken, particularly unbundling and privatization of the electricity market, which has led to the opening of the country to foreign investors, to a significant decrease of energy losses and to the introduction of cost-covering energy tariffs. Furthermore, the Energy Strategy of the Republic of Moldova until 2020 foresees the ambitious target of increasing the share of renewable energy sources in the country's energy balance to six per cent in 2010 and to 20 per cent in 2020. The Republic of Moldova is one of the few project countries that has introduced feed-in tariff for biofuels. It is actively participating in the Kyoto Protocol mechanisms, with several Clean Development Mechanism (CDM) projects under development.

Romania

Romania's macroeconomic gains have only recently started to encourage creation of a middle class and address Romania's widespread poverty. Romania's strong GDP growth is highly dependent on exports. Lack of political reforms, such as those that have been undertaken by neighbouring Bulgaria, has left the country highly vulnerable to the global downturn in financial markets and trade that started in late 2008; subsequently, the recovery from the present financial crisis is expected to be slower compared to other Eastern European countries.

Romania has the largest oil and gas reserves in Central Europe, leading to a rather modest dependency on energy exports. Overall energy supply is well diversified, using the complete range of fuels; nonetheless, the majority of energy supply is still based on fossil fuels and the country depends entirely on the Russian Federation for its natural gas supply. Primary energy intensity of Romania is only moderately above the EU-27 average and is 35 per cent lower than the average of the project region. Three ESCO companies are currently active in Romania. Hydropower accounts for one third of the total electricity generation in Romania, while combustible renewable and waste account for around eight per cent of the total Romanian primary energy supply, most of them being used directly by households for heating purposes. Renewable energy sources have an significant untapped potential, which can be used at both local and national levels.

Similarly to Bulgaria, Romania has made good use of the accession process to the European Union and has implemented several policy reforms in the energy sector. In particular, the Law on Energy Efficiency states that all new buildings and all public buildings (both new and existing) must be audited and must have energy performance certificate. Furthermore, Romania has introduced in 2008 a programme for replacing and supplementing traditional heating systems with solar and geothermal power systems. Finally, Romania has introduced a system of green certificates for electricity from renewable energy sources and has feed-in tariff in place; investors can also receive additional incentives such as tax exemptions.

Russian Federation

The Russian Federation is by far the largest country in the project region and spreads over a vast diversity of climatic, geographic and economic regions; also the administrative structure is complex, since the Federation is composed of 83 federal subjects subdivided into republics, oblasts (provinces), krays (territories), autonomous oblasts, autonomous districts and federal cities. While these subjects have the same federal rights, in the sense that they have equal political representation, they differ greatly in their size, administrative structure as well as political and economic organization. The Russian Federation has, along with Croatia, the highest GDP per capita in the project region – even if this average value hides major differences between the country's regions. Although the Government has laid out plans to diversify the economy, the country's economy is still heavily dependent on oil and natural gas exports.

The Russian Federation possesses the world's largest natural gas reserves, the second largest coal reserves and the eighth largest crude oil reserves; overall, the Russian Fuel-and-Energy complex represents over one third of the country's GDP. The Russian power system includes 440 thermal power plants and 31 nuclear reactors; however, the grid infrastructure faces the challenge of the vast size of the country: e.g. the power generation facilities located in the Far East are not connected to the power grid of the rest of the country. The share of renewable energy sources in the Russian Federation is rather low (3 per cent); most of it is produced by large hydropower plants, with total installed capacity of 45 GW, while the remaining part comes from combustible renewables. Given the vast country size and the huge variety of climatic conditions, the country has a huge potential for renewable energy sources, which is largely untapped. The Russian Federation has one of the highest energy intensity levels in the project region. Climate conditions and a high share of energy-intensive industries in the Russian economy are major reasons for this; among other reasons are inefficient and obsolete equipment, insufficient consumption metering and extensive gas flaring.

Significant policy reforms have been implemented in the Russian Federation, especially in the area of energy efficiency. Of the 83 federal subjects of the Russian Federation, 43 have adopted regional laws on energy efficiency and there are three large energy efficiency regional programmes in place; these specific regional policies take into account climatic, geographic and economic diversity between the regions. Another significant step further in the development of energy efficiency policy was taken in late 2009 with the approval of the Law on Energy Saving and on Increasing Energy Efficiency and on Introduction of Changes in Selected Legislative Acts of the Russian Federation, which replaced the Law on Energy Efficiency of 1996 and provides an extensive and groundbreaking regulatory framework for all further policy developments in the area of energy efficiency, thus giving the Russian Federation an opportunity to undertake concrete activities in support of energy efficiency and to set an example of innovative and comprehensive regulatory framework for energy efficiency for other countries in the region and in the Commonwealth of Independent States.

Serbia

Serbia is the legal successor of the former State Union of Serbia and Montenegro, which were the two last republics within the Federal Republic of Yugoslavia. The five districts of Kosovo are governed under the provision of the UN Security Council Resolution 1244. After the transition from the Federal Republic of Yugoslavian, Serbia has made progress in trade liberalization, enterprise restructuring and privatization, as well as the development of small- and medium- size private companies. From 2004 to 2008, the annual GDP growth varied between six and eight per cent.

Similarly to neighbouring Bosnia and Herzegovina, Serbia possesses significant coal reserves, which are the main fuel for electricity generation in the country. One third of electricity is generated by large hydropower plants, placing Serbia in the group of countries with the highest share of renewable energy sources in the project region. However, Serbia has also one of the highest energy intensities in the project region, as along with Russian Federation and Kazakhstan. Three industries, namely iron and steel metallurgy, basic chemical products and construction materials consume roughly half of the total energy supply of the industrial sector, although their share of GDP is below 15 per cent.

Serbia has the framework Law on Energy, which was adopted in 2004 and regulates main aspects of the energy sector. Serbia has developed the Energy Sector Development Strategy until 2015, with the objective of technological modernization of the existing energy infrastructure and adopted a corresponding Implementation Programme for the period 2007-2012. More progress is needed in the sector of energy efficiency, where there is currently no dedicated law in place, and in the sector of renewable energy sources, where legislation is mainly provided by decrees rather than through a comprehensive legal framework. Serbia has recently introduced feed-in tariff, which has been developed in compliance with the obligations under the Energy Community Treaty.

The former Yugoslav Republic of Macedonia

The former Yugoslav Republic of Macedonia is the smallest country in the project region. Since the independence from the Federal Republic of Yugoslavia, the country has come a long way in its transition to a market economy, even though the reform efforts have been frequently interrupted by political instability within the country and spreading over from neighbouring countries. Agriculture plays a strong role in the country economy, with a 12 per cent share of GDP.

The former Yugoslav Republic of Macedonia has significant coal reserves, but imports large quantities of crude oil and electricity. Nearly three quarters of the national electricity production is based on domestic coal, while large hydropower plants account for 24 per cent of the electricity production. The technological status of the thermal and hydro power plants can be regarded as obsolete and the largest plants are going to be modernized with financial support from international institutions. Additionally, the new energy strategy of the former Yugoslav Republic of Macedonia envisages three new coal power plants with a total capacity of 900 MW, two large gas power plants with a total capacity of 600 MW and 800 MW additional capacity from large hydropower plants by 2030. The country has moderate energy intensity and a high share of renewable energy sources, which explains the choice of an energy strategy based largely on conventional fuels and to a lesser extent on large hydropower.

Following the provisions of the Energy Community Treaty and with the objective of harmonization with the EU legislation, the former Yugoslav Republic of Macedonia has undertaken several policy reforms in recent years. The restructuring, unbundling and privatization of the energy sector started in 2004. The liberalization of electricity prices, starting with customers connected to the high-voltage grid, led to a reduction of energy intensity in the industrial sector due to increased energy costs. While there is no dedicated law on renewable energy sources, some policy reforms has been undertaken in the area of energy efficiency. Since 2002, municipalities enjoy more budget autonomy and can implement energy efficiency and renewable energy projects; furthermore, they have an obligation to develop and implement five-year local energy efficiency programmes and action plans. In 2010, energy audits will become mandatory for new large buildings.

Ukraine

Despite significant economic progress and an average annual GDP growth above seven per cent between 2000 and 2007, Ukraine is still among the countries with the lowest GDP per capita in the project region. The national economy is largely based on heavy industries such as coal, metallurgy and machineries. The main export product of the country is steel, making the national economy highly vulnerable to external shocks, such as sharp decrease of steel prices in the international commodity markets.

Despite having significant resources of coal and natural gas, Ukraine is a net importer of primary energy sources; in particular, natural gas is the main primary energy source in the country, thus making the country dependent on gas supplies from the Russian Federation. In order to reduce this dependence, Ukraine plans to increase the share of coal in the primary energy supply by 150 per cent until 2030. Nearly half of the electricity generation comes from the 15 operational nuclear power reactors in the country. Hydropower accounts for only seven per cent of total electricity generation; in fact Ukraine has the lowest share of renewable energy sources within the project region (1.2 per cent of primary energy supply), despite the availability of a large untapped potential for biomass, wind and solar energy. Although energy intensity decreased by 45% since 1997, it is among the highest in the project region. Among the main reasons for this are: slow restructuring and modernization of energy-intensive industries, low efficiency of power generation and losses from district heating grid, low tariffs in the heat and power sector and cross-subsidization of households by industrial customers.

Ukraine has a complex legal framework for the energy sector, which includes several laws supplemented by a number of government resolutions, presidential decrees, by-laws, regulations, norms, standards and methodological guidelines. A draft Law on Efficient Use of Fuel and Energy Resources developed in April 2009 is expected to replace the Law on Energy Saving of 1994 after it is adopted. An example of a successful policy reform in Ukraine is provided by the 2008 Law on Amendments to Some Ukrainian Laws on Green Tariff Establishment, which introduces new feed-in tariff for renewable energy power plants established after 1 January 2009 and modifies the Land Code in order to grant preferential land purchase prices for renewable energy power plants. The latter measure is expected to promote a market for renewable energy projects and to kick-start the establishment of independent power producers in the renewable energy sector.

Barriers to Investments in Energy Efficiency and Renewable Energy Projects in the Project Region

One of the main goals of the Regional Analysis is the identification of barriers to investments in energy efficiency and renewable energy projects in the project region, in order to develop recommendations for policymakers on how to overcome them. The identified barriers are classified in three groups:

- Legal, institutional and administrative barriers;
- Economic and financial barriers;
- Lack of awareness, human capacities and professional skills.

Legal, Institutional and Administrative Barriers

Legal, institutional and administrative barriers can be manifold and very difficult to address because of the different administration and policymaking levels involved. The most frequently encountered barriers of this kind in the project region are:

- Complexity and lack of transparent structure of the regulatory framework;
- Regulatory instability and discontinuity, caused either by political instability in the country and/or frequent and uncoordinated updates and revisions of the current policy framework;
- Lack of secondary legislation and operational instructions, tools, standards and procedures necessary to implement primary legislation or strategic programmes;
- Excessive bureaucratic obstacles, non-transparent administrative procedures and complex and cumbersome authorization procedures for new projects;
- Absence of dedicated public procurement guidelines for acquisition of energy-efficient equipment and requests for provision of energy services to public entities;
- Inefficient or limited use of public tendering processes for energy efficiency and renewable energy projects;
- Lack of cooperation between different ministries and agencies involved in energy policy as well as between authorities at the national and at the local level;
- Unresolved property issues in multi-resident apartment buildings and significant fragmentation of land property, which significantly limit feasibility of energy efficiency investments in the housing sector and increase costs for the development of renewable energy projects.

Economic and Financial Barriers

Many economic barriers that hinder financing and implementation of attractive projects come from inefficiencies in the structure of the energy markets:

- State intervention in the price formation, artificially low tariffs for final customers and cross-subsidies between customer segments;
- Energy tariffs which do not fully cover costs and therefore limit the profitability of energy efficiency projects; furthermore these tariffs do not take into account the environmental costs of energy supply and do not offer incentives for a change of behaviour of the final consumers;
- Environmental and economic efficiency of energy efficiency and renewable energy projects is hindered by obsolete and insufficient infrastructure for transmission and distribution of energy (grid losses, lack of adequate grid connection, lack of metering), even when the business case for the project itself is attractive;
- Local utilities and distribution companies that are facing serious profitability problems regarding insufficient payment rates and/or unprofitable regulated customer tariffs do not have adequate financial means for infrastructure improvement and are therefore reluctant to support or push forward even promising energy efficiency projects;
- Public ownership of the energy companies, which creates a conflict of interest between the company profitability and the pursuit of political interests through socially popular pricing policies;
- Insufficient availability of public funds for financing of initiatives and programmes: premium tariffs for renewable energy sources are developed but often not operational and are frequently of limited extent (e.g. they apply only to certain technologies or have restrictive requirements). Energy efficiency funds, if they are operational, have limited resources; alternative incentive measures such as dedicated credit lines providing soft loans, tax exemptions or support schemes for third-party financing are often not in place;
- Small size of energy efficiency and renewable energy projects, resulting in relatively high evaluation and transaction costs per project;
- High interest rates applied by local banks to medium- and long-term loans and restrictive requirements for collaterals.

Lack of Awareness, Human Capacities and Professional Skills

These barriers comprise all stakeholders involved in identification, development, financing and implementation of energy efficiency and renewable energy projects and require extensive work of awareness-raising and capacity-building to achieve tangible results:

- Insufficient political commitment to implement the necessary policy reforms;
- Lack of qualified human resources and insufficient professional expertise among local authorities for implementation of identified projects;
- Lack of experience in financing energy efficiency and renewable energy projects and lack of awareness of possible economic benefits arising from energy efficiency and renewable energy projects among commercial banks;
- Lack of training and education possibilities for the formation of professionals with adequate skills for conducting energy audits, identification of attractive project opportunities, and preparation of bankable project proposals;
- Lack of awareness on the side of consumers, which are used to regard energy more like a public service than a valuable good and are very reluctant to change their consumption behaviour unless this implies a tangible improvement of their living standard;
- Limited or absent demand for the services of Energy Service Companies.

Barriers to Investments in Energy Efficiency and Renewable Energy Projects in the Project Countries

Albania

Albania has undertaken several policy reforms, mainly in compliance with its status of a candidate country to the European Union. However, there are no dedicated laws regarding energy efficiency and renewable energy sources and therefore the policy framework seems to be more declaratory than operational. Furthermore, the power infrastructure in Albania is in urgent need of rehabilitation. Without significant investments in the power transmission and distribution infrastructure potentially attractive projects in the power sector, such as wind power projects, are unlikely to be implemented.

From the economic point of view, the absence of public funding for projects and initiatives is an obstacle for the development of energy efficiency and renewable energy projects. The feed-in tariff for electricity produced from renewable energy sources applies only to hydropower and does not include other promising sources such as solar or wind energy.

Finally, a widespread habit of energy fraud and highly inefficient use of electricity for heating purposes indicate low awareness of the value of energy and natural resources among the population, public administration and policy makers.

Belarus

The main barriers for investments in energy efficiency and renewable energy investments in Belarus are the strong influence of the state in the economic sector, which hinders the development of a proper private sector (most Belarussian companies, which are not fully state-owned, still have partial and often significant share of state ownership). Furthermore, monetary savings achieved in an organization that receives state funding for its operations must be returned to the state budget and cannot be used for repayment of the investment (unless the investor is the state itself), therefore representing a barrier for the development of ESCO business models.

The other major regulatory and institutional barrier in Belarus is lack of a clear framework in the energy sector (such as a framework law for the electricity sector or framework regulation on renewable energy sources) as well as lack of transparent implementation plans for policy reforms.

Bosnia and Herzegovina

Bosnia and Herzegovina faces several institutional and administrative barriers which are related to the specific administrative structure of the country. In particular, development and implementation of energy policies are conducted in parallel at the entity level with little coordination between the entities.

From the economic and financial point of view, the availability of low-cost domestic power generation implies very low energy prices, which hinder the development of energy efficiency programmes. Furthermore, the comparatively low feed-in tariff for electricity from renewable energy sources is not sufficient to encourage substantial investments in the renewable energy projects.

Finally, absence of reliable energy statistics is an obstacle to the development of concrete action plans to reduce energy intensity.

Bulgaria

Despite strong commitment by the Bulgarian Government and significant progress in political reforms, some institutional and administrative barriers still persist. In particular, lack of penalties for companies failing to comply with the obligation to perform energy audits or implement improvement measures is an obstacle to the successful implementation of the energy efficiency policy. Frequent amendments of existing regulations cause uncertainty and confusion among potential investors and project developers.

Even though there are no significant economic and financial barriers in Bulgaria for energy efficiency and renewable energy, Bulgarian commercial financing institutions are reluctant to invest in this sector,. On the other hand, the strong commitment of the Bulgarian Government to energy efficiency improvements appears to be driven mainly by the EU accession and post-accession requirements, while at the municipal level increased awareness and human capacity among policy-makers are still necessary for tangible improvements.

Croatia

The administrative barriers for energy efficiency and renewable energy projects in Croatia are mainly identified in the complex authorization procedures for energy efficiency and even small renewable energy projects as well as lack of coordination between different governmental agencies involved in energy efficiency and renewable energy policies.

Another barrier specifically related to the development of wind projects, which could however have significant effects on the implementation of the overall renewable energy strategy, is limited capacity of the power transmission grid to accommodate new wind power generation. The current grid capacity for new wind power plants is estimated at a maximum of 360 MW, compared to the already expressed interest of 5,000 MW.

Finally, despite the availability of credit lines from the Croatian Government and from international financing institutions, the promotion of funds for energy efficiency and renewable energy projects among bank customers is virtually non-existing on the part of commercial banks. As a result, available financing mechanisms remain unused. This indicates the necessity of awareness raising and capacity building among local financing institutions.

Kazakhstan

Huge availability of fossil fuels and weak governmental commitment in the past have hindered the development of energy efficiency and renewable energy projects so far. This regulatory gap is particularly acute in the sector of energy efficiency, where the Law on Energy Savings of 1997 has never been enforced and where there are neither targets nor an action plan in place. Another barrier is represented by the uncertain status of Kazakhstan regarding the Kyoto Protocol ratified by the country in 2009, which has so far prevented the development of both CDM and JI projects.

From the economic and financial point of view, the greatest barrier to energy efficiency projects is lack of provisions for establishment of national or municipal funds or budgets. Energy efficiency incentives are envisaged by the draft Law on Energy Efficiency. However, there is concern that these incentives might not be introduced due to the current financial crisis. A project-based feed-in tariff for electricity produced from renewable energy sources has been developed and approved only recently. However, the new feed-in tariff is not transparent and may be applied differently to different project developers thus requiring further development.

Republic of Moldova

The main barrier for investments in energy efficiency and renewable energy projects in the Republic of Moldova is capital constraints. There are no national or municipal funds for development of energy efficiency projects, and high interest rates on bank loans hinder the formation of a market for private companies involved in development of energy projects.

From the institutional and administrative point of view, one of the barriers to the energy efficiency investments is the fact that so far development and implementation of all energy efficiency and renewable energy projects have been done by state institutions. Lack of public tendering process has hindered the formation of a competitive environment for private companies.

Romania

No major administrative barriers for development of energy efficiency and renewable energy projects have been identified in Romania. With the adaptation of the feed-in tariff and green certificate scheme, there are no major economic and financial barriers for the development of renewable energy projects.

However, at the municipal level the availability of co-financing on a non-guaranteed basis remains uncertain, as project preparation, utilization capacity and co-financing ability are generally weak. These issues are particularly apparent in small municipalities, which have not been able to secure financing from either international financing institutions or local banks.

The presence of dedicated energy agencies, several ESCOs and international energy utilities may indicate that there is no significant need for capacity building in the country. However, relatively low activity in energy efficiency and renewable energy projects outside existing support schemes from international financing institutions suggests lack of capacity to fully develop bankable project proposals.

Russian Federation

The new Law on Energy Saving and on Increasing Energy Efficiency approved in late 2009 addresses many of the barriers that have been identified so far, such as the outdated regulatory framework, the absence of dedicated agencies and the lack of economic tax incentives for the promotion of energy efficiency. However, in practice, it will still take some time after approval of the Law, before the barriers will be actually removed. In particular, establishment of a network of agencies at the national, regional and local levels will take some time, given the huge size of the country and the current diversity in the progress of policy reforms in this area. Also the widespread installation of metering devices and the establishment of databases with consumption data for public and residential buildings will take some time before tangible results can be seen.

From the economic and financial point of view, the Law on Energy Saving and on Increasing Energy Efficiency provides attractive incentives for energy efficiency projects. However, there is no mention of dedicated credit lines or establishment of a national fund to provide financing for the activities related to the implementation of the new regulatory framework. This may be clarified at a later stage through secondary legislation, which is expected to be approved by mid-2010.

From the point of view of capacity building and professional skills, the mandatory provisions on certifications and audits in the Law on Energy Saving and on Increasing Energy Efficiency will encourage the development of adequate professional skills. However, absence of operational credit lines among financial institutions suggests general lack of experience in the Russian banking sector regarding financing schemes for energy efficiency and renewable energy projects which needs to be addressed.

Serbia

The Serbian Government appears to have a strong commitment towards the development of energy efficiency and renewable energy sources, as indicated by the priorities in the National Energy Strategy and by a number of policy activities. However, dedicated laws supporting energy efficiency and renewable energy sources are still under development and therefore the timeframe necessary for final approval, entry into force and practical implementation must be taken into account before tangible benefits can be evaluated. Furthermore, there is lack of secondary legislation, such as building and labeling standards, obligations to perform energy audits and a legal framework for ESCO companies.

From the economic point of view, the primary barrier to successful project implementation is absence of economic incentives in the area of energy efficiency, as well as the fact that the feed-in tariff for electricity from renewable energy sources is developed but not yet operational.

Lack of qualified human resources appears to be a major barrier throughout the entire public administration. In the private sector, technical skills are available, but there is lack of experience in the preparation of bankable projects to be submitted to funding institutions.

The former Yugoslav Republic of Macedonia

The Government of the former Yugoslav Republic of Macedonia makes significant efforts to develop policies to support energy efficiency and renewable energy sources, with the objective of full compliance with EU regulations. However, much of the dedicated regulatory framework, including secondary legislation and operational procedures is still under development.

Similarly, from the economic point of view, the main barrier appears to be lack of clear economic incentives; the feed-in tariff is not yet operational. Furthermore, energy tariffs for regulated customers are extremely low and the market structure does not provide any prospects for full price liberalization until 2015.

However, the main barrier for investments in energy efficiency and renewable energy sources in the country is lack of professional skills, both in the public administration at the national and municipal levels, and in the business sector as well as among banks and other national financial institutions.

Ukraine

The main legal and institutional barriers encountered in Ukraine are complexity and fragmentation of the regulatory framework on the energy sector in general and on energy efficiency and renewable energy sources in particular. The Energy Strategy until 2030, as the main policy instrument in the energy sector, envisages the need to reduce dependency on fuel imports. However, this is expected to be achieved mostly by substitution of imported natural gas with domestic coal and additional nuclear capacity.

Economic and financial barriers that were identified are lack of transparency in distribution of state funds for energy conservation and energy saving measures, difficulties with access to credit resources, since banks are reluctant to provide loans for investments with a payback period of over one year, and the current difficult economic situation in the country. The heat tariffs applied by the municipalities do not fully cover the costs, thus hindering highly necessary investments in the renovation and upgrade of the infrastructure.

Case Studies

The Regional Analysis includes 12 Case Studies, which are meant to serve as examples of success stories to overcome bottlenecks and barriers for investments. Their purpose is to allow cross-country comparison and to motivate policymakers to replicate the success stories in their countries, through adjustment to local conditions. The Case Studies are listed and described in Table E.1.

Table E.1: *Overview of Case Studies*

No.	Case Study	Topic	Country (Origin)	Removed Barriers	Countries for which Case Study is recommended
1	Energy Efficiency Demonstration Zone	Capacity building on municipal energy efficiency planning and specialized training for local energy decision makers and municipality management	Bulgaria	The Case Study refers to municipalities and their functions with respect to energy planning and management. Its objectives are to provide municipalities with the required competencies in energy efficiency related projects. This is achieved through a variety of activities - specialized studies, dissemination of general and specific information about efficient use of energy resources, training of local decision makers and experts on energy planning and management. The Case Study contributes in removing financial barriers (poor investments) and strengthening financial capabilities for municipalities to undertake energy efficiency projects while missing competencies and know-how.	Kazakhstan, Serbia, the former Yugoslav Republic of Macedonia and Ukraine
2	Water Efficiency – Tariff Reform Programme	Tariff issues	Russian Federation	The Case Study refers to the implementation of a tariff reform aiming at rehabilitating water infrastructures of the City of Cherepovets. The Case Study contributes in removing financial barriers from utilities facing a decrease of water end customer's tariffs and therefore lack of financial resources to realize investments regarding water-efficiency projects.	Bulgaria and Ukraine
3	TSKB - Environmental Impact Assessment of Projects	Establishment of standards within the banks, imposing an environmental and energy screening of all projects prior to financing	Turkey	The Case Study refers to the setting-up of standards procedures aiming at screening each project on a financial, technical and environmental point of view. The concerned Turkish bank has been the first one having been certified ISO 140001. The Case Study contributes in removing barriers related to the provision of medium- and long-term loans for projects not achieving targeted objectives in terms of social, financial and environmental benefits. Through screening procedures, projects are prioritized and only co-financed when answering bank requirements.	Albania, Bosnia and Herzegovina and Republic of Moldova
4	Incentives for Foreign Investments	Support to foreign investments	Bosnia and Herze-govina	The Case Study refers to the establishment and approval of a set of incentives aiming at supporting and attracting foreign investors. The Case Study contributes to removing legal and administrative barriers of doing business in the country.	Kazakhstan and Republic of Moldova
5	Sustainable Energy Financing Facilities - Dedicated Loan Facilities to Local Banks Undertaking Energy Efficiency Projects	Design of dedicated credit lines	Bulgaria	The Case Study refers to the establishment of dedicated loan facilities to local banks for on-lending to clients (residential and industrial credit lines) undertaking energy efficiency and renewable energy projects. The Case Study contributes to removing financial barriers in particular related to the lack of loans from local commercial banks to companies in industrial and residential sectors willing to undertake energy efficiency and renewable energy projects.	Albania, Republic of Moldova and the former Yugoslav Republic of Macedonia

6	Enhancement of Awareness-Raising through the Development of a Network of Certified Energy Auditors	Awareness-raising	Slovenia	The Case Study refers to the establishment of an Energy Auditing Programme implemented by an association of certified energy auditors with the objective to enhance the penetration of energy auditing procedures through transfer of know-how and experience in energy auditing. The Case Study contributes to removing such barriers as lack of awareness, know-how and experience on the part of decision makers, municipalities, property owners related to energy efficient building technologies and lack of market for energy auditing services.	Albania and the former Yugoslav Republic of Macedonia
7	Greening Facility - State Environmental Fund	Financing a Public Fund	Czech Republic	The Case Study refers to the financing of a public fund through the sale of CO2 emission certificates. The Case Study contributes to removing financial barriers and strengthening financial capabilities of national governments by raising additional money for a public fund supporting energy efficiency and renewable energy measures.	Bulgaria, Romania, Ukraine and Russian Federation
8	Market Transfor-mation on Solar Water Heating	Awareness-raising, labeling, capacity building and financial support	Albania	The Case Study refers to the establishment of a programme to build up a market for solar water heating. The Case Study contributes to removing barriers related to lack of awareness and capacities as well as financial barriers by raising awareness of the target audience and providing information, strategic advice, technical training and financial support.	Belarus, Bosnia and Herzegovina, Kazakhstan, Republic of Moldova, Serbia and the former Yugoslav Republic of Macedonia
9	Establishment of ESCO	Energy Performance Contracting/ ESCO services	Croatia	The Case Study refers to a successful establishment of an Energy Service Company (ESCO) engaged in financing energy efficiency projects on a commercial basis. The Case Study contributes to removing financial barriers as well as barriers related to lack of technical capacities by establishing an ESCO, which prepares finances and implements energy efficiency projects on a commercial basis.	Albania, Belarus, Bosnia and Herzegovina, Republic of Moldova and Serbia
10	Ukraine Energy Efficiency Programme	Third-party financing, capacity building	Ukraine	The Case Study refers to the establishment of a financing facility permitting private sector companies to reduce their energy intensity and operating costs. The Case Study contributes to removing financial barriers and strengthening financial capabilities of industrial companies to develop bankable energy efficiency and renewable energy projects.	Albania, Bosnia and Herzegovina and the former Yugoslav Republic of Macedonia
11	Municipal Finance Facility	Third-party financing including technical capacity building	Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic and Slovenia	The Case Study refers to the successful implementation of a finance facility stimulating commercial bank lending to small- and medium-sized municipalities and their utility companies. The Case Study contributes to removing barriers to commercial third-party financing and risk-sharing as well as lack of capacity for the development of bankable projects, specifically for municipalities.	Kazakhstan, Republic of Moldova and Romania
12	Forest Resources and Technology Project (FOREST)	Awareness-raising and capacity building	Russian Federation	The Case Study refers to the successful implementation of a wood energy programme. The Case Study contributes to exploring and promoting the use of wood and wood waste as a source for production of electricity and heat power to be used in wood processing facilities and municipal communities.	Albania, Romania and the former Yugoslav Republic of Macedonia

Recommendations for Policy Reforms at the Regional Level

The ultimate objective of the Regional Analysis is the development of a set of recommendations for policy reforms addressed to the attention of national and local policymakers in order to overcome the identified barriers to investments in energy efficiency and renewable energy sources. These recommendations have been developed based on the detailed analysis of the country-specific progress in implementation of policy reforms and market formation and subsequently identified barriers that still need to be overcome, as well as on the results of implementation of the analysed Case Studies in project countries and in neighbouring countries with similar framework conditions. The Case Studies provide examples of successful implementation, thus indicating ways and means for replication of these success stories in other project countries that face similar barriers. Country-specific recommendations are developed for each project country. However, the following more general recommendations are applicable to all or many project countries:

- **Development of policy frameworks.** Countries of the project region should develop sound strategies, action plans and implementation programmes, which constitute the policy framework that identifies the measures that can cost-effectively yield energy savings and increase renewable energy generation in the short-term, assigns the responsible institutions in charge of developing, implementing and monitoring the policies and programmes and indicates the financial resources for these activities;

- **Monitoring of policy implementation.** Countries of the project region should establish regular and institutionalized monitoring of policy implementation. This should involve communicating policy requirements to all concerned parties, ensuring that targets of positive support for policy changes are identified, clearly stating the need for and the nature of required changes as well as sources of potential resistance to these changes and ways to overcome it;

- **Transparent procedures for tendering, authorizations, grid connections.** Standard Bidding Documents provide a guide to transparency in procurement opportunities and in contract evaluation and award procedures, while authorization procedures require clear guidelines and the definition of an obligatory response period for the institutions involved. Master Plans for the Transmission grid should identify and evaluate the needs for an upgrade and expansion of the transmission capacity, while grid connection and accounting rules for grid costs should be formulated in appropriate legislation and regulations;

- **Spatial planning for renewable energy projects.** Adjustments to existing legal frameworks that take into consideration specific needs of new renewable energy initiatives can be time consuming and can delay implementation of such initiatives. National and local authorities can stimulate development of renewable energy projects by allocating areas suitable for their implementation in the framework of spatial planning;

- **Metering and consumption-based billing.** As a first step, installation of individual meters in new buildings and buildings undergoing major renovations should be mandatory where this has not been applied yet. As a second step, an action plan for a nationwide rollout of individual metering systems should be developed, evaluating different options, which are technically possible, financially reasonable, and proportionate in relation to the potential energy savings, and indicating overall and intermediate targets.

- **Establishment or strengthening of institutional structures.** Dedicated institutions responsible for implementation of the energy efficiency and renewable energy policies should be established or strengthened. Such institutions may include national agencies for renewable energy and energy efficiency, regional networks of energy agencies under the umbrella of a national energy agency, and municipal energy agencies. These institutions should ensure the availability of reliable statistical information essential for understanding the current situation and monitoring the effectiveness of policies;

- **Energy tariff reforms.** The countries should conduct a tariff reform, which should not simply mean higher tariffs for energy services but should primarily encourage energy efficiency measures and use of renewable energy sources. Tariff levels and tariff structure (also by the type of consumer) should reflect fully the costs of provision of energy services, including operation and maintenance costs and capital investments to improve services. The tariffs should internalize environmental costs in the energy prices;

- **Provision of financial incentives for energy efficiency and renewable energy sources.** The most comprehensive legislation cannot guarantee that energy efficiency and renewable energy measures are implemented without provisions in place that encourage and support investments. Financial incentives (e.g. capital grants, third-party finance, investment tax credits, property tax exemptions, production tax credits, sales tax rebates, excise tax exemptions etc.) focused on cost reductions and improving the relative competitiveness of sustainable energy technologies in given markets should be put in place;
- **Advanced feed-in tariffs.** Advanced feed-in tariff schemes should be introduced to ensure the least cost approach while considering future technology development, changes in market competition and optimum resource utilization;
- **Increasing public awareness and dissemination of information.** The national governments with participation of local and regional authorities should develop information and awareness raising programmes in order to inform citizens of the benefits and practicalities of energy efficiency measures and use of renewable energy sources;
- **Capacity building.** Capacity building programmes should be developed and implemented to better inform decision makers of the ways to improve energy efficiency and to achieve renewable energy objectives. Such programmes (appropriately customized for the specific audience) should provide information and training to government officials, investors, banks and project developers on the state-of-the art technologies, successful institutional models, innovative financing mechanisms, as well as methodologies and tools for practical identification and preparation of bankable projects.

Recommendations for Policy Reforms for the Project Countries

Albania

The development of a comprehensive renewable energy action plan is strongly recommended for the constant and sustainable growth of energy supply in Albania: this implies setting national targets for renewable energy sources, adaptation of the feed-in tariff and development of an action plan to encourage sustainable use of natural resources.

Development and implementation of the National Energy Efficiency Programme requires development of concrete actions, assignment of responsible institutions for monitoring the implementation progress and provision of financial incentives for industrial, services and residential sectors.

Information campaigns, and awareness raising and training programmes are recommended in order to inform citizens and companies of the benefits of energy efficiency and use of renewable energy and to provide practical guidelines. Capacity building for local financing institutions is recommended in order to facilitate financing of energy efficiency and renewable energy projects.

Belarus

Belarus has developed a number of strategic programmes to modernize the energy sector, improve energy efficiency and increase the use of renewable energy sources. Implementation of a transparent monitoring system for effective policy implementation is recommended.

In order to allow state-funded organizations to reap the benefits of energy efficiency and renewable energy investments, the Ministry of Finance should ensure that these organizations are allowed to enter into multiyear contracts and enable flexible budgeting principles. Introduction of transparent public procurement and tendering guidelines would encourage development of private investments, particularly in the sector of energy efficiency.

Bosnia and Herzegovina

The main recommendations for Bosnia and Herzegovina concerns the development and implementation of measures to exchange information between the two entities and to develop common energy policies, such as the establishment of a Communication Council (with representatives of both entities), specifically dedicated to energy matters, and the development and implementation of a national energy strategy based on the relevant energy policy frameworks of the entities.

A tariff reform for heat and electricity should reflect the internalization of environmental costs in the energy prices (especially concerning electricity and heat produced from low-quality lignite) as well as adaptation of the existing feed-in tariff for electricity produced from renewable energy sources.

Bulgaria

Bulgaria has adopted extensive policy framework to promote energy efficiency and use of renewable energy sources. The challenge for policy-makers is to ensure the efficient implementation of policy measures and coherence of various sectoral instruments. Therefore, the establishment of a system, which will ensure monitoring, clarification and further development of the existing energy policies, is recommended.

In order to overcome the degradation of the district heating systems in Bulgaria, development and implementation of a least-cost investment plan for the rehabilitation of district heating is recommended. In order to increase the number of commercial banks participating in financing energy efficiency projects, experts from the Bulgarian Energy Efficiency Fund (which has proven to be a successful financing instrument) should provide assistance and support for awareness raising and capacity building among local banks.

Croatia

Policy development to promote energy efficiency and use of renewable energy sources is well advanced in Croatia. However, monitoring of effective implementation of the policies and simplification of administrative procedures are recommended. In particular, establishment of a transparent one-stop authorization procedure for energy efficiency and small renewable energy projects would be a welcome step and could provide as well as by many countries in the European Union.

Other recommendations include development of public procurement guidelines and a master plan for expansion of the transmission grid.

Implementation of advanced feed-in tariff schemes to support electricity produced from high-efficiency cogeneration plants and other measures to promote demand for heating and cooling from renewable energy sources is also recommended. At the same time, marketing efforts and capacity building directed towards local financing institutions are necessary to ensure that available financing mechanisms are promoted among bank customers.

Kazakhstan

Given the vast size economic diversity of the country, decentralization of regulation and administration from national to regional level with mandatory requirements for development and effective implementation of regional energy strategies based on national guidelines are recommended for Kazakhstan. In order to reinforce the implementation and monitoring of energy efficiency and renewable energy policies, it is recommended to establish a network of regional Energy Agencies under the supervision and coordination of a National Energy Agency.

Provision of financial incentives for energy efficiency in form of a dedicated fund such as the EU/EBRD Small Municipalities Finance Facility is recommended. The existing feed-in tariff for electricity from renewable energy sources should be further developed in order to ensure transparency and non-discrimination for potential investors.

In order to create a positive image for investments in sustainable energy, the Government should develop information campaigns and awareness raising and training programmes. A training and certification programme for energy auditors should be at the core of the capacity building programme.

Republic of Moldova

Given the economic constraints of the Republic of Moldova and the important role of the agricultural sector in the national economy, the establishment of a biomass energy programme is recommended to fully exploit the large biomass potential of the country and significantly increase the share of renewable energy sources at a relatively low cost. In order to support this biomass for energy programme, adaptation of the Land Code to overcome significant fragmentation of land ownership and dedicated spatial planning are recommended. In order to ensure transparency in public procurement and to foster a competitive environment for private business, transparent public procurement and tendering guidelines should be established.

From the economic point of view, in order to stimulate energy efficiency and renewable energy investments at the municipal level, a dedicated fund, such as the EU/EBRD Small Municipalities Finance Facility should be established by the Government, with support of international financing institutions.

In order to create a positive image for investments in sustainable energy, the Government should develop information campaigns for general public and awareness raising and training programmes for local policy makers, commercial banks and project developers.

Romania

Romania has the largest oil and gas reserves in Central Europe, but still is a net energy importer. The country needs to diversify its energy sources, including promotion of renewable energy use. In particular, to overcome barriers to more efficient use of wood as energy source and to increase sustainable use of existing forest resources, a wood energy programme should be developed and implemented.

In order to overcome the current situation with gas prices for customers that are below costs and to increase financial viability of energy efficiency projects, the Romanian Energy Regulatory Authority should proceed with full liberalization of the national gas market and establish a schedule for gas price increases to gradually reach cost recovery levels for tariffs.

The Government should improve dissemination of information about project financing schemes targeted to project developers, municipalities and local banks and their customers.

Russian Federation

The recent Law on Energy Saving and on Increasing Energy Efficiency and on Introduction of Changes in Selected Legislative Acts of the Russian Federation of late 2009 is likely to be the key to the efforts of the Russian Federation in increasing energy efficiency. Therefore, strong attention must be paid to the effective implementation of the new regulatory framework, especially regarding the availability of sufficient financial means to implement the provisions of the Law, and the development of a network of agencies at the national, regional and local level.

Further development of policies to support energy efficiency and renewable energy sources should concentrate on secure energy supply in the entire country, on the modernization of the infrastructure (particularly the power transmission and distribution grids, which play a key role in the development of renewable energy projects) and on the development and implementation of a comprehensive regulatory framework for renewable energy sources similar to the one developed for energy efficiency.

Serbia

Serbia should concentrate on the implementation of the national policy framework, which includes a market-based regulatory framework enforced by an independent regulator and support of energy efficiency and renewable energy sources. In parallel, the energy infrastructure must be further modernized, e.g. through a least-cost investment plan for district heating, through the complete rollout of heat metering and through establishment of a consumption statistical database.

Current district heating subsidies hamper energy efficiency in the district heating sector. Environmental costs associated with mainly coal-based electricity production are not taken into account and thus artificially decrease energy costs and hinders development of profitable energy efficiency projects. Therefore, a tariff reform for heat, adaptation of the feed-in tariff to include high-efficiency cogeneration and the provision of financial incentives for energy efficiency is recommended.

To overcome lack of awareness with regard to sustainable energy, the Government should develop information and awareness raising campaigns and implement training and capacity building programmes for energy auditors, local policy makers and local financing institutions.

The former Yugoslav Republic of Macedonia

Increased use of renewable energy sources and improved energy efficiency could significantly improve the security of supply and reduce energy import dependence of the former Yugoslav Republic of Macedonia. Therefore, an acceleration of the policy-making progress in this sector is recommended, with the adoption of dedicated laws and action plans, establishment of municipal energy agencies, implementation of transparent public tendering procedures and development of a programme for sustainable management of wood energy.

Implementation of feed-in tariff for electricity from renewable energy sources is recommended in order to encourage investments in this sector. Another recommendation is establishment of capacity-building and training programmes for project development and project financing in the areas of sustainable energy.

Ukraine

The energy policy of Ukraine is mainly driven by the desire to improve energy security and reduce natural gas imports. To ensure implementation of the strategic objectives, monitoring and promotion of implementation of already developed policies is recommended. Development of a National Energy Efficiency and Renewable Energy Action Plan with clear targets and implementation steps is also recommended. Targeted actions in the area of district heating are necessary, such as development of a least-cost investment plan for district heating, a heat tariff reform and introduction of incentives for heat from renewable energy sources.

Conclusions

The conducted analysis resulted in the development of a set of recommendations for policy reforms addressed to the policymakers in the project countries, in order to overcome the existing barriers to investments in energy efficiency and renewable energy projects. All recommendations provided meet the following criteria:

- They have potential to provide significant energy savings or generate significant amounts of renewable energy sources at a relatively low cost;
- They address existing market barriers and significant gaps in existing policy frameworks;
- They are broadly supported by international institutions and experts.

The recommendations present a cohesive set of measures and instruments, responding to the need of overcoming barriers to energy efficiency and renewable energy, which are pervasive, dispersed, and complex. The implementation of the full set of measures is highly recommended to achieve significant improvements in energy efficiency and use of renewable energy. At the same time, before an implementation programme can begin, it is essential to set priorities in the implementation of policy reforms. For this purpose, the governments should focus on three clusters of measures, each of which is necessary to achieve the full energy efficiency and renewable energy potential in the project region:

- **"Quick Wins"** will demonstrate some rapid results and increase political support. These measures can be introduced in less than a year and are likely to produce significant impact at moderate costs;
- **"Essentials"** are the backbone of a comprehensive energy efficiency and renewable energy policy, affecting the areas of greatest potential by raising standards and stimulating investments that are already financially viable;
- **"High Cost, High Return"** measures will remove fundamental barriers and will make more energy efficiency and renewable energy investments financially viable. These interventions carry a much higher initial cost to the economy but most of them have a high return in terms of energy savings and are crucial to ensure long lasting impact and sustainability.

Another essential step towards successful implementation of the policy reforms recommended is the allocation of clear responsibilities for implementation and monitoring to governmental institutions and agencies. Development of an action plan or a roadmap including a realistic estimate of the necessary timeframe and resources and provision of dedicated financial and other resources would be critical for this purpose.

Development and successful implementation of policy reforms to support energy efficiency and renewable energy is vital for the economies in the project countries in order to overcome the present dependency on energy imports (with the exception of the Russian Federation and Kazakhstan) and non-rational use of energy resources as well as to mitigate adverse climate change effects and should be therefore assigned a high priority in the political agenda of the national governments.

PART I: INTRODUCTION

Chapter 1: UNECE Project Financing Energy Efficiency Investments for Climate Change Mitigation

South-Eastern European, Eastern European and Central Asian countries are confronted with a wide range of economic and environmental problems caused by their inefficient and polluting energy systems. At the same time, their energy economies provide some of the most promising opportunities for reducing global greenhouse gas emissions. This will require the use of cost-effective energy efficiency improvements and renewable energy technologies – the main self-financing methods to implement climate change mitigation.

The investment potential for energy efficiency in these countries is so large that only the private sector can provide the capital needed to achieve meaningful results. This in turn will require a market for energy efficiency in which large investments can be made with low transaction costs at an acceptable risk-to-return ratio and within a reasonable period of time. At present, private investors do not often finance energy efficiency projects in these countries because dedicated sources of financing are lacking and local banks are generally unfamiliar with such investments. Another obstacle in financing energy efficiency projects is the absence of policy and institutional support for their implementation. The lack of knowledge and experience on how to select and formulate energy efficiency investment projects is often a challenge for local experts.

In order to address these obstacles, in January 2008 the UNECE began implementing the Financing Energy Efficiency for Climate Change Mitigation (FEEI) Project. The project is designed to assist countries from Eastern Europe, South-Eastern Europe and Central Asia to enhance their energy efficiency and reduce air pollution and greenhouse gas emissions in order to meet international obligations under the United Nations Framework Convention on Climate Change (UNFCCC) and UNECE environmental conventions. Twelve countries from Eastern Europe, South Eastern Europe and Central Asia are included in the scope of the activities: Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Kazakhstan, Republic of Moldova, Romania, the Russian Federation, Serbia, the former Yugoslav Republic of Macedonia and Ukraine. The goal of the FEEI Project on Financing Energy Efficiency Investments for Climate Change Mitigation is to promote market formation so that self-sustaining energy efficiency and renewable energy projects can be identified, developed, financed and implemented locally in participating countries.

Funding for the Project has been provided by the following supporting institutions:

- United Nations Foundation/UN Fund for International Partnerships (UNF/UNFIP)
- United Nations Environment Programme/Global Environment Facility (UNEP/GEF)
- Fonds Français pour l'Environnement Mondiale/Agence Français de Développement (FFEM/AFD)
- European Business Congress e.V. (EBC)

In-kind contributions for the Project are provided by the participating countries and by the UNECE secretariat.

The general objective of the Financing Energy Efficiency for Climate Change Mitigation project is to promote an investment climate in which self-sustaining energy efficiency and renewable energy projects can be identified, developed, financed and implemented by local teams in municipalities, factories and energy utilities.

In particular, the project has three objectives and related sets of activities:

Objective one: Identify and develop demand side and supply side energy efficiency and renewable energy projects to meet environmental, health and institutional reform priorities in the private and public sector and at the local level;

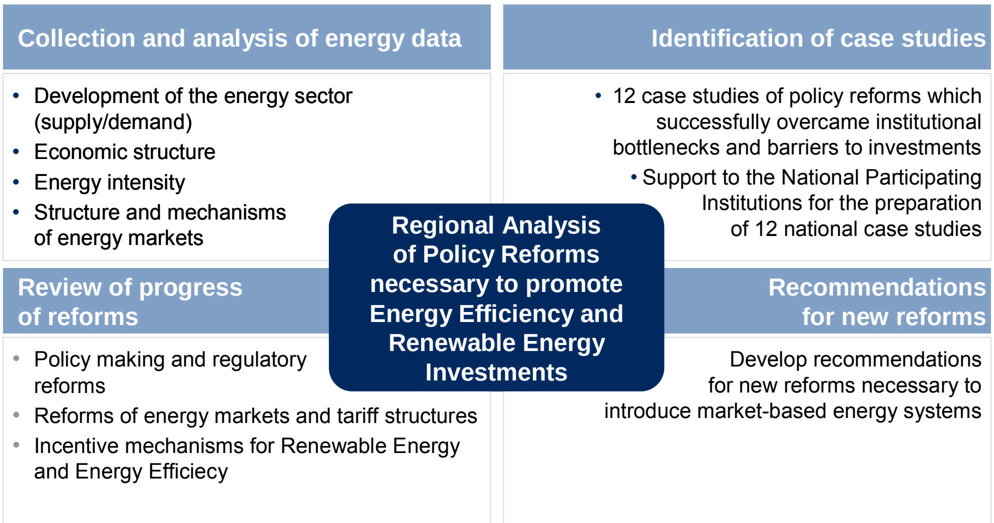
Objective two: Strengthen energy efficiency and renewable energy policies in the participating countries, assisting municipal authorities and national administrations to introduce the economic, institutional and regulatory reforms needed to support investments in energy efficiency and renewable energy projects;

Objective three: Promote opportunities for banks and commercial companies to invest in energy efficiency and renewable energy projects through the development of new public private partnership investment funds or financing mechanisms.

Chapter 2: Goals and Scope of the Regional Analysis

In the context of the second objective, the Regional Analysis is conceived as a wide-ranging regional assessment, including Case Studies, expert workshops and senior policy maker seminars. The goals of the Regional Analysis are depicted in Figure 2.1 below.

Figure 2.1: Goals of the Regional Analysis



In comparison with previous market reports and assessments referring to the investigated countries, the differentiation of the present Regional Analysis consists in its main focus on the provision of Case Studies showing potential benefits associated with policy reforms as well as the development of a set of recommendations for new reforms. Therefore the main contribution of the Regional Analysis to the overall progress of the Project on Financing Energy Efficiency Investments for Climate Change Mitigation is to highlight which regulatory measures and policy changes are necessary in order to create a favorable environment for the success of investment projects in the region.

The geographical scope of the Regional Analysis comprises twelve countries from Eastern Europe, South-Eastern Europe and Central Asia. Detail of the country scope is given in Figure 2.2 below.

- Albania
- Belarus
- Bosnia and Herzegovina
- Bulgaria
- Croatia
- Kazakhstan
- Republic of Moldova
- Romania
- Russian Federation
- Serbia
- The former Yugoslav Republic of Macedonia
- Ukraine

***Figure** 2.2:* *Geographic scope of the Regional Analysis*

Country Codes:

AL Albania
BY Belarus
BA Bosnia and Herzegovina
BG Bulgaria
HR Croatia
KZ Kazakhstan
MD Republic of Moldova
RO Romania
RU Russian Federation
RS Republic of Serbia
MK The former Yugoslav Republic of Macedonia
UA Ukraine

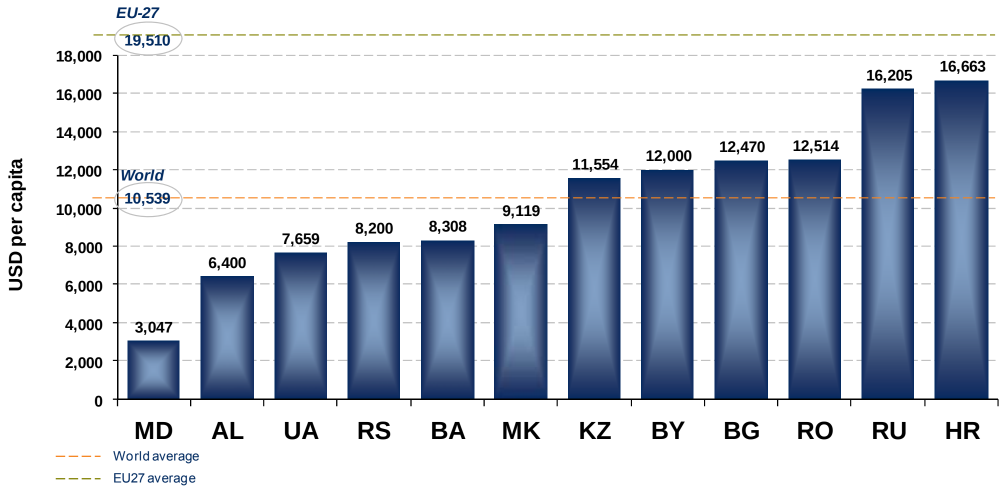
Chapter 3: Overview of the Project Region from the Point of View of Energy Efficiency and Renewable Energy Investments

3.1. *General Economic Development and Climate for Investments*

The twelve countries in the project region show broad differences in their economic development, as can be seen in Figures 3.1 and 3.2, which represents the GDP at Purchasing Power Parity of the countries in 2008.

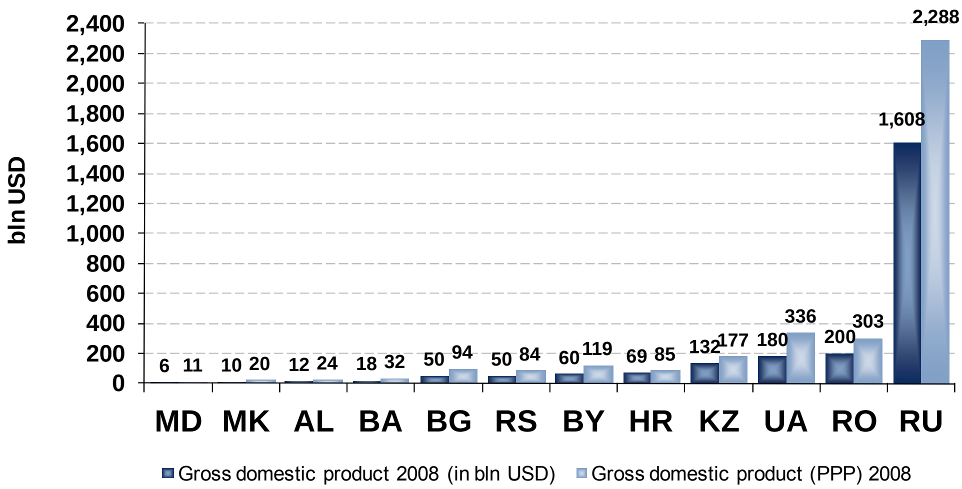
While half of the countries have a GDP which is above the world's average some countries, in particular the Republic of Moldova and Albania, are well below this threshold. Croatia and the Russian Federation are not far from reaching the EU-27 average value, whereas the two new EU members Bulgaria and Romania are still well below this threshold.

Figure 3.1: *Per capita Gross Domestic Product (at Purchasing Power Parity) of the project countries in 2008*



Source: Data provided by NPIs (2009); Illustration by Pöyry

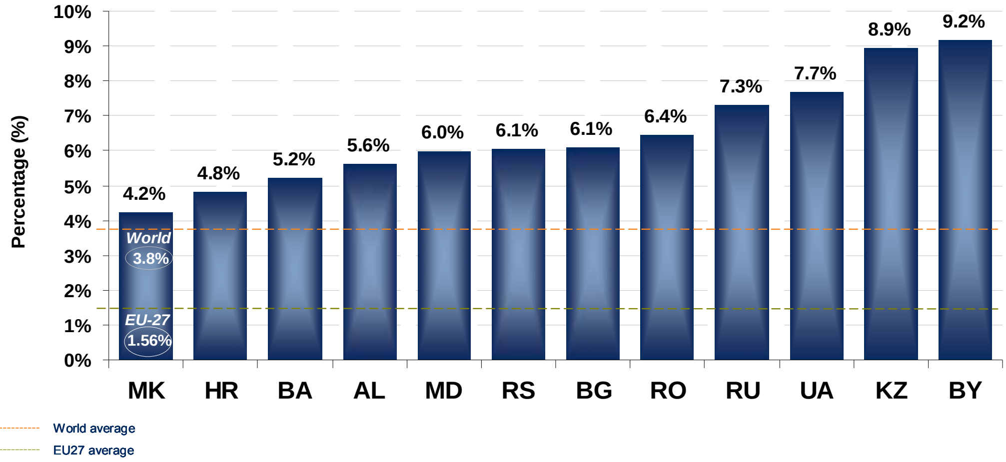
Figure 3.2: *Absolute GDP and GDP at PPP values 2008*



Source: World Bank[1] (2009); Illustration by Pöyry

Even more than the absolute value of the GDP of the project countries (see Figures 3.1 and 3.2), the growth of the GDP in the last five years is truly remarkable (see Figure 3.3). All project countries without exception are above the world average and significantly above the EU-27 average, with countries of the former Soviet Union leading the group.

Figure 3.3: *Average growth of the Gross Domestic Product of the project countries in the period 2003-2008*



Source: Data provided by NPIs (2009); Illustration by Pöyry

The figures shown above point out that all countries in the project region have gone a long way in their transition from centrally planned to market economies. After severe economic crises and downturns at the end of the 1990ies, all countries have experienced significant economic growth with real growth values of the GDP well above world average.

Nevertheless, the twelve countries in the project region have not been immune from the world financial crisis, which emerged from a property bubble and a credit boom. Although the countries from South-Eastern Europe have been able to withstand the economic crisis a bit longer than other countries, they have been hit hard in 2009. The implication of the crisis resulted in economic turbulence based on a lack of demand in the world markets for products and falling resources of finance. Investments, remittances, industrial production, and foreign exchange rates have all fallen. As a result, gross domestic growth has slowed down (see Figure 3.3)[2]. Expansionary fiscal policies on top of external trade deficits growing at record levels are the consequence[3]. More than one fifth of the economic output and employment in South-Eastern Europe is based on exports, making them particularly vulnerable to a fall in global growth and trade.[3]

Countries with flexible exchange rate mechanisms (floating rate) have so far better weathered the economic crisis than countries, which have fixed currency pegs, since latter where able to improve their competitive situation.[2]

The Russian Federation is currently experiencing a sharp recession. While in the first seven months of 2008 the gross domestic growth averaged eight per cent, the Russian Federation experienced in the same period for 2009 a contraction of 10.4 per cent. At the same time exports decreased by 50 per cent and the industrial output decreased by 14.2 per cent. Especially two factors contributed to the sharp decline of the GDP in the Russian Federation: declining commodity prices and a sharp capital drain. In order to stabilize the economy and increase domestic demand, the Russian Government is incurring huge budget deficits, which might lead to a significant reduction of the Russian Stabilization Fund and the National Wealth Fund by the end of 2010, which together accounted for USD 225 billion in 2007.[2]

None of the project region countries is expected to avert a recession in 2009, while the range of GDP contraction ranges between one per cent (Albania) and 11 per cent (Ukraine) (see Table 3.1)[2]. According to the Vienna Institute for International Economic Studies (WIIW), the economic recovery for the project region is expected for 2011[2].

Table 3.1: Economical forecast of the project region in per cent

Country	GDP growth			Inflation			Unemployment rate			Current-account balance		
	2008	2009	2010	2008	2009	2010	2008	2009	2010	2008	2009	2010
Albania[1)]	8.0	-1.0	1.0	3.4	2.0	2.0	12.8	15.0	16.0	-14.4	-14.5	-13.7
Belarus[2)]	10.0	-3.5	-2.0	14.8	12.5	8.0	n.a.	n.a.	n.a.	-9.4	-10.0	-4.5
Bosnia and Herzegovina[1)]	5.0	-3.0	-1.0	7.5	-0.5	0.0	23.4	27.0	28.0	-15.1	-9.0	-8.0
Bulgaria[1)]	6.0	-3.0	0.0	12.0	2.0	2.0	5.6	9.0	9.0	-25.3	-13.9	-12.2
Croatia[1)]	2.4	-4.0	0.5	6.1	3.0	2.5	8.4	10.5	11.0	-9.4	-6.0	-6.0
Kazakhstan[2)]	3.2	-0.8	1.0	17.0	7.5	6.4	6.6	7.5	6.9	5.2	-2.4	2.4
Romania[1)]	7.1	-6.0	0.0	7.9	6.0	4.0	5.8	9.0	9.0	-12.2	-5.0	-5.3
Republic of Moldova[3)]	7.2	-10.0	1.0	12.8	1.0	3.0	4.0	5.7	n.a.	-16.8	-12.0	-10.8
Serbia[1)]	5.4	-4.0	0.0	11.7	8.0	6.0	14.0	18.0	20.0	-17.6	-10.0	-10.0
Russian Federation[1)]	5.6	-4.7	4.0	14.1	12.0	10.0	6.3	10.5	10.0	6.1	3.1	2.4
The former Yugoslav Republic of Macedonia[1)]	5.0	-2.0	0.0	8.3	3.0	3.0	33.8	34.0	33.0	-13.1	-7.0	-8.0
Ukraine[1)]	2.1	-11.0	1.5	25.2	16.0	12.0	6.4	8.5	8.0	-7.2	-0.8	0.4

[1)] Source: The Vienna Institute for International Economic Studies [2] (2009)
[2)] Source: The Economist Intelligence Unit[4] (2009)
[3)] Source: NPI Moldova (2009)

Furthermore, poverty is still a significant issue in some of the project countries, as well as the persistence of strong economic inequalities within the countries. Therefore fuel poverty is expected to remain a major issue in the project region and should be especially considered in the definition of price policies.

Besides the risk of fuel poverty and the persistence of economic and social inequalities, corruption is another issue that might significantly influence the ability of the investigated countries to attract foreign investments in their domestic markets and hence foster a dynamic and competitive environment for profitable project development.

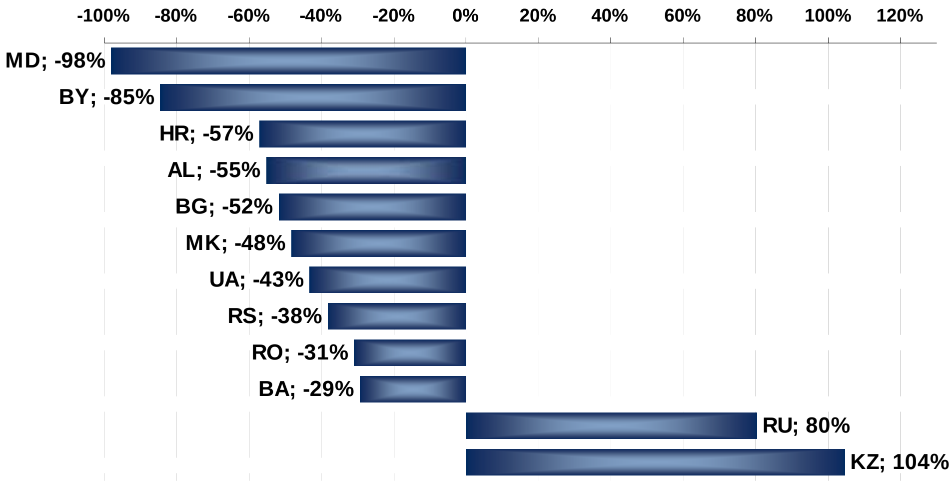
3.2. *Energy Supply and Utilization in the Region*

3.2.1. Energy balances and energy supply per capita

Figure 3.4 illustrates the overall net energy balance of the project countries. It must be pointed out that the net balance of the overall energy supply (i.e. of the sum of all primary energy sources) provides a good overview of the country's overall dependency or surplus of primary energy sources, but at the same time a country might be an exporter of one source of energy and an importer of another (which is very frequently the case)[5].

Apart from Kazakhstan and the Russian Federation, who are large exporters of energy into the project region and well beyond its borders, all other project countries have a significant dependency on energy imports, which can reach up to 85 per cent and 98 per cent in the cases of Belarus and the Republic of Moldova, respectively. This fact significantly points out that enhancing efficiency in the use of primary energy and exploiting the domestic potential of renewable energy sources is the most sustainable way to reduce dependency on foreign energy deliveries.

Figure 3.4: *Net balance of primary energy sources in the project countries in 2007*

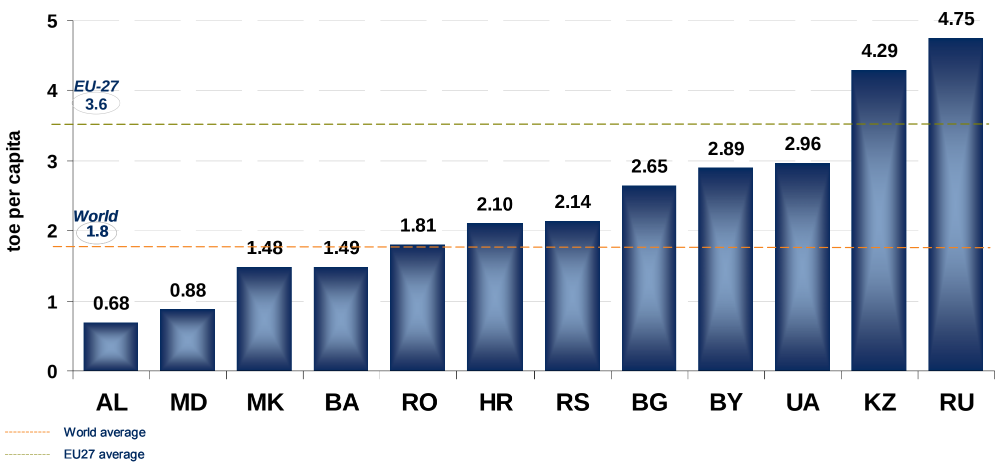


Source: IEA[5] (2009); Illustration by Pöyry

Regarding total primary energy supply per capita, Figure 3.5 shows that some of the project countries have a rather modest energy supply: in the case of Albania, the Republic of Moldova, the former Yugoslav Republic of Macedonia, and Bosnia and Herzegovina this value is even below world average. Except for Kazakhstan and the Russian Federation, all project countries have a per capita total supply of primary energy sources which is below the average value for the EU-27[5].

It must be noted that the total primary energy supply does not necessarily correlate with total final consumption, since in the first indicator also the energy losses during electricity and heat generation as well as transport and distribution losses are included. A large spread between total primary energy supply and total final consumption might therefore provide an indication of a potential for improvement of energy efficiency in the energy sector.

Figure 3.5: *Total supply of primary energy sources per capita in project countries in 2007*

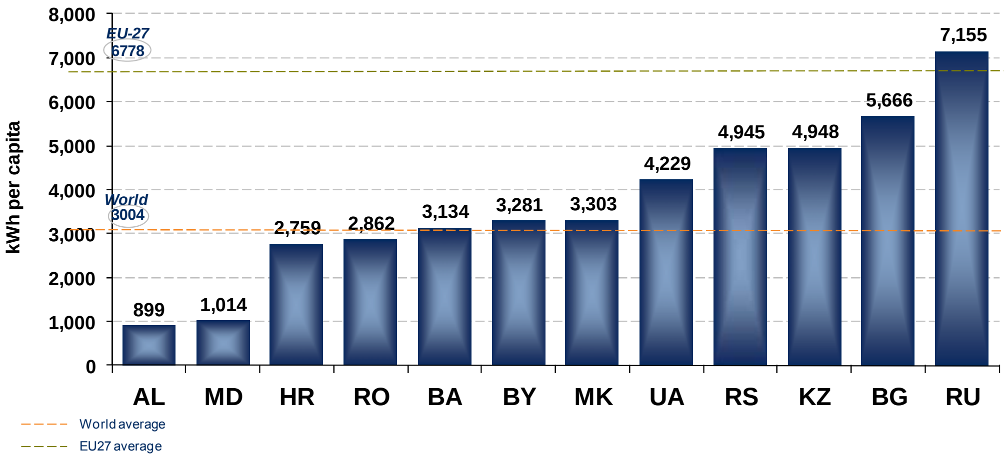


Source: IEA[5] (2009); Illustration by Pöyry

3.2.2. Electricity Production

Figure 3.6 illustrates the total electricity produced per capita. Within the project region, Albania and the Republic of Moldova dispose of the lowest per capita values of electricity produced, while the Russian Federation boasts of a total electricity production per capita of around 7,000 kWh, which is more than seven times higher than the respective value of Albania.

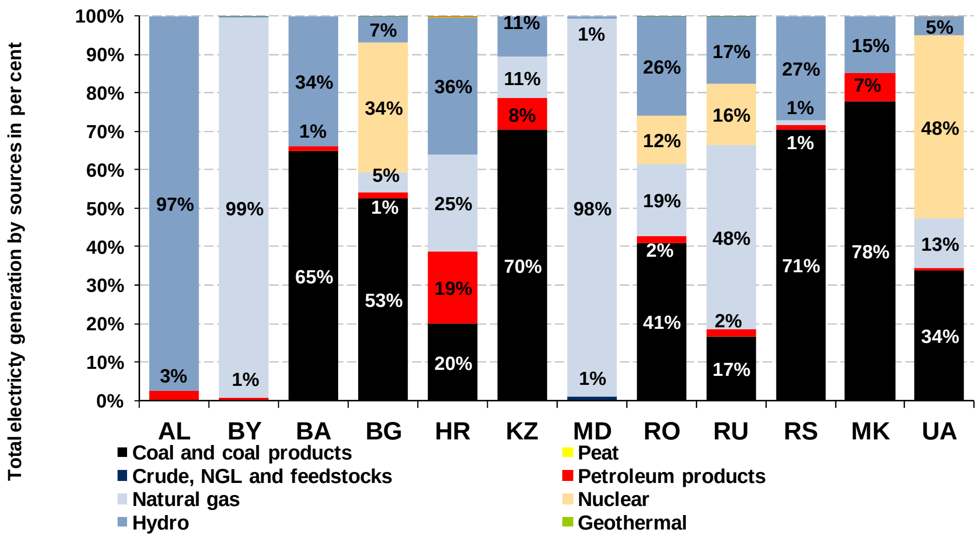
Figure 3.6: Total production of electricity per capita in project countries in 2007



Source: IEA[5] (2009); Illustration by Pöyry

The main sources for electricity production in the project region are foremost coal, gas and hydro (see Figure 3.7). Nuclear is only relevant for Ukraine, Bulgaria and the Russian Federation. With the exception of Albania, Belarus and the Republic of Moldova, coal provides a significant part of the electricity generation in the project region, whereas gas plays a considerable role especially in Belarus, the Republic of Moldova and the Russian Federation. Hydro is the dominant source of electricity production in Albania and plays a significant role in Croatia, Bosnia and Herzegovina, Romania, and Serbia.

Figure 3.7: Electricity generation by sources in project countries in 2007 (in per cent/rounded)

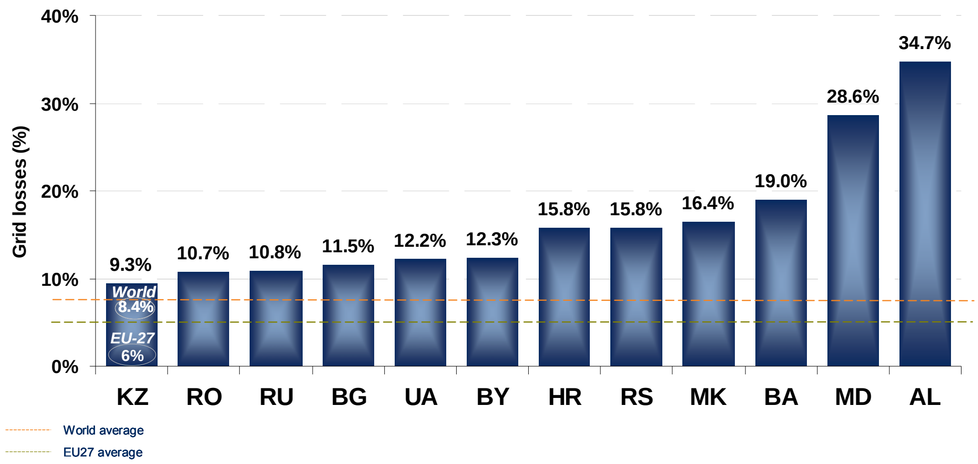


Source: IEA[5] (2009); Illustration by Pöyry

The losses from the electricity grid[6], i.e. from transport and distribution, in 2007 are shown in Figure 3.8. Due to inconsistencies with data from other sources not only the values from Enerdata have been included, but also data from the International Energy Agency (IEA). In particular, the values for electricity losses for 2007 for the Republic of Moldova, the former Yugoslav Republic of Macedonia, and Albania appeared too high to be plausible; therefore, for these two countries, the values for 2006 provided by the IEA, while for the remaining countries the data for 2007 provided by Enerdata appeared to be plausible.

The presented values show the total losses, which comprise technical and commercial losses. The commercial losses are loss of economic value due to non-payment of bills, errors in billing, failure in payment collection, as well as fraud and theft. Most countries[i] within the project region have an average electricity loss level between 10-16 per cent, while Albania and the former Yugoslav Republic of Macedonia show higher energy loss levels, in case of Albania even 35 per cent. All project countries dispose of grid losses above the world or EU-27 average. It has to be noted however, that more recent data show a trend of improvement. This improvement is in general related to an improvement of invoice collection practices by distribution companies, especially those who have been taken over by foreign investors (for instance in the case of Bulgaria, where several foreign distribution companies, such as CEZ from the Czech Republic, entered the market) and less to enhanced investments in transmission and distribution networks.

Figure 3.8: Total losses from the electricity grid in the project countries in 2007



Source: Enerdata[6] (2007) and IEA[5] (2009); Illustration by Pöyry

3.2.3. Energy Consumption

Primary energy

Figure 3.9 shows the primary energy consumption per capita[5]. The countries with the highest primary energy supply per capita also have the highest primary energy consumption per capita. The spreads between the total primary energy supply and the total primary energy consumption, in case of the Russian Federation 4.75 vs. 3.03 toe per capita, can be explained on the one hand by transmission and distribution losses, but on the other hand by the fuel input used for the generation of electricity. The input of fossil fuels for the generation of electricity is not being counted into the final consumption. In case of Bosnia and Herzegovina, which uses mostly fossil fuels for electricity generation, this leads to a spread of almost 49 per cent between total primary energy supply and total primary energy consumption. In case of Albania the picture is different; since it uses primarily hydro power plants for the generation of electricity, its spread between total primary energy supply and total primary energy consumption is only 15 per cent.

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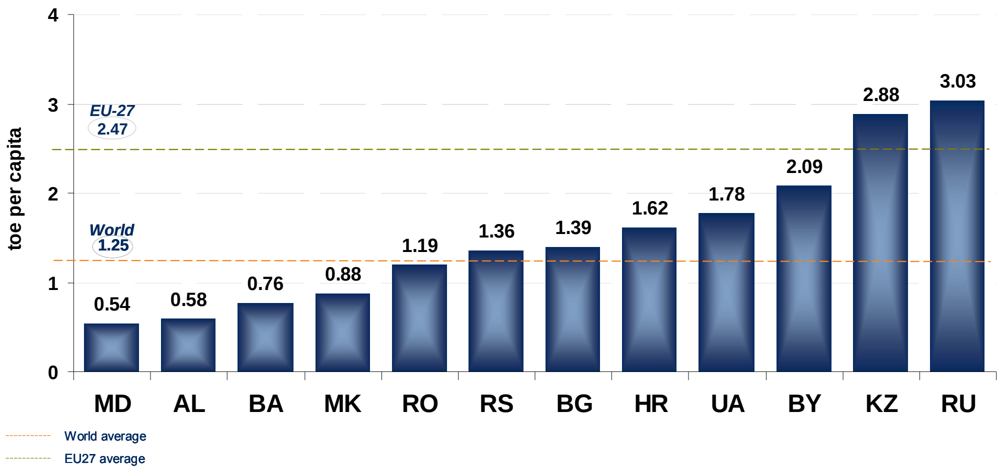
[i] Regarding the Republic of Moldova, there are discrepancies between Enerdata, IEA and national data. According to the National Agency for Energy Regulation (ANRE)'s Report for the year 2008 (page 17) the effective electricity losses incurred by electricity distribution companies in 2008 ranged in the Republic of Moldova between 10.97% and 15.38% (see onhttp://www.anre.md/upl/file/Rapoarte/ANRE%20Report%202008%20Engl.doc), which is in the same range with most countries in the region.

Figure 3.9: Total final consumption of primary energy sources per capita in project countries in 2007



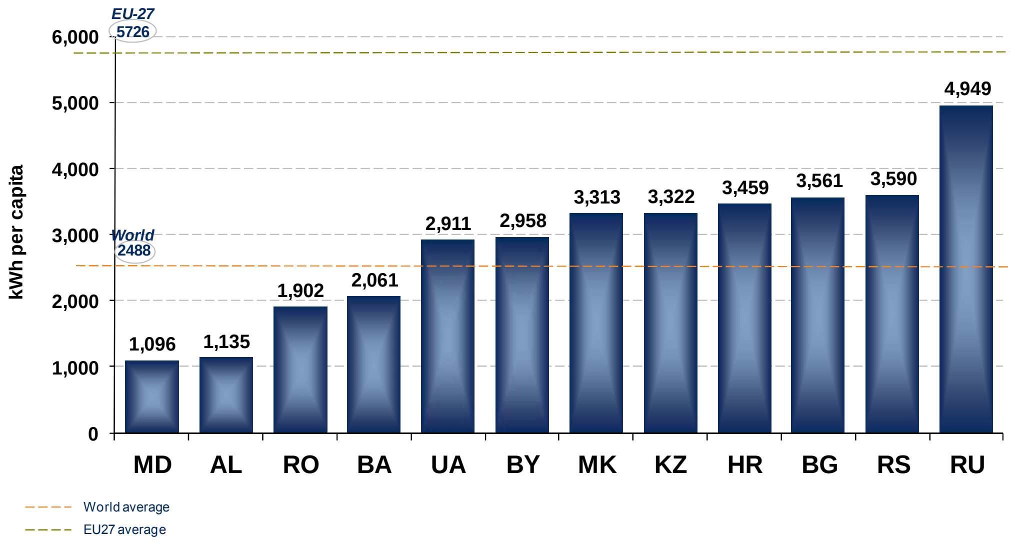
Source: IEA[5] (2009); Illustration by Pöyry

Electricity

Figure 3.10 illustrates the total consumption of electricity per capita in the project countries[5]. The Russian Federation shows the highest level of overall electricity consumption per capita with around 4,900 kWh per year, while Albania and the Republic of Moldova have significantly lower values in the range of 1,100 kWh per capita and year. However, the electricity consumption of households per capita, as shown in Figure 3.11 offers a different picture. While the Russian Federation has the highest total consumption of electricity per capita, its level of household electricity consumption ranges in the middle within the project region. This points to the fact that the residential sector in the Russian Federation has a significantly lower share of the total electricity consumption than for instance in Serbia, which has the highest electricity consumption of the residential sector within the project region. Thus, it can be observed that in countries with comparatively lower household tariffs, the residential sectors usually account for a higher share of the total consumption of electricity.

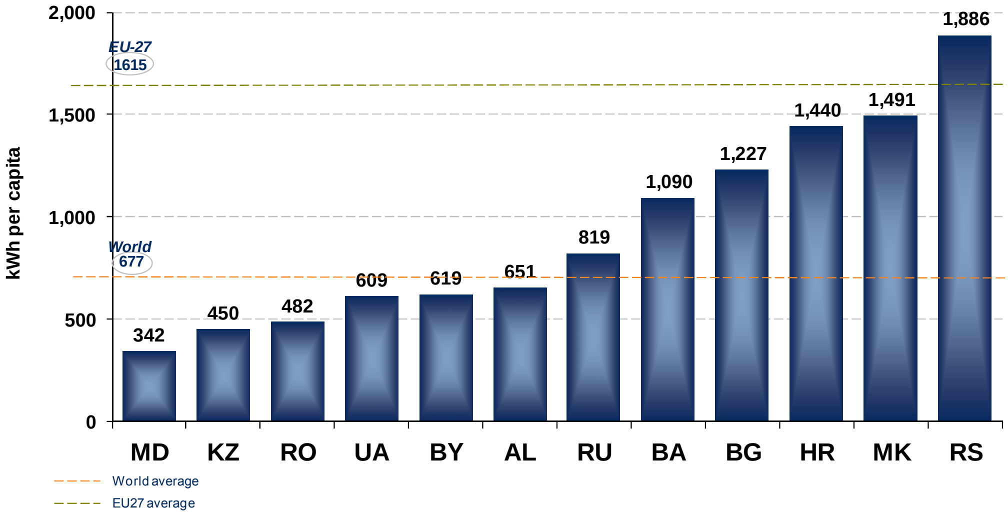
Furthermore, with exception of Albania and Serbia, all project countries had a positive average electricity consumption growth rate averaging between two to six per cent in the period of 2003 to 2007[6].

Figure 3.10: Total consumption of electricity per capita in project countries in 2007



Source: IEA[5] (2009); Illustration by Pöyry

Figure 3.11: *Total consumption of electricity of the residential sector per capita in project countries in 2007*

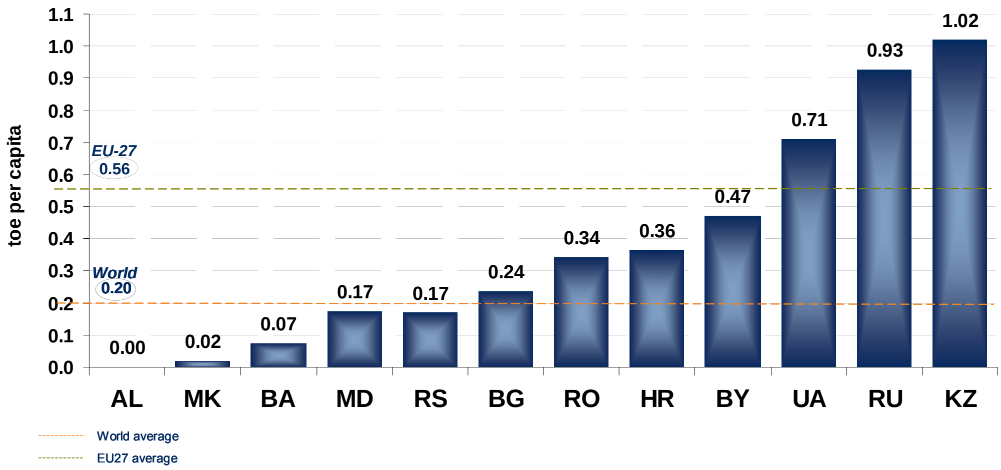


Source: IEA[5] (2009); Illustration by Pöyry

Gas

Figure 3.12 shows the total consumption of gas per capita in the project countries[5]. The highest levels of gas consumption per capita exist in the Russian Federation, Kazakhstan and Ukraine. While in the Russian Federation and in Ukraine the share of gas consumption is evenly distributed among the residential, transport and industry sectors, the gas consumption in Kazakhstan is almost entirely non-specified, i.e. predominantly used for the maintenance of crude wellhead pressure for liquids extraction by injection of gas. Albania is the only country within the project region, which has no gas consumption at all.

Figure 3.12: *Total consumption of gas per capita in project countries in 2007*

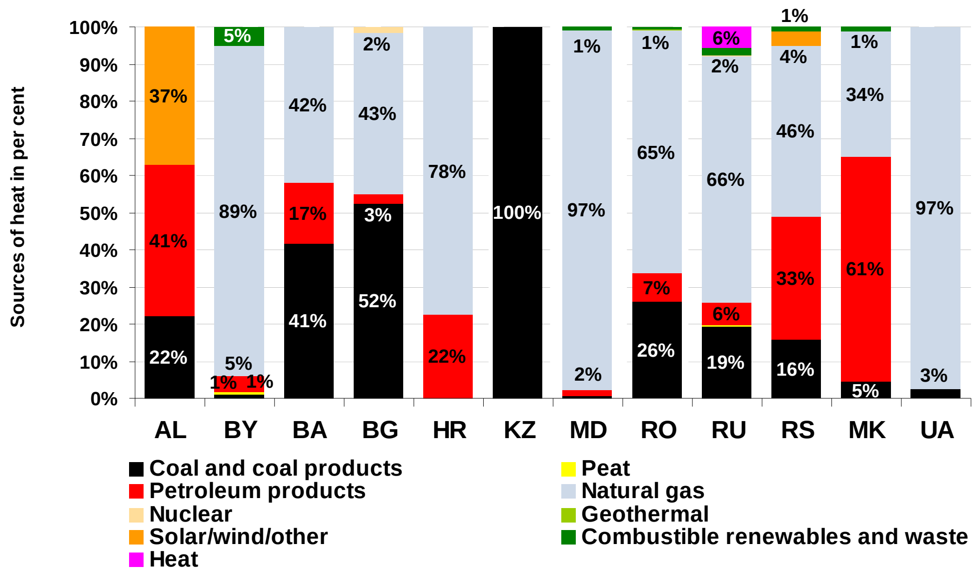


Source: IEA[5] (2009); Illustration by Pöyry

District heating

The main sources for heat in the project region are foremost gas, coal, and petroleum products (see Figure 3.13). Nuclear energy, biomass, and other sources play a less significant role.

Figure 3.13: Sources of heat per country in 2007 (in per cent/rounded)



Source: IEA[5] (2009); Illustration by Pöyry

Figure 3.14 illustrates the total consumption of heat per capita in the project countries[5]. The values provided only refer to centralized heating sources and do not include decentralized heating sources, since no data on decentralized heating sources are publicly available.

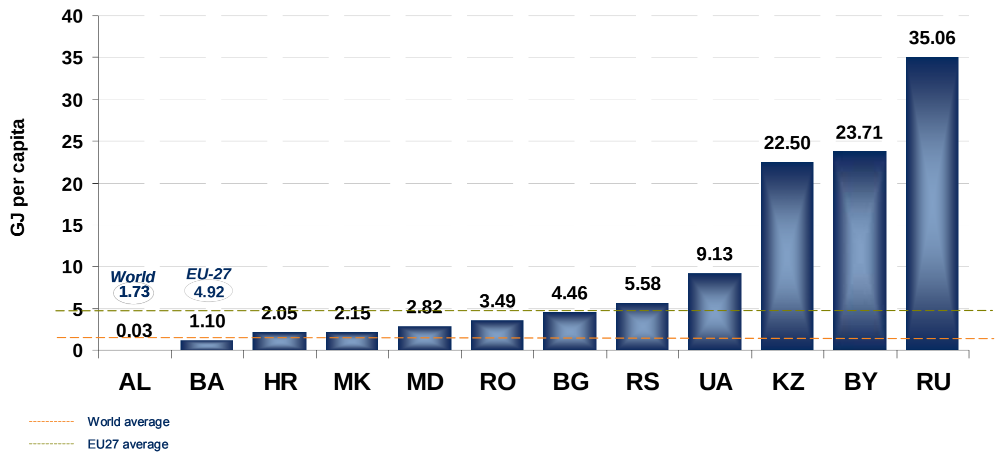
Table 3.2: Share of population connected to district heating (in per cent)

Country	Share of population connected to district heating (in per cent)
Albania	n.a.
Belarus	n.a.
Bosnia and Herzegovina	10%
Bulgaria	18%
Croatia	10%
Kazakhstan	n.a.
Republic of Moldova	n.a.
Romania	30%
Russian Federation	n.a.
Serbia	16%
The former Yugoslav Republic of Macedonia	n.a.
Ukraine	n.a.

Source: IEA[5] (2009)

The Russian Federation, Belarus, and Kazakhstan display significant higher heat consumption levels per capita than the other countries within the project region. While the Russian Federation has the highest levels of consumption per capita for electricity, gas and heat, Albania ranks last in this regard. As can be seen in Figure 3.14, countries like Croatia, Bulgaria, Serbia and the former Yugoslav Republic of Macedonia have low heat consumption levels per capita. As shown in Figure 3.11, the mentioned countries had the highest residential electricity consumption levels per capita, which could be explained by the extensive use of electricity for heating purposes.

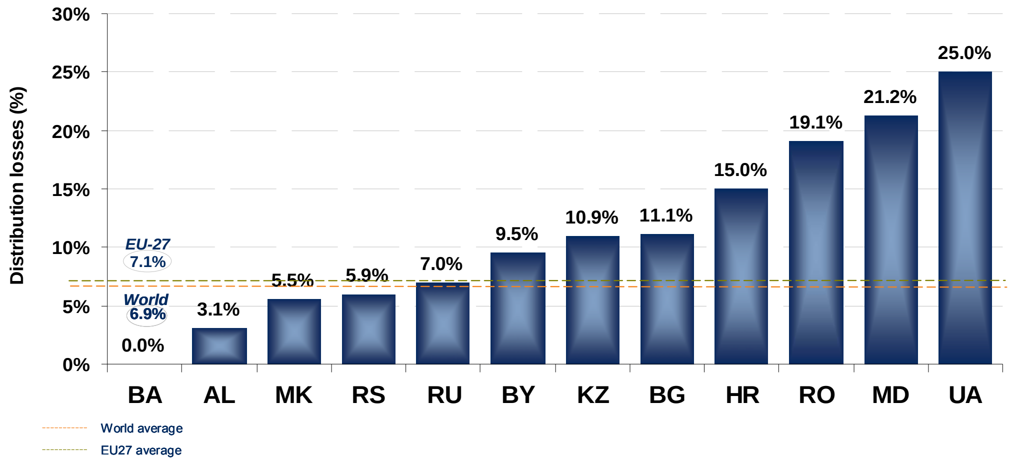
Figure 3.14: Total consumption of heat per capita in project countries in 2007



Source: IEA[5] (2009); Illustration by Pöyry

The heat distribution losses in the project countries are indicated in Figure 3.15[ii]. While Ukraine, the Republic of Moldova, and Romania have the highest distribution losses of all project countries, the former Yugoslav Republic of Macedonia and Albania feature the lowest ones[5].

Figure 3.15: Heat distribution losses in project countries in 2007



Source: IEA[5] (2009); Illustration by Pöyry

ii Regarding the Republic of Moldova, there are discrepancies between IEA and national data. According to the Techni-cal University of Moldova the heat distribution losses in the Republic of Moldova amounted to 15.6% in 2006 compared to 21.2% reported by the IEA for 2007

3.3. *Legislative and Regulatory Framework*

3.3.1. Dedicated regulation for energy efficiency and renewable energy sources

Regulations and provisions regarding the energy sector are available in all project countries; however, the structure, the goals, and the extent of the national legislations can differ significantly between the countries. The project countries that are currently in negotiations for accession to the European Union have developed a regulatory framework which is oriented to the implementation of the *acquis communautaire*, while the countries of the former Soviet Union have regulatory frameworks that are generally based on the former regulation of the Soviet Fuel-and-Energy-Complex. A peculiar situation is given in Bosnia and Herzegovina where, according to the Dayton Agreements of 1995, the regulation of the energy activities does not fall under the responsibility of the national administration but is in the competence of the two separated entities in which the country is divided; this represents a major obstacle to the development of a Bosnian energy policy, as will be shown in the country analysis of Bosnia and Herzegovina.

Furthermore, all project countries have long-term national strategic programmes in place, which describe the government vision and targets for the development of the national energy sector. In most countries, targets referring to energy efficiency and renewable energy sources are mentioned. However, these national strategic programmes often contain ambitious targets without any clarity regarding the planned measures for implementation of the programmes and frequently there are no implementation plans and/or no entities responsible for monitoring the implementation progress.

Regarding dedicated regulation for support of energy efficiency and renewable energy sources, there are broad differences among the project countries. Table 3.3 and Table 3.4 list the project countries according to the presence of a dedicated regulation for energy efficiency and renewable energy sources, respectively. Except for Kazakhstan, all project countries have a governmental agency in place, which is responsible for the development and the implementation of energy efficiency and renewable energy policy. In Belarus, a governmental agency is responsible for the development and implementation of energy efficiency policy, i.e. the Department for Energy Efficiency of the State Committee for Standardization.

Table 3.3: National legislation for energy efficiency

Status of dedicated legislation	Countries
Dedicated legislation and secondary legislation implemented	Belarus, Bulgaria, Romania
Dedicated regulation in place but partial implementation or lack of secondary legislation	Albania, Republic of Moldova, Russian Federation[1)]
Regulatory provision from other regulatory framework but no dedicated legislation	Bosnia and Herzegovina[2)], Croatia, Serbia, the former Yugoslav Republic of Macedonia
Regulation currently under development or under major revision	Kazakhstan, Ukraine

[1)] The Russian Federation has approved a comprehensive Federal Law on Energy Efficiency in late 2009, secondary legislation and implementation of the law are expected in the course of 2010

[2)] For Bosnia and Herzegovina, only legislation at the entity level is available

Table 3.4: National legislation for renewable energy sources

Status of dedicated legislation	Countries
Dedicated legislation and secondary legislation implemented	Bulgaria
Dedicated regulation in place but partial implementation or lack of secondary legislation	Republic of Moldova, Russian Federation
Regulatory provision from other regulatory framework but no dedicated legislation	Belarus, Bosnia and Herzegovina[1)], Croatia, Romania, Serbia, the former Yugoslav Republic of Macedonia
Regulation currently under development or under major revision	Albania, Kazakhstan, Ukraine

[1)] For Bosnia-Herzegovina only legislation at the entity level is available

3.3.2. Dedicated incentive mechanisms for energy efficiency and renewable energy sources

Important institutional financing mechanisms for energy efficiency and renewable energy projects are national funds for energy efficiency projects respectively the availability of a premium tariff for producers of electricity from renewable energy sources (linked with the obligation for the grid operators to connect renewable power plants to the electricity grid).

Table 3.5 and Table 3.6 show the availability of incentive mechanisms for energy efficiency and renewable energy sources in the project countries. A comparison between the two tables shows that while, as can be seen in the previous section, the legislation for energy efficiency appears to have a higher degree of development than the regulation for renewable energy sources regarding the implementation of national incentive mechanisms, renewable energy sources are clearly more advanced than energy efficiency. On one side, this may relate to the fact that financing of the premium tariffs is generally done through special tariff components included in the price for electricity paid by final consumers of electricity, while the financing of national energy efficiency funds relies upon the availability of dedicated national and/or municipal budget. On the other side, premium tariffs for electricity from renewable energy sources cover a narrower range of activities and technologies, while funds for financing energy efficiency projects may require a much higher range of technical and financial competences as well as a higher amount of human resources for the management of the fund, therefore presenting more complexities and challenges for operational implementation.

Table 3.5: *Availability of national funds for energy efficiency in the project region*

Status of dedicated legislation	Countries
National Energy Efficiency Fund established and operational	Bulgaria, Croatia, Romania
National Energy Efficiency Fund partially established or with limited operational activities	Republic of Moldova, Serbia, Ukraine
No National Energy Efficiency Fund	Albania, Belarus, Bosnia and Herzegovina[1)], Kazakhstan, Russian Federation[2)], the former Yugoslav Republic of Macedonia

[1)] For Bosnia-Herzegovina only legislation at the entity level is available

[2)] A National Energy Efficiency Fund might be implemented through the bylaws of the new Law on Energy Efficiency approved in late 2009

Table 3.6: *Availability of incentive mechanisms for electricity from renewable energy sources*

Status of dedicated legislation	Countries
Premium tariff system developed and implemented	Belarus, Bosnia-Herzegovina, Bulgaria, Croatia, Romania[1)]
Premium tariff system developed but not implemented or not yet operational	Albania, Kazakhstan, Republic of Moldova, Russian Federation[2)], the former Yugoslav Republic of Macedonia, Ukraine
No premium tariff system available	Serbia

[1)] Romania has implemented an incentive system with obligatory shares of renewable energy sources and an underlying market for green certificates

[2)] The Russian Federation plans to provide a premium tariff based on current market prices

3.3.3. Progress of market liberalization

All countries in the project region are in the process of deregulation and liberalization of their energy markets, with electricity markets having generally the highest degree of progress and gas and heat markets very often lagging behind. While the establishment of transparent market conditions and the enhancement of a fair competition between market players provides a favorable environment for private investments, at the same time, the governments should maintain a supervisory and monitoring function over the market rules, price formation mechanisms and behavior of market operators in order to grant on one side fair access to the markets to new entrants and on the other to prevent phenomena of fuel poverty and protect weak social categories.

Energy market reforms such as unbundling of energy and grid assets from operations, establishment of independent grid operators, granting third-party access to the power and gas grid and freedom for final customers to choose their energy supplier (at least for large customers) have been realized in the last years and provide an important framework for foreign investments.

As can be seen in Table 3.7 below, the progress in market liberalization varies greatly among the project region: while the two EU member states Romania and Bulgaria, the candidate state Croatia as well as Kazakhstan have realized a full liberalization and deregulation of their electricity markets, most other countries are still in the early stages of market liberalization or, such as in the case of Belarus, have not started any market liberalization yet. Ukraine has undertaken a partial liberalization of the electricity market, since the market is entirely liberalized only on the generation side but not on the final customer side.

Table 3.7: *Progress of electricity market liberalization in the project region*

Progress of liberalization	Countries
Full liberalization	Bulgaria, Croatia, Kazakhstan, Romania
Partial liberalization	Ukraine, Republic of Moldova
Early stage liberalization	Albania, Bosnia and Herzegovina, Russian Federation, Serbia, the former Yugoslav Republic of Macedonia
Liberalization process not yet started	Belarus

Privatization of energy assets (in the electricity and gas sector) and unbundling and restructuring of former national monopolies is an ongoing process in nearly all project countries. In countries like Albania, Bulgaria, Republic of Moldova, Romania, Russian Federation and the former Yugoslav Republic of Macedonia, foreign investors can enter the markets of generation and distribution of electricity as asset owners or at least shareholders.

At the same time in Belarus, Bosnia and Herzegovina, Croatia, and Serbia, the presence of a state monopoly or the market domination by state-owned companies is still a factor limiting the degree of market competition and hindering the entrance of independent operators in these markets.

3.3.4. International commitments and treaties

United Nations Framework Convention on Climate Change and Kyoto Protocol

All project countries are signatories of the United Nations Framework Convention on Climate Change and have ratified the Kyoto Protocol[7].

Table 3.8 shows the affiliation status of the project countries to the Annex I of the United Nations Framework Convention on Climate Change and to the Annex B of the Kyoto Protocol.

Table 3.8: *Commitment to the Kyoto Protocol of project countries*

Kyoto Protocol affiliation	Countries
Annex B countries	Bulgaria, Croatia, Romania, Russian Federation, Ukraine
Non-Annex B countries	Albania, Bosnia and Herzegovina, Republic of Moldova, Serbia, the former Yugoslav Republic of Macedonia
Unclear status	Belarus, Kazakhstan

Source: United Nations Framework Convention on Climate Change[7] (2009)

Five countries of the project region are Annex B parties to the Kyoto Protocol and are therefore eligible for Joint Implementation projects with other Annex B countries as well as for the trading of emission certificates. While five other countries are non-Annex B parties to the Kyoto Protocol and are therefore eligible for Clean Development Mechanism projects with Annex B countries. For Belarus and Kazakhstan, the status is still unclear:

- Belarus signed the UNFCCC as an Annex I country and ratified the Kyoto Protocol in 2005 as a non-Annex B country. Subsequently, Belarus adopted the Amendment to Annex B of the Kyoto Protocol but has not been included in Annex B yet, since this requires ratification by 75 per cent of the parties of the Protocol (by the end of 2008, only five of the 175 signatories ratified this provision);
- Kazakhstan signed the Kyoto Protocol in March 1999 as a non-Party to Annex I of the UNFCCC and as a non-Party to Annex B of the Kyoto Protocol; in April 1999, Kazakhstan stated its intent to accede Annex I to the UNFCCC. In early 2009, Kazakhstan ratified the

Kyoto Protocol and still aims at becoming an Annex I country. However, the reduction target foreseen by Annex B has not been determined yet.

Clean Development Mechanisms and Joint Implementation projects are powerful instruments for co-financing energy efficiency and renewable energy projects in the project region, since many industrialized countries as well as companies (utilities, energy-intensive industries) falling under the Emission Trading Scheme (ETS) are eager to compensate their CO_2-emissions with Certified Emission Reductions (CER) and Emission Reduction Units (ERU).

However, the additionality criterion specified by the Kyoto Protocol foresees that the CDM and JI financing mechanisms do not apply to projects which would be profitable already in absence of these mechanisms. Therefore, CDM and JI projects would not be within the target group of projects to be financed by the FEEI investment fund. At the same time, the presence of these mechanisms can promote energy efficiency and renewable energy projects in the project countries in two manners:

- On one side, the development of CDM and JI projects in the host country would promote the formation of a market for project developers and support the development of professional skills related to the preparation of bankable project proposals;
- On the other side, countries which have ratified the Annex B of the Kyoto Protocol have the financial opportunity to sell their surplus CO_2-emissions on the carbon market to other countries which are signatories of the Annex B; the financial revenues from these transactions can then be used to established national funds to promote sustainable energy projects, such as is described in the Case Study of Czech Republic – State Environmental Fund and Green Investment Scheme (see also section 16.7: Green Facility – State Environmental Fund (SEF) and Green Investment Scheme (GIS) – Case Study of the Czech Republic).

The volume of the carbon market reached a total value transacted of about EUR 86 billion in 2008, double its 2007 value. The biggest share is the trade between companies falling under the EU Emission Trading Scheme. The market for already issued Certified Emission Reductions (secondary CERs) is the second largest segment of the carbon market with transactions in excess of EUR 18 billion, representing a five-fold increase in both value and volume over 2007. Approximately EUR five million of the overall value is accounted for by project-based transactions (primary CDM, JI, voluntary market). The average price for CERs on the secondary market amounts to around EUR 17, primary CDM and JI achieve average prices between EUR ten and 11 per tCO_2eq . The price on the voluntary market is on average EUR five per tCO_2eq.[8]

European buyers continuously dominate the CDM and JI markets for compliance, with a combined market share of over 80 per cent. With around 90 per cent of volumes contracted, private sector companies have been the most active buyers. Even during the economic downturn, European utilities are purchasing primary CERs with an eye to their Phase III (2013-2020) compliance needs.

The market share of European governments amounts to around ten per cent. Governmental buyers prefer primary CERs and Emission Reduction Units from JI projects. Due to delayed and reduced CER/ERU supply, 2008 and early 2009 saw increasing interest of public buyers in International Emission Trading, namely Assigned Amount Units (AAUs). Industrialized countries with a lack of credits to cover their own emissions can purchase credits from other industrialized countries which have a credit surplus. The money for these credits is then transferred to national Green Investment schemes (GIS) of the selling countries where they support projects and programmes which lead to additional emission reductions. The supply of AAUs is estimated to be about 1,000 million tCO_2eq. The first AAU transaction saw Hungary selling two million AAUs to Belgium in September 2008 and six million to Spain in November 2008. The Government of Japan focused its Kyoto Mechanism (KM) Credit Acquisition Programme on AAU/GIS, which now represent about 70 per cent of all planned and announced purchases. AAU/GIS are reported to trade on average around EUR ten, within a EUR 6-14 price range. The most advanced GIS implementation can be found in Czech Republic where the transfer of the revenues from the AAU sale to projects has already started.

The interest of buyers and sellers to engage in the market could increase dramatically depending on the progress of international climate negotiations in Copenhagen. In relation to the COP15, pledges on reduction targets for 2020 (compared to 1990) have been made by Australia (-5 to -15 per cent), the European Union (-20 to -30 per cent), Japan (-25 per cent), Russia (-10 to -15 per cent), Norway (-30 per cent), Canada (-3 per cent), United States (-17 to -20 per cent compared to 2005). There is already anecdotal evidence of transactions of private early compliance buyers from the U.S. and Australia.

Due to this increasing carbon market perspectives, project countries should push forward the implementation of CDM/JI projects, despite the current uncertainty about the future development of these mechanisms after 2012. An assessment of the JI and CDM projects and installed GIS in the project countries shows that there are only few countries where these projects have been used extensively.

As already mentioned above, Belarus and Kazakhstan have an unclear status under the Kyoto Protocol, therefore neither JI nor CDM projects can be developed in these countries.

For potential JI and GIS host countries it is very important to have the national political willingness to sell emission credits to foreign investors as these countries have to fulfill national reduction targets in the period 2008-2012 in comparison to the base year 1990. With the exception of Croatia[iii], all other JI project countries (Bulgaria, Romania, Russian Federation, Ukraine) have significantly lower emissions than allowed by the Kyoto Protocol. This opens the opportunity to sell JI credits to foreign investors.

Regarding the International Emission Trading between industrialized countries, most of the surplus AAUs (estimated supply of about 1,000 million tCO_2eq as mentioned above) lie with the former Eastern Bloc countries. Russia accounts for about 50 per cent of the potential supply, followed by Ukraine with 25 per cent and EU-10 with 20 per cent.

Ukraine has been the most successful of the project countries with 11 JI projects registered, followed by Romania and Bulgaria. The Russian Federation has by far the biggest share of JI projects in the pipeline, but bureaucratic problems have hindered the registration of any project. The Russian government introduced national regulations for JI projects in 2007, but failed so far to get them operational.

Table 3.9: *JI projects in the project countries*

Kyoto Protocol affiliation	At project determination	At request for registration	Registered
Bulgaria	13	-	1
Croatia	-	-	-
Romania	5	-	4
Russian Federation	107	-	-
Ukraine	20	3	11

Source: United Nations Environment Programme (UNEP)[9] (2009)

For EU Member States (Bulgaria, Romania), the EU Double Counting Directive (2006/780/EC) sets limits to the implementation of JI projects in sectors which are covered by the EU ETS (e.g. installations above 20 MW in the energy sector or energy-intensive industry). This kind of JI projects is tolerated by the EU only until 2012 and the host country has to set an own JI project reserve within the National Allocation Plan (NAP) and deduct the same amount from the free

iii Croatia is a special case because the initial reduction target was five per cent below 1990 levels. Croatia's GHG emissions are currently above this target because of new thermal power plants built after independence which replace electricity imports from other former Yugoslavian countries. Therefore, Croatia hesitated to ratify the Kyoto Protocol because it would be a net buyer of certificates. In the Conference of Kyoto Parties in 2006 it was decided that Croatia can add 3.5 million t CO2e to its 1990 emission level. Nevertheless, Croatia could still face problems in fulfilling its Kyoto obligation; therefore, Croatia plans not to allow any JI projects in the country.

allocation to the energy sector. From all EU member countries, Romania is the only one which has set such a reserve for not identified projects. In all other EU Member States, only JI projects from ETS sectors which already have received a letter of approval by the national authorities will receive allowances.

Meanwhile the future of JI projects after 2012 is very unclear. The international framework conditions for the carbon market after 2012 are still missing, but there are clear political and market indications that there will be significant demand for emission reduction credits from CDM projects after 2012 (e.g. from the EU ETS as well as from the currently discussed US American Emission Trading Scheme).

Many energy projects in the non-industrialized countries have the potential to be developed under CDM. Many emerging countries (e.g. China, India, Mexico, and Brazil) have been very successful in implementing CDM projects. More than 1,800 CDM projects have been successfully registered worldwide. Nevertheless, among the project countries only the Republic of Moldova has registered CDM projects. Albania and the former Yugoslav Republic of Macedonia have some projects in the validation and request for registration phase. The lack of CDM expertise, non-functioning of national CDM regulations and also lack of project financing might be the main reasons why CDM is not more developed in these countries.

Table 3.10: CDM project development in the project countries

Kyoto Protocol affiliation	At project validation	At request for registration	Registered
Albania	3	-	-
Bosnia and Herzegovina	-	-	-
Republic of Moldova	3	-	4
Serbia	-	-	-
The former Yugoslav Republic of Macedonia	1	1	0

Source: United Nations Environment Programme (UNEP)[10&11] (2009)

Integration in the European Union

Integration in the European Union is a major driver for policy reforms aiming at the establishment of market-based energy systems. The implementation of the *acquis communautaire* (for member states as well as for candidate states) with the related sets of guidelines and regulations strongly supporting the creation of a transparent and reliable regulatory framework as well as favorable conditions for entrance of foreign capital in the country (investors, market players, project partners).

Table 3.11 below shows the current status of integration within the European Union.

Table 3.11: EU membership status of project countries

EU membership status	Countries
Full membership	Bulgaria, Romania
Candidate states	Croatia, the former Yugoslav Republic of Macedonia
Application for membership submitted	Albania, Serbia
Expressed interest in membership	Bosnia and Herzegovina, Republic of Moldova, Ukraine
No negotiations on membership	Belarus, Kazakhstan, Russian Federation

Source: European Commission[12] (2009)

Besides integration in the European Union, several bilateral or multilateral agreements regulate the cooperation with the European Union and support the implementation of common policy practices and regulatory standards. The most relevant agreements for cooperation with the European Union are shown in Table 3.12.

Table 3.12: Current EU relationships of the project countries

Current EU relationships	Countries
Stabilization and Association Agreements	Albania, Bosnia and Herzegovina, Croatia, Serbia, the former Yugoslav Republic of Macedonia
European Neighbourhood Policy	Belarus, Republic of Moldova, Ukraine
European Union - Russia Common Spaces	Russian Federation
Partnership and Cooperation Agreements	Kazakhstan, Republic of Moldova, Russian Federation, Ukraine

Source: European Commission[12] (2009)

Energy Community Treaty

The Treaty establishing the Energy Community (also known as Energy Community South-East Europe Treaty or ECSEE) was signed in Athens in late 2005 and entered into force on 1 July 2006. It aims at establishing a single regulatory framework across South-East Europe and the European Union on the same terms.

The Treaty will ensure that the signatory states will adopt European Union single market regulations regarding energy (the *acquis communautaire* in the relevant fields of energy, environment, competition and others). The timetable for implementation of the Treaty is as follows:

- 01.07.2007: Implementation of the two EU energy market directives and regulation on cross-border network access;
- 01.01.2008: Liberalization of the markets for all non-household customers;
- 31.12.2011: Reduction of the sulphur content of certain liquid fuels;
- 01.01.2015: Market liberalization for all final customers;
- 31.12.2017: Limitation of emissions of certain pollutants into the air from large combustion plants.

Table 3.13 shows the current membership status to the Energy Community of the project countries[13].

Table 3.13: Membership of the Energy Community of project countries

Membership status	Countries
Member states	Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Romania, Serbia, The former Yugoslav Republic of Macedonia,
Observer states	Republic of Moldova, Ukraine[1)]
Non-members	Belarus, Kazakhstan, Russian Federation

[1)] On 18 December 2009, the 7th Energy Community Ministerial Council in Zagreb, Croatia approved the accession of Ukraine and Moldova to the Energy Community. The accession will be effective when and if these countries solve the remaining gaps and make their gas laws comply with the EU acquis requirements and complete their respective ratification procedures.

Source: Energy Community[13] (2009)

Energy Charter Treaty

The Energy Charter Treaty is an international agreement originally based on integrating the energy sectors of the former Soviet Union and Eastern Europe into the broader European and world markets[14].

Following the political declaration of principles contained in the Energy Charter of 1991, the legally-binding Treaty was signed in Lisbon in late 1994, together with the Protocol on Energy Efficiency and Related Environmental Aspects (PEEREA). The Treaty and the Protocol, that came into effect in April 1998, focus on four broad areas:

- Protection of foreign investments, based on the extension of national treatment and protection against key non-commercial risks;

- Non-discriminatory conditions for trade in energy materials, products and energy-related equipment;
- Resolution of disputes between participating states and between investors and host states;
- Promotion of energy efficiency and attempts to minimize the environmental impact of energy production and use.

Table 3.14 shows the current membership status to the Energy Charter Conference of the project countries. Belarus has accepted provisional ratification of the Treaty to the extent that it is consistent with its own constitutions, law and regulations, while Serbia, who has signed the Energy Charter in 2001, holds the status of an Observer within the Energy Charter Conference[14]. The Russian Federation decided on 6 August 2009 to withdraw from the Energy Charter Treaty.

Table 3.14: Membership of the Energy Charter Conference of project countries

Membership status	**Countries**
Member states	Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Kazakhstan, Republic of Moldova, Romania, the former Yugoslav Republic of Macedonia, Ukraine
Observer states	Serbia
Members with pending ratification	Belarus
Non-members	Russian Federation

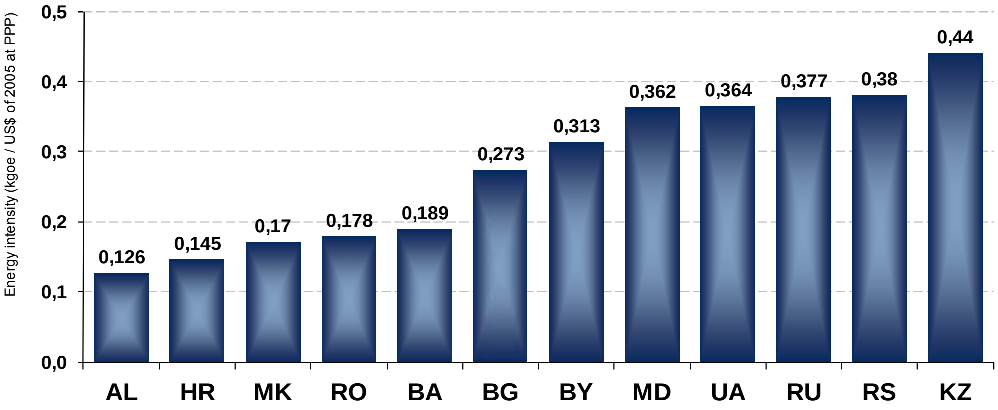
Source: Energy Charter[14] (2009)

3.4. Needs for Investments in Energy Efficiency and Renewable Energy Sources

3.4.1. Energy efficiency

Figure 3.16 represents the overall energy intensity of the project countries (expressed as kilo of oil equivalent per US Dollar at Purchasing Power Parity)[6]. As the energy intensity is one of the main indicators for energy efficiency, the chart points out the strong need for improvement of energy efficiency in the majority of the project countries. With the exception of Albania and Croatia, all other countries are above the EU-27 average. It should be noted, however, that the low energy intensity of some countries, in particular Albania, is more related to the growth of the GDP due to foreign aid and remittances from abroad over the years, as well as the collapse of heavy industries, rather than due to improvements of energy efficiency[15]. Furthermore, the figures have to be regarded cautiously since some countries feature an active shadow economy (in case of Ukraine 40 per cent)[16]. This activity is not being considered when calculating the energy intensity levels. Thus it can be speculated that the actual energy intensity levels could be lower than officially reported.

Figure 3.16: Primary energy intensity at Purchasing Power Parity in 2007



Source: Enerdata[6] (2007); Illustration by Pöyry

As indicated in Figure 3.17, the overall energy intensity of the project countries decreased, with exception of Albania, significantly in the period of 1997 to 2007[6]. Nevertheless, as shown in Figure 3.17 the energy intensity levels of some countries still are significantly high. Furthermore, it should be noted that in most cases the decline in energy intensity levels is actually not based on newly introduced energy efficiency measures, but more related to the heavy decline of the industrial output and energy consumption in the respective countries.

Figure 3.17: Decrease of primary energy intensity from 1997 to 2007

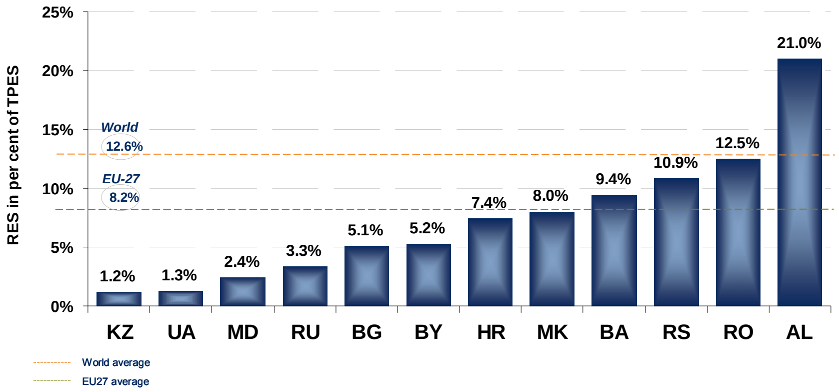
Source: Enerdata[6] (2007); Illustration by Pöyry

3.4.2. Renewable energy sources

The current deployment of renewable energy sources[5] (defined as a share of the total primary energy supply) is depicted in Figure 3.18. The major contribution to renewable energy sources comes from hydro and biomass, while other renewable energy sources (geothermal, solar, wind) only have a negligible share. The high share of renewable energy in the Balkan region comes from the widespread use of hydro for the generation of electricity, while the other large contribution derives from the use of wood for heating purposes[5].

While a rather satisfactory situation can be observed with respect to deployment of renewable energy sources in many project countries (at least in comparison with the EU-27 average value), it must be noted that the counting of large hydro power plants among renewable energy sources is a very disputed issue and in most European countries no financial incentives are available for this technology. Similarly, the extended use of wood for heating purposes might pose a potential conflict with respect to the efficiency of heating generation compared to other, more efficient energy sources (primarily gas) and moreover, depending on the technology used and on the fuel sourcing strategy in place, it may be in conflict with other environmental standards (forest conservation and/or air pollution). Therefore, the development of “cleaner” renewable energy sources such as solar, wind or small hydro power, should be strongly encouraged by policymakers.

Figure 3.18: *Deployment of renewable energy sources in the project countries[iv] in 2007 (as per cent of total primary energy supply)*



Source: IEA[5] (2009); Illustration by Pöyry

Figure 3.19 indicates the share of renewable energy sources in the electricity generation of the project countries. While Albania generates almost all its electricity by hydro power plants, Belarus’ energy production is nearly entirely based on fossil fuels. However, the main contributions come from large hydro projects for electricity generation (especially in the Balkan region). The contribution of the so-called new renewable sources, which are generally characterized by higher environmental sustainability (solar, wind, geothermal, small hydro power) is negligible in all project countries, despite the presence of significant untapped potential. Hindering factors in the development of renewable energy projects are the availability of cheap conventional fuels as well as the absence of an attractive feed-in tariff for electricity produced from renewable energy sources (in order to ensure a positive return for investors) and finally, in certain cases, the difficulties for independent power producers to get a connection to the power grid[17].

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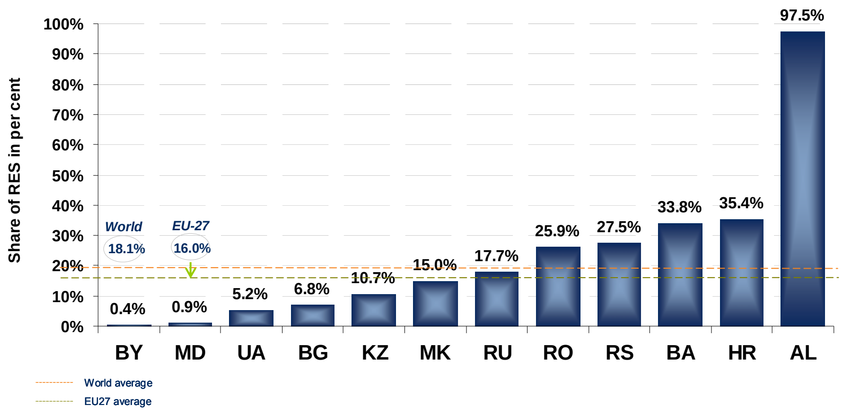
iv Regarding the Republic of Moldova, there are discrepancies between IEA, EREF and national data. According the National Bureau of Statistics of the Republic of Moldova the deployment of RES as per cent of the total primary energy supply (without Transnistria) within the 2000-2007 period varied between a minimum 2.1 per cent in 2007 and a maximum 5.6 per cent in 2002 (including: 4.2 per cent in 2000, 3.4 per cent in 2001, 5.6 per cent in 2002, 1.1 per cent in 2003, 2.3 per cent in 2004, 4.1 per cent in 2005, 4.9 per cent in 2006, 2.1 per cent in 2007 and 3.9 per cent in 2008).

Figure 3.19: *Deployment of renewable energy sources in the project countries[v] in 2007 (as per cent of total domestic electricity production)*



Source: IEA[5] (2006); Illustration by Pöyry

However, several project countries dispose of significant untapped renewable energy resources and intend to exploit it in the near future. In Croatia alone, new wind power plants with a significantly high potential capacity of 5,000 MW are being considered for development.

As for electricity generation, the use of renewable energy sources for heating purposes is negligible. Only Albania has a significant amount of solar thermal power for heating, which accounts for 37 per cent of the total heat generation. Furthermore Belarus (five per cent), the Russian Federation (two per cent), the Republic of Moldova (one per cent), Romania (one per cent) and the former Yugoslav Republic of Macedonia (one per cent) feature a small share of biomass in their heat generation.

3.4.3. Energy Service Companies (ESCOs)

Energy service companies (ESCOs)[vi] and Energy Performance Contracting (EPC)[vii] are common tools to enhance the sustainable use of energy through promoting energy efficiency and renewable energy sources. ESCOs and EPC help to overcome financial constraints to investments and pay off initial costs through the energy cost savings based on reduced energy demand[18].

While ESCOs have been operational in the European Union on a large scale since the late 1980ies and early 1990ies[18], the energy service market within the project region is far from utilizing its full potential, although the situation varies from country to country. In Table 3.15 the number of identified ESCOs (including also ESCOs, which are not working on a purely performance contracting base), which have already been established or are planned to be set up, is shown (detailed information for each country can be found in the respective country analysis in the section “ESCOs and other initiatives in energy efficiency”).

The European region of the Commonwealth of Independent States (including the Russian Federation, Belarus and Ukraine) can be considered a set of successful examples of ESCO penetration into transition economies[18].

The situation looks different for the Balkan region. In Albania, Bosnia and Herzegovina, and Serbia no pure ESCOs have been established so far and only small scale projects by ESCO-like

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v Regarding the Republic of Moldova, there are discrepancies between IEA and national data. For instance, according to the national statistical data, only the share of ‘hydro power’ in the total electricity supply in the Republic of Moldova in 2006 was 6.9 per cent (two HPPs in Moldova produced 352 million kWh and the total electricity supply was 5114 million kWh)

vi An ESCO is a natural or legal person that delivers energy services and/or other energy efficiency improvement measures in a user’s facility or premises, and accepts some degree of financial risk in doing so. The payment for the services delivered is based (either wholly or in part) on the achievement of energy efficiency improvements and on the meeting of the other agreed performance criteria (EU Directive 2006/32/EC)

vii EPC is a contractual arrangement between the beneficiary and the provider (normally an ESCO) of an energy efficiency improvement measure, where investments in that measure are paid for in relation to a contractually agreed level of energy efficiency improvement (EU Directive 2006/32/EC) companies have been undertaken. In the former Yugoslav Republic of Macedonia an Energy Service Company is being set up jointly by two major energy companies and a further private ESCO-like company is already operative (see page 288). Croatia, however, boasts of the best European energy service provider for energy efficiency projects of 2007 (awarded by the European Energy Service Initiative), HEP ESCO (see page 158).

In the Republic of Moldova an ESCO has been recently established[19] and a few engineering companies have worked on donor-financed turn-key projects (see page 203), while in Kazakhstan two municipal ESCOs are in the planning phase (see page 183).

In general it can be observed that the number of state-owned ESCOs (for instance HEP ESCO in Croatia and BelinvestESCO in Belarus) and ESCOs financed by loans, grants and technical assistance from international institutions (for instance the European Bank of Reconstruction and Development in Ukraine and Bulgaria or the United Nations Development Programme in Kazakhstan) is significantly high.

Significant adjustments in policies in order to create a supportive ESCO market in general and the introduction of incentives for energy saving, including tax privileges on profit from energy saving measures, as well as the improvement of the tariff systems, should enable the creation of private ESCOs as well[18].

Table 3.15: Number of identified ESCOs in the project region

Country	Number of identified ESCOs[viii]
Albania	1
Belarus	3
Bosnia and Herzegovina	1
Bulgaria	3
Croatia	2
Kazakhstan	2
Republic of Moldova	1
Romania	3
Russian Federation	>10
Serbia	0
The former Yugoslav Republic of Macedonia	2
Ukraine	>10

Source: Pöyry Expert Team[17] and Bertoldi, P., Boza-Kiss, B., & Rezessy, S. (2007)[18]

3.4.4. Carbon dioxide emissions

Figure 3.20 indicates the carbon dioxide emissions per capita due to human activity. The presented values consider only carbon dioxide emissions from the burning of fossil fuels, but not from emissions from deforestation and fossil fuel exports.

The two resource-rich countries Kazakhstan and the Russian Federation have the highest carbon dioxide emissions per capita within the project region. All other project countries have a carbon dioxide emission per capita, which is below the EU-27 average, while only Albania and the Republic of Moldova[ix] exhibit an emission value below world average[20].

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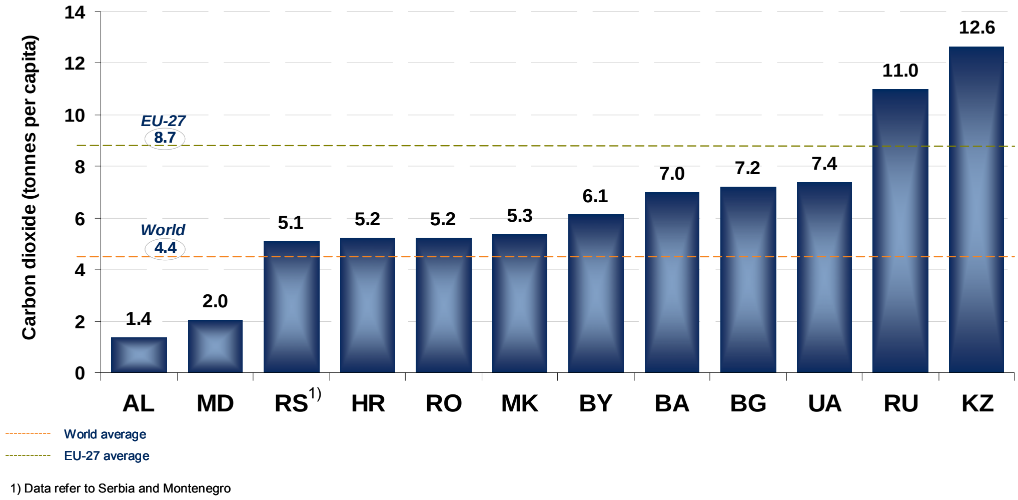
viii Includes ESCOs which are not working on a purely performance contracting base and also ESCOs, which are in the planning phase

ix Regarding the Republic of Moldova, there are discrepancies between UNDP and national data. According to the “National Inventory Report: 1990-2005. Greenhouse Gas Sources and Sinks in the Republic of Moldova” (2009) (see on http://www.clima.md/files/2_Cadrul_National/ENG/NIR_ENG.pdf), within the CO2 emissions the 2000-2005 period per capita varied between minimum 2.3 tons per capita in 2000 and 2.9 tons per capita in 2005.

Figure 3.20: *Carbon dioxide emissions per capita in 2006*

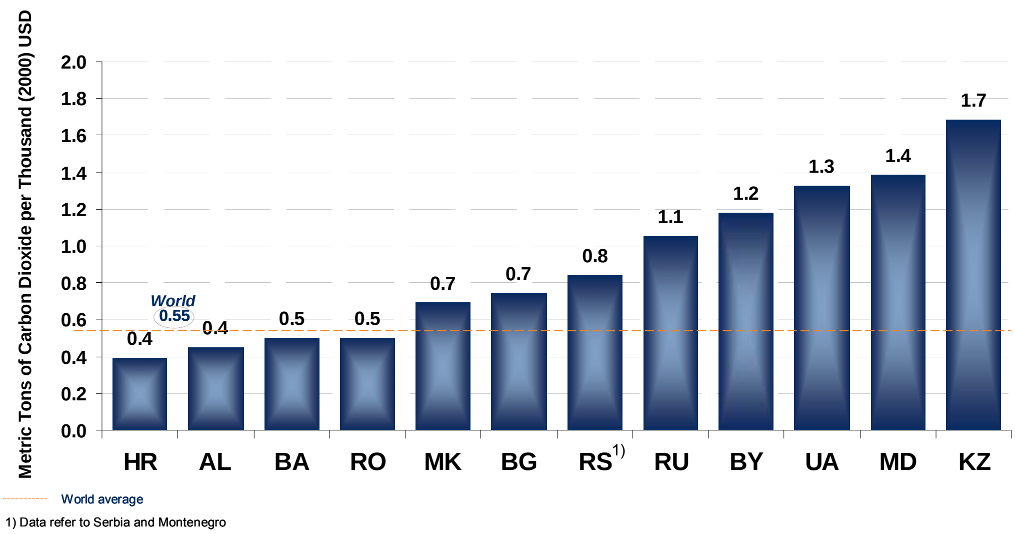


Source: UNDP[20] (2006); Illustration by Pöyry

Figure 3.21 indicates the carbon intensity of the project countries[x], i.e. the emissions from the consumption and flaring of fossil fuels per thousand USD of GDP (based on Purchasing Power Parities).

Kazakhstan exhibits the highest carbon intensity of all project countries. Only Albania, Bosnia and Herzegovina, Croatia and Romania have a carbon intensity, which is below world average[21].

Figure 3.21: *Carbon intensity (2006) - Emissions from the consumption and flaring of fossil fuels per thousand USD of Gross Domestic Product using Purchasing Power Parities*



Source: Energy Information Administration [21] (2006); (Illustration by Pöyry)

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x Regarding the Republic of Moldova, there are discrepancies between IEA and national data. According to the national available information the carbon intensity in 2006 was in the Republic of Moldova 1.3 metric tons of carbon dioxide emissions per thousand (2000) US $.

3.5. *Barriers to the Implementation of Investment in Energy Efficiency and Renewable Energy Projects*

The identification of barriers to implementation of investments in energy efficiency and renewable energy projects is one of the main goals of the Regional Analysis and will be discussed in detail in the section related to the analyses of the single countries as well as in the corresponding regional summary.

As a starting point to the investigation of the project countries, key assumptions have been made regarding political, economic and environmental framework conditions common to the region:

- The inefficient and polluting energy systems in the project region pose evident economic and environmental problems and are at the same time interwoven with promising opportunities for reducing global greenhouse gas emissions;
- Eastern European countries suffered from the low productivity and living standards associated with inefficient energy use long before central planning economies came to an end;
- Decision makers in the project region still lack the confidence that experience would give them to promote energy efficiency and renewable energy investments;
- Energy managers have the technical skills to select, install and maintain the technology needed but generally they still lack expertise in preparing bankable project proposals;
- In most countries of the project regions (however, there are exceptions such as the Russian Federation), local banks are still unfamiliar with project financing techniques. Furthermore, most commercial banks are still reluctant to provide finance in a sector perceived as highly risky;
- Establishing prices for end-users reflecting the cost of production would allow energy efficiency and, to a lesser extent, renewable energy investments to become inherently cost-effective and self-financing;
- The reform of energy prices and the elimination of subsidies are on the macro-economic agenda in most of the countries in the project region; however, there are huge differences between the countries as to the progress in the realization of these reforms;
- Energy efficiency improvements are closely linked to the increase in industrial and service sector productivity and living standards; in fact, the success of any energy efficiency measure will strongly depend on its ability to take these critical factors into consideration;
- Rationalizing the large capital investments in the energy infrastructure of the countries in the project region could help maintain economic growth through productivity gains, attract foreign investments and diminish loss of domestic capital.

PART II: REGIONAL ANALYSIS METHODOLOGY

Chapter 4: Key Assumptions Concerning Energy Efficiency Market Formation in the Participating Countries

Key assumptions concerning barriers to the implementation of investments in energy efficiency and renewable energy were introduced In Chapter 3.5. These assumptions serve as a foundation for the Regional Analysis in respect of the assessment of these barriers in each project country (Chapter 11).

The Regional summary from the analysis of the policy framework (Chapter 12) confirms the validity of these key assumptions. Chapter 18 (Conclusions and Recommendations for the Project Countries) illustrates that many of the identified barriers also provide opportunities to overcome or at least better manage them. Market economies have abundant examples of every aspect of successful energy efficiency and renewable energy applications including innovative financing models. New European Union countries from Central Europe also have extensive and growing experience in the area of energy efficiency market formation that can be transferred to the neighbouring countries in South-Eastern and Eastern Europe. Some of these experiences are reflected in the Case Studies provided in Chapter 16.

Chapter 5: Overall Project Approach

The Regional Analysis is based on an interactive approach, which means that, besides Pöyry and the UNECE Project Management Unit, several experts and institutions from the participating countries have been involved in the project. The overview of the contributions to the project is provided in the next section.

The project activities have been divided into four sequential phases. The project phases and the related activities and results are depicted in Figure 5.1. The overall timeline of the project activities was from January 2009 until end of December 2009.

Figure 5.1: Project approach

Tasks	**Outline of the regional analysis**	**Analysis or Energy Policies and Identification of Bottlenecks**	**Preparation of report draft**	**Presentation and publication of final report**
Results	Project Implementation Plan	Analysis Results, Identified bottlenecks and case studies	Report Draft with Case Studies	Published Final Report
Activities	• Project Implementation Plan with time schedule of the project • Methodological outline of the analysis	• Analysis of energy market development • Analysis of policy reforms • Identification of bottlenecks and case studies	• Elaboration of case studies • Development of recommendations for policy reforms • Preparation of report draft	• Presentation of the work in progress • Finalization of report • Publication of report
Interaction	• First meeting with NPIs/ NC • Presentation of working plan to 13th Session of Ad Hoc Group of Experts	• Data and Information exchange with NPIs • Interviews and meetings with NPIs/ NC and analysis results • Presentation to Steering Committee of Project EE21	• Interviews and meetings with NPIs and NC on case studies and policy reforms • Presentation of work in progress to 14th Session of Ad Hoc Group of Experts	• Presentation of the report at an international workshop in one of the participating countries
Time-scale	January-February 2009	March-Mai 2009	June-October 2009	Nov. - December 2009

Project Milestones

Chapter 6: Methodology for Collection and Consolidation of Data

6.1. *Analysis of Energy Market Development and Progress in Policy Reforms and Development of Regulatory Frameworks*

In order to evaluate and assess the development of the energy markets in the participating countries and to identify possible bottlenecks and barriers for investments, the following data and indicators have been collected, consolidated and evaluated for each of the investigated countries.

Table 6.1: *Information collected for the analysis of energy markets and their development*

Topic	Information
Energy supply	• Primary energy sources • Energy balances of the country (primary energy sources, electricity, heating) • Electricity production and heat supply • Installed power generation capacity and technologies in use
Energy demand	• Demand of primary energy sources by consumption sectors (industry, transport, residential, agriculture, services) • Electricity, gas and heat demand by consumption sectors (industry, transport, residential, agriculture, services)
Energy markets	• Structure of the national electricity, gas and heating markets • Degree of concentration of national electricity, gas and heating markets • Dominant players at national and regional level • Wholesale tariffs for electricity, gas and heat • Tariff policies for final customers (by customer sector)
Energy efficiency	• Energy intensity of the country/by consumption sector (industry, transport, residential, agriculture, services) • Estimated potential for energy savings • Losses from electricity, gas and heating transport/distribution grids • Degree of metering of final customers for electricity, gas and heat (by customer sector)/metering technologies deployed • Market for white certificates • Market potential and market players for energy efficiency • ESCOs: amount, size (employees, revenues), areas of activities, ownership
Renewable energy sources	• Deployment for renewable energy sources for electricity production (installed capacity/technologies used/yearly production) • Estimated potential for renewable energy sources • Production/import/export of biogas and other biofuels (including wood and timber) for transportation and heating purposes • Market players for renewable energy sources • Market value of electricity from renewable energy sources/biogas/biofuels compared to conventional fuels

Furthermore, in order to evaluate and assess the progress of regulatory reforms and policies and to identify possible bottlenecks and barriers for investments, the following policy information has been collected, consolidated and evaluated for each of the investigated countries.

Table 6.2: *Information collected for the analysis of policy reforms and their regulatory frameworks*

Topic	Information
General framework for investments	• Current regulatory framework • Presence and nature of foreign/private investments • Attractiveness for foreign/private investors • Regulatory framework for public-private partnerships • Available financing instruments and mechanisms • Economic Freedom Index and other economic indicators
Barriers to new entrants	• Explicit or implicit barriers to new market entrants in the energy markets • Presence of foreign/private market operators/new entrants in the energy markets • Authorization procedures for investments in the renewable energy and energy efficiency sectors (subjects involved, procedures, duration, costs, risks)
Energy policies	• Current regulatory framework for the energy markets (electricity, gas and heat) • Degree of liberalization of electricity and gas markets • Current progress in the liberalization of electricity and gas markets and expected developments in the future
Energy policy-makers	• Energy authorities and price regulators for electricity, gas, renewable energy sources and energy efficiency: - Areas of competence - Regulatory power - Shareholders/governing institutions - Size (number of employees) and yearly budget
Policies on energy efficiency	• Current regulatory framework for energy efficiency • National and regional targets for energy efficiency (industry, transport, housing, appliances) • Incentive structure and volume • Initiatives and programmes (private/public)
Policies on renewable energy sources	• Current regulatory framework for renewable energy sources • National and regional targets for renewable energy sources (electricity, biogas, biofuels) • Incentive structure and volume • Initiatives and programmes (private/public)
Inter-national commit-ments	• Kyoto Protocol (targets, deployment of CDM/JI projects and other project-based mechanisms) • Commitments towards the European Union (targets, progress of implementation, instruments adopted) • Other international commitments

6.2. *Sources and Contributions to the Project*

To collect information and data presented in this report, a literature review has been undertaken. A complete list of sources for analysis is provided at the end of the report. In general, strong relevance has been given to the utilization of internationally acknowledged sources of information, such as: European Bank for Reconstruction and Development (EBRD), Energy Charter, Enerdata, European Commission, Eurostat, International Energy Agency, United Nations Development Programme (UNDP), United Nations Economic Commission for Europe (UNECE), United Nations Environment Programme (UNEP), World Bank and so on.

However, despite the extensive literature review undertaken, the present Regional Analysis is built not only upon review of literature information and data, but also upon the contributions of national experts from the participating countries as well as from the UNECE.

In particular, valuable contributions have been provided from the following experts and institutions:

- **National Participating Institutions:** These are institutions which play a key role in the achievement of the overall project on Financing Energy Efficiency Investments and in the implementation of project results at a local level. The list of representatives of the National Participating Institutions participating in the project is provided in Annex 5;
- **National Coordinators and Government Representatives:** National coordinators and government representatives represent the governments of the participating countries who are involved in the development of project results. Their role is on one side to bring in their expertise and their point of view as representatives of regulating authorities and on the other to act as facilitators for implementation of the proposed policy reforms at a later stage. The list of National Coordinators and government representatives participating in the project is provided in Annex 5;
- **Members of the Ad Hoc Group of Experts on Energy Efficiency Investments for Climate Change Mitigation:** These are internationally acknowledged experts which gather twice a year at the sessions organized by the United Nations Economic Commission for Europe to discuss and review the progress of the UNECE project on Financing Energy Efficiency Investments. These experts have played a valuable role in the development of the Regional Analysis by bringing in their expertise, critical point of view and project experience during workshops and seminars organized in the course of the projects, as well as by providing reviews to selected sections of the draft report;
- **United Nations Economic Commission for Europe Project Management Unit:** The UNECE Project Management Unit is the initiator of the Regional Analysis and is in charge of the approval of the project deliverables and results. In this function, it played a key role in the project steering as well as in the achievement of the project results. A particularly valuable contribution to the Regional Analysis have been the results of the 11 assessment missions conducted by the UNECE Project Management Unit, jointly with selected advisors, in the participating countries in the forefront of the start of the Regional Analysis. The results of these assessment missions are collected in the UNECE publication[22] "Financing Energy Efficiency Investments for Climate Change Mitigation Project: Investor Interest and Capacity Building Needs".

6.3. *Cooperation with National Participating Institutions in the Project Countries*

As mentioned in the previous section, throughout the entire timeframe of the Regional Analysis, an intensive and highly productive cooperation between Pöyry and the National Participating Institutions has taken place in order to achieve the project objectives.

In particular, the following contributions by the National Participating Institutions have been of crucial importance to the elaboration of the Regional Analysis results:

- Provision of information in form of questionnaires prepared by Pöyry and additional documentation on national energy policies, joint discussion and clarification of the information provided;
- Organization of interviews with local experts, policymakers, financing institutions and project developers in each of the project countries; the overview of the missions conducted by Pöyry in the project countries is provided in the figure below;
- Review and discussion of the country analyses, the identified barriers, and the proposed recommendations for policy reforms;
- Discussion and review of the twelve Case Studies.

Figure 6.1: Overview of missions performed in the participating countries

Bosnia-Herzegovina	**14.-15. April, 2009**	**Rep. of Moldova**	**14.-15. May, 2009**
Serbia	**16-17. April, 2009**	**Kazakhstan**	**7.-10. July, 2009**
Croatia	**21.-22. April, 2009**	**Albania**	**14.-15. July, 2009**
FYROM	**4.-6. May, 2009**	**Russian Federation**	**20.-21. July, 2009**
Bulgaria	**7.-8. May, 2009**	**Belarus**	**22.-24. July 2009**
Ukraine	**12.-13. May, 2009**	**Romania[1)]**	**No country mission**

[1)] Currently, no active participation in the project activities

6.4. *Structure of Country Analyses*

The twelve country analyses provided in the next part have been developed with the same structure in order to allow easy cross-country comparisons and quick reference reading. The structure of the country analyses is provided below.

Table 6.3: Structure of the country analyses

Structure of the country analyses
Overview of the economic situation • General demographic data • Current political situation and outlook • Gross Domestic Product
Energy Sector and development of energy markets • Energy supply • Energy demand • Energy markets - Electricity market - Electricity tariffs - Gas market - Gas tariffs - Heating market - Heating tariffs
Current situation with respect to energy efficiency and future potential for energy savings and increase in efficiency • Energy intensity • Energy losses from electricity and gas grids • District heating grid • Other sources of inefficiency • Estimated potential for energy savings by sector • ESCOs and other initiatives in energy efficiency
Current situation with respect to renewable energy sources and future deployment potential • Deployment of renewable energy sources • Estimated potential for renewable energy sources • Projects and initiatives in renewable energy sources

Institutional, regulatory and policy framework for energy efficiency and renewable energy sources

- Policymakers in the energy sector
  - Institutional policymakers
  - Non-institutional policymakers
- Regulatory and administrative institutions at the regional and local level
- Energy policy and regulatory framework
- Policy and regulation on energy efficiency
- Policy and regulation on renewable energy sources
- International commitments and current status of implementation
  - EU Regulation
  - Kyoto Protocol
  - Other international commitments

Economic incentives and financing schemes for energy efficiency and renewable energy projects

- General investment climate in the country
- Incentives for energy efficiency
- Incentives for renewable energy sources
- Financing mechanisms for energy efficiency and renewable energy sources
  - National financing schemes
  - International financing schemes
  - Commercial financing schemes
- Other support mechanisms

Barriers to the implementation of energy efficiency and renewable energy projects

- Legal, institutional and administrative barriers
- Economic and financial barriers
- Lack of awareness, human capacities and professional skills

Chapter 7: Synthesis of Data and Validation of Results

7.1. *Synthesis of Data in the Report*

Once the data and the policy information for the country analyses were collected and consolidated into the predefined structure, the next challenge faced was to synthesize the information in order to ensure on one side a wide-ranging perspective on the current situation of the single countries as well as an in-depth understanding of the current state of progress in policy reforms (in the awareness that the markets and the political environment in the project countries are intrinsically dynamic and subject to sudden and unexpected changes) and at the same time ensure a good readability of a report covering such a large variety of countries and economic-political environments.

Therefore, the main body of the country analyses is to be understood as a clear defined storyline, which allows the reader to quickly grasp the main issues and challenges associated with the single country and at the same time easily make cross-country comparisons. As a consequence, a high number of detailed figures and data, absolute values related to the charts in the main body of the report (which are deliberately given in percentage in order to allow comparison countries with huge disparities in geographical and economical size), secondary economic and energetic indicators, currency and exchange rates, metric units used and lists of abbreviations are all to be found in the Annexes attached to the main report of the Regional Analysis.

7.2. *Energy Balances*

One of the main instruments to understand the situation in the energy sector of a country is its energy balance. Considerations on the deficit or surplus of primary energy sources (electricity, heat) as well as on the degree of diversification of energy sources deployed in the country are the starting point for any analysis of the energy sector of a country.

For the purpose of this report, the energy balances of the project countries have been calculated using the data and the balance methodology provided by the International Energy Agency[5]. The exhaustive definition of the energy balance calculation methodology of the International Energy Agency is described in its Energy Statistics Manual[23].

The total energy supply, as presented in the respective country analysis of the project region countries (e.g. Figure 11.4) has been calculated by summing up the domestic production and imports (the definition[24] of each input variable is listed in Table 7.1). As domestic production in general consists only of primary energy sources, the position heat production needs some further explanation. This number includes only waste heat of various grades produced as by-products in industrial processes and heat generated by heat pumps.[xi]

The final energy consumption (e.g. Figure 11.7), also called total final consumption (TFC) by the International Energy Agency, is by definition of the IEA (see Table 7.1) the sum of consumption by the different end-use sectors, which includes the industry sector, transport sector, other sectors (residential, commercial and public services, agriculture/forestry, fishing and non-specified consumption) and non-energy use.

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xi Heat pumps are devices for transferring heat from a cold source to a warmer source and may be used to draw heat from outside a building to warm the inside.

Table 7.1: Glossary of energy balance input variables

Variable	Definition
Production	Production is the production of primary energy, i.e. hard coal, lignite/brown coal, peat, crude oil, NGLs, natural gas, combustible renewables and waste, nuclear, hydro, geothermal, solar and the heat from heat pumps that is extracted from the ambient environment. Production is calculated after removal of impurities.
Coal/peat	Coal/peat includes all coal, both primary (including hard coal and lignite/brown coal) and derived fuels (including patent fuel, coke oven coke, gas coke, BKB, coke oven gas, blast furnace gas and oxygen steel furnace gas). Peat is also included in this category.
Crude oil	Crude oil comprises crude oil, natural gas liquids, refinery feedstocks and additives as well as other hydrocarbons.
Petroleum products	Petroleum products comprises refinery gas, ethane, LPG, aviation gasoline, motor gasoline, jet fuels, kerosene, gas/diesel oil, heavy fuel oil, naphtha, white spirit, lubricants, bitumen, paraffin waxes, petroleum coke and other petroleum products.
Gas	Gas includes natural gas (excluding natural gas liquids) and gas works gas. The latter appears as a positive figure in the "gas works" row but is not part of indigenous production.
Nuclear	Nuclear shows the primary heat equivalent of the electricity produced by a nuclear power plant with an average thermal efficiency of 33 per cent.
Hydro	Hydro shows the energy content of the electricity produced in hydro power plants. Hydro output excludes output from pumped storage plants.
Combustible renewables & waste	Combustible renewables & waste comprises solid biomass, liquid biomass, biogas, industrial waste and municipal waste. Biomass is defined as any plant matter used directly as fuel or converted into fuels (e.g. charcoal) or electricity and/or heat. Included here are wood, vegetal waste (including wood waste and crops used for energy production), ethanol, animal materials/wastes and sulfite lyes. Municipal waste comprises wastes produced by the residential, commercial and public service sectors that are collected by local authorities for disposal in a central location for the production of heat and/or power.
Other	Other includes geothermal, solar, wind, tide/wave/ocean energy, electricity, and heat. Unless the actual efficiency of the geothermal process is known, the quantity of geothermal energy entering electricity generation is inferred from the electricity production at geothermal plants assuming an average thermal efficiency of 10 per cent. For solar, wind and tide/wave/ocean energy, the quantities entering electricity generation are equal to the electrical energy generated. Direct use of geothermal and solar heat is also included here. Electricity is accounted for at the same heat value as electricity in final consumption (i.e. 1 GWh = 0.000086 Mtoe). Heat includes heat that is produced for sale and is accounted for in the transformation sector.
Imports and exports	Imports and exports comprise amounts having crossed the national territorial boundaries of the country, whether or not customs clearance has taken place. a) Oil and gas quantities of crude oil and oil products imported or exported under processing agreements (i.e. refining on account) are included. Quantities of oil in transit are excluded. Crude oil, NGL and natural gas are reported as coming from the country of origin; refinery feedstocks and oil products are reported as coming from the country of last consignment. Re-exports of oil imported for processing within bonded areas are shown as exports of product from the processing country to the final destination. b) Coal: Imports and exports comprise the amount of fuels obtained from or supplied to other countries, whether or not there is an economic or customs union between the relevant countries. Coal in transit is not included. c) Electricity: Amounts are considered as imported or exported when they have crossed the national territorial boundaries of the country.
International marine bunkers	International marine bunkers covers those quantities delivered to ships of all flags that are engaged in international navigation. The international navigation may take place at sea, on inland lakes and waterways, and in coastal waters. Consumption by ships engaged in domestic navigation is excluded. The domestic/international split is determined on the basis of port of departure and port of arrival, and not by the flag or nationality of the ship. Consumption by fishing vessels and by military forces is also excluded.
International aviation bunkers	International aviation bunkers covers deliveries of aviation fuels to aircraft for international aviation. Fuels used by airlines for their road vehicles are excluded. The domestic/international split should be determined on the basis of departure and landing locations and not by the nationality of the airline. For many countries this incorrectly excludes fuel used by domestically owned carriers for their international departures.
Stock changes	Stock changes reflects the difference between opening stock levels on the first day of the year and closing levels on the last day of the year of stocks on national territory held by producers, importers, energy transformation industries, and large consumers. A stock build is shown as a negative number, and a stock draw as a positive number.

Total primary energy supply	Total primary energy supply (TPES) is made up of production + imports – exports – international marine bunkers – international aviation bunkers ± stock changes. For the world total, international marine bunkers and international aviation bunkers are not subtracted from TPES.
Transfers	Transfers includes both interproduct transfers, products transferred and recycled products.
Statistical differences	Statistical differences includes the sum of the unexplained statistical differences for individual fuels, as they appear in the basic energy statistics. It also includes the statistical differences that arise because of the variety of conversion factors in the coal and oil columns.
Electricity plants	Electricity plants refers to plants which are designed to produce electricity only. If one or more units of the plant is a CHP unit (and the inputs and outputs cannot be distinguished on a unit basis) then the whole plant is designated as a CHP plant. Both main activity producers and autoproducer plants are included here.
Combined heat and power plants	Combined heat and power plants refers to plants which are designed to produce both heat and electricity, sometimes referred as cogeneration power stations. If possible, fuel inputs and electricity/heat outputs are on a unit basis rather than on a plant basis. However, if data are not available on a unit basis, the convention for defining a CHP plant noted above is adopted. Both main activity producers and autoproducer plants are included here.
Heat plants	Heat plants refers to plants (including heat pumps and electric boilers) designed to produce heat only, which is sold to a third-party under the provisions of a contract. Both main activity producers and autoproducer plants are included here.
Gas works	Gas works is treated similarly to electricity generation, with the quantity produced appearing as a positive figure in the gas column, inputs as negative entries in the coal and petroleum products columns, and conversion losses appearing in the total column.
Petroleum refineries	Petroleum refineries shows the use of primary energy for the manufacture of finished petroleum products and the corresponding output. Thus, the total reflects transformation losses. In certain cases the data in the total column are positive numbers. This can be due to either problems in the primary refinery balance or to the fact that the IEA uses regional net calorific values for the petroleum products.
Coal transformation	Coal transformation contains losses in transformation of coal from primary to secondary fuels and from secondary to tertiary fuels (hard coal to coke, coke to blast furnace gas, lignite to BKB, etc.).
Liquefaction	Liquefaction includes diverse liquefaction processes, such as coal liquefaction plants and gas-to-liquid plants.
Other transformation	Other transformation covers non-specified transformation not shown elsewhere. It also includes backflows from the petrochemical sector.
Own use	Own use contains the primary and secondary energy consumed by transformation industries for heating, pumping, traction, and lighting purposes [International Standard Industrial Classification (ISIC) Divisions 10-12, 23 and 40]. These quantities are shown as negative figures. Included here are, for example, coal mines' own use of energy, power plants' own consumption (which includes net electricity consumed for pumped storage), and energy used for oil and gas extraction.
Distribution and transmission losses	Distribution and transmission losses include losses in gas distribution, electricity transmission, and coal transport.
Total final consumption (TFC)	Total final consumption (TFC) is the sum of consumption by the different end-use sectors. Backflows from the petrochemical industry are not included in final consumption.

Industry sector	Industry sector consumption is specified in the following subsectors (energy used for transport by industry is not included here but reported under transport): • Iron and steel industry [ISIC Group 271 and Class 2731]; • Chemical and petrochemical industry [ISIC Division 24] excluding petrochemical feedstocks; • Non-ferrous metals basic industries [ISIC Group 272 and Class 2732]; • Non-metallic mineral products such as glass, ceramic, cement, etc. [ISIC Division 26]; • Transport equipment [ISIC Divisions 34 and 35]; machinery comprises fabricated metal products, machinery and equipment other than transport equipment [ISIC Divisions 28 to 32]; • Mining (excluding fuels) and quarrying [ISIC Divisions 13 and 14]; • Food and tobacco [ISIC Divisions 15 and 16]; • Paper, pulp and printing [ISIC Divisions 21 and 22]; • Wood and wood products (other than pulp and paper) [ISIC Division 20]; • Construction [ISIC Division 45]; • Textile and leather [ISIC Divisions 17 to 19]; • Non-specified (any manufacturing industry not included above) [ISIC Divisions 25, 33, 36 and 37].
Transport sector	Transport sector includes all fuels used for transport [ISIC Divisions 60 to 62]. It includes transport in the industry sector and covers road, railway, domestic aviation, domestic navigation, fuels used for transport of materials by pipeline and non-specified transport. Fuel used for ocean, coastal and inland fishing should be included in fishing (other sectors). Please note that international marine bunkers and international aviation bunkers are also included here for world total.
Other sectors	Other sectors covers residential, commercial and public services [ISIC Divisions 41, 50-52, 55, 63-67, 70-75, 80, 85, 90-93, 95 and 99], agriculture/forestry [ISIC Divisions 01 and 02], fishing [ISIC Division 05] and non-specified consumption.
Non-energy use	Non-energy use covers those fuels that are used as raw materials in the different sectors and are not consumed as a fuel or transformed into another fuel. Non-energy use also includes petrochemical feedstocks. Non-energy use is shown separately in final consumption under the heading non-energy use.

Source: IEA[24] (2009)

Table 7.2: Definition of indicators used in the report

Indicator	Definition
Gross Domestic Product (GDP)	Gross Domestic Product is a measure of economic activity in a country. It is calculated by adding the total value of a country's annual output of goods and services. GDP = private consumption + investment + public spending + the change in inventories + (exports - imports). It is usually valued at market prices; by subtracting indirect tax and adding any government subsidy, however, GDP can be calculated at factor cost. This measure more accurately reveals the income paid to factors of production. Adding income earned by domestic residents from their investments abroad, and subtracting income paid from the country to investors abroad, gives the country's gross national product (GNP)[25].
Purchasing Power Parity (PPP)	Purchasing Power Parity is a method for calculating the correct value of a currency, which may differ from its current market value. It is helpful when comparing living standards in different countries, as it indicates the appropriate exchange rate to use when expressing incomes and prices in different countries in a common currency. By correct value, economists mean the exchange rate that would bring demand and supply of a currency into equilibrium over the long-term. The current market rate is only a short-run equilibrium. Purchasing Power Parity (PPP) says that goods and services should cost the same in all countries when measured in a common currency. PPP is the exchange rate that equates the price of a basket of identical traded goods and services in two countries. PPP is often very different from the current market exchange rate[26].
Energy intensity at Purchasing Power Parity	Energy use (kilogram of oil equivalent) per $1 GDP (PPP) is energy use measured in units of oil equivalent per $1 of GDP converted from national currencies using Purchasing Power Parity (PPP) conversion factors. The indicator provides a measure of energy intensity (it is the inverse of energy efficiency). Differences in this ratio over time and across countries reflect structural changes in the economy, changes in the energy efficiency of particular sectors and differences in fuel mixes. In principle, the lower the ratio, the better the energy efficiency. Total commercial energy consumption is converted to kilogramme of oil equivalence using standard tables. GDP data must be converted using PPP tables so that real output is compared with real energy input. National total GDP is deflated (currently to 2005 US PPP dollars) by reference to PPP tables. Energy input is divided by GDP to derive the ratio.
Heritage Foundation Investment Freedom	Since 1995 The Heritage Foundation, a Washington-based think tank, and The Wall Street Journal (HER) have tracked economic freedom around the world through the Index of Economic Freedom. The Index gauges the economic success of the world's nations through a series of 10 broad factors of economic freedom. One of these factors is the Investment Freedom. This component scrutinizes each country's policies toward the free flow of investment capital (foreign investment as well as internal capital flows) in order to determine its overall investment climate. The authors assess all countries using the same rubric. Questions examined include whether there is a foreign investment code that defines the country's investment laws and procedures; whether the government encourages foreign investment through fair and equitable treatment of investors; whether there are restrictions on access to foreign exchange; whether foreign firms are treated the same as domestic firms under the law; whether the government imposes restrictions on payments, transfers, and capital transactions; and whether specific industries are closed to foreign investment[27].
Transparency International Corruption Perceptions Index (CPI)	Transparency International's Corruption Perceptions Index (CPI) for 2008, which uses quantitative data to assess the perception of corruption in the business environment, is a high-level indicator for the overall climate for investments. The 2008 CPI scores 180 countries on a scale from zero (highly corrupt) to ten (highly clean).

7.3. *Data Gaps and Inconsistencies*

Another challenge faced during the validation of the collected results was the issue of incomplete data and of data inconsistencies:

- **Gaps in databases:** especially in the countries of former Yugoslavia, repeated political changes in the national boundaries and the severe damage to parts of the energy infrastructure as a consequence of civil war have led to a lack of reliable data and statistics related to the energy sector. In this case, the only possible solution was to point out the urgent need of the establishment of an energy database compatible with International Energy Agency statistics and to be aware that any analysis or recommendations related to these countries must be taken with great care as for what concerns quantitative estimations;

- **Inconsistencies between different data sources:** in other cases, such as is the case of the Republic of Moldova, some discrepancies were encountered between national data sources (e.g. National Bureau of Statistics of Moldova, www.statistica.md) and international data sources (International Energy Agency, Enerdata). The origin of these discrepancies is not always easy to tackle: in certain cases they may originate from changes in the national or electric boundaries of a country; in others, they may come from different historical series taken into account by the data providers; finally, in other cases, they may simply come from differences in statistical aggregation of the data. Whatever the origin may be, the approach used in the report every time such an issue was encountered was on one side to try to provide a plausible explanation for the discrepancies and on the other side to provide the national statistics, whenever they appeared to be relevant for the completeness of the analysis, in the report annexes. In the main report, however, data from international data sources have been maintained in order to ensure consistency between the data from the single countries as well as cross-country comparisons.

7.4. *Validation of Data*

Once the country analyses had been prepared, a two-step review and validation process has been undertaken to ensure a reliable analysis background for the development of recommendations for policy reforms:

- **Internal review through Pöyry pool of experts:** to ensure high quality of the project results, Pöyry has appointed a pool of experts (consisting both of country experts and of policy experts), which undertook an independent review of the country analyses developed by the core project team and provided critical inputs and feedbacks that were implemented in the finalized version of the report;
- **External review through National Participating Institutions:** to ensure that the results of the country analyses truly reflect the actual situation in the participating countries and most of all to ensure that the findings and results can be implemented at the local level in later stages of the overall project on Financing Energy Efficiency and Renewable Investments, the single country analyses have been sent to the respective National Participating Institutions for review and validation. Similarly to the internal review, the critical inputs and feedbacks that have been received by the national counterparts have been implemented in the finalized version of the report.

Once the country analyses had been reviewed and validated, the next and final step of the Regional Analysis was the development of recommendations for policy reforms. Again, a two-step approach was adopted: first, a set of recommendations for policy reforms (both at the level of the single countries and at the regional level) has been developed by the Pöyry project team jointly with senior policy experts from the Pöyry pool of experts. Subsequently, the proposals for recommendations have been presented and discussed at a dedicated workshop held among the UNECE offices with government representatives from the participating countries, the National Participating Institutions, the National Coordinators, the UNECE Project Management Unit as well as the members of the Ad Hoc Group of Experts on Energy Efficiency Investments for Climate Change Mitigation. The inputs and feedbacks from workshop discussions have been subsequently implemented in the finalized version of the report.

Chapter 8: Methodology for Identification and Replication of Case Studies

8.1. *Criteria for Identification of the Case Studies*

The Case Studies are meant to serve as examples of success stories of overcoming bottlenecks and barriers for investments. Their purpose is to allow cross-country comparison and to motivate policymakers to replicate the success stories in their own countries, through adaptation to the local specificities and peculiarities.

The 12 Case Studies have been identified, whenever possible, among the participating countries, or otherwise among countries with similar framework conditions, in order to allow the comparison between the country that already realized the success story and the country who is still facing an analogous bottleneck.

For each Case Study, the starting point for identification were the barriers to investments identified in the project countries, in order to ensure that there is a clear link between the barriers to investments in the project regions (see previous chapter) and the Case Studies presented.

8.2. *Criteria for Replication of Case Studies*

In order to ensure that the results from the analysis of the Case Studies are applicable and relevant for the countries in the project region, each Case Study is recommended for replication in one or more project countries.

The choice of countries associated with each Case Study is based on the identification of common barriers to investments in energy efficiency and renewable energy sources between the country where the Case Study was originated and the project country for which replication is recommended.

The association between Case Studies and project countries was done in three logical steps: overview and clustering of the barriers to investments identified in the project countries, overview of barriers that have been overcome by the Case Studies and association between Case Studies and project countries.

Step 1: Overview of barriers identified in the project countries

Following the barriers to investments in energy efficiency and renewable energy sources that have been identified in each of the project countries, the first step was to consolidate and to group them into a homogenous list of barriers which are common to one or more of the project countries. Barriers that are related to the specific situation of one country and not or only to a limited extent relevant for the remaining countries have been grouped into more general barrier clusters. The overview of the clusters is given in Chapter 14 and Chapter 15.

Step 2: Overview of barriers to investments that have been overcome in the Case Studies

As from the identification criteria of the Case Studies, each Case Study describes a success story of barriers to investments that have been successfully overcome through policy reforms. Therefore the Case Studies have been chosen following the rationale that the barriers overcome are the same barriers that have been identified most frequently in the project region: each of the 12 Case Studies refers to at least one of the barriers identified in the country analyses of the project countries (certain Case Studies address more than one barrier). The overview of barriers to investments addressed by the 12 Case Studies is given in Chapter 14 and Chapter 15.

Step 3: Relevance of the Case Studies for the project countries and choice of countries proposed for replication

As a final step, the correlation between identified barriers in the project countries and barriers overcome in the analysed Case Studies provides the association between the project countries and the countries in which the Case Studies have been originated and hence serves as a starting point for the development of recommendations for replication.

Chapter 9: Methodology for Development of Recommendations

9.1. *Development of Recommendations from Country Analyses*

For each policy recommendation, the starting point was the identified barriers to investments in energy efficiency and renewable energy in the project country. The purpose is to provide an enabling framework for targeting and implementing policy reforms to overcome the identified barriers.

The recommendations are build on international best practice and success of policy instruments based on extensive ongoing Pöyry research and analysis. This analysis builds on reviews of international policy experience, literature reviews and dialogues with stakeholders worldwide.

The policy instrument appearing to be most suitable for overcoming the identified barriers has been selected and described taking into consideration the given country-specific framework conditions.

9.2. *Development of Recommendations from Case Studies*

Recommendations have been developed from Case Studies in terms of "lessons learned" from the analysis of the 12 Case Studies on overcoming barriers to enhanced energy efficiency and renewable energy use.

The purpose of the recommendations from Case Studies is to analyse "lessons learned" that can be usefully applied to other countries. Based on this analysis and the resultant lessons, series of country specific recommendations for promoting energy efficiency and renewable energy investments were formulated. These recommendations address the question of what should be done by the project countries. It seeks to provide practical ideas with regards to improvement and enhanced effectiveness of policy measures in a timely manner to ensure that successful practices are replicable.

9.3. *Final Consolidations and Development of Country-Specific Recommendations*

The recommendations, developed for each single project country, build on the 12 Case Studies on overcoming barriers to enhanced energy efficiency and renewable energy use and on extensive Pöyry experience in energy efficiency and renewable energy policy development.

All of the recommendations meet the following criteria:

- Likelihood to save a large amount of energy resp. generate a large amount of renewable energy at relatively low costs;
- Address existing market barriers and a significant gap in existing policy;
- Supported by international consensus;
- Recommendations are presented and discussed according to a common structure:
- Description of barrier and related country-specific framework conditions;
- Description of recommendation including, where possible, a specification for the implementing authority/agency as well as an estimation for the necessary timeframe and costs for the implementation of the policy measures. However, these estimations should be regarded as indicative only. Costs and timeframe will depend on many factors including the rate and effectiveness of implementation in each country. If applicable, the recommendation was linked to the "lessons learned" from the Case Studies.

Concerning cross-national conclusions of the Regional Analysis, regional and subregional recommendations were developed, which are applicable to the several countries in the project region.

Analogous to the Regional Analysis, regional and subregional recommendations are clustered as follows:

- Legal, institutional and administrative barriers;
- Market inefficiencies, economic and financial barriers;
- Lack of awareness and human capacities for the preparation of bankable projects.

The set of recommendations are presented and discussed according to the common structure:

- General description of best practice respectively barrier towards successful policy implementation;
- Identification of country-specific barriers;
- Description and outline of recommended policy implementation. If applicable, the recommendation was linked to suitable Case Studies.

It is important to view the recommendations presented as a cohesive set of measures and instruments, because the barriers to energy efficiency and renewable energy are pervasive, dispersed and complex. As such, if governments want to significantly enhance energy efficiency and renewable energy, the implementation of the full set of measures is highly recommended.

PART III: ANALYSIS OF POLICY FRAMEWORK AND EXISTING BARRIERS TO THE IMPLEMENTATION OF ENERGY EFFICIENCY AND RENEWABLE ENERGY PROJECTS

Chapter 10: Introductory Considerations

The analyses of the project countries presented in this chapter are the result of extensive collection of information and data from several sources, which have been subsequently consolidated and validated according to the methodology adopted for the Regional Analysis.

In certain cases, there are data inconsistencies or the data are missing, insufficient or outdated; in all these cases, reasonable and justified assumptions have been made in order to obtain plausible results and to ensure comparison between the countries.

After consolidation and validation of the collected information, the results provide the necessary base in order to infer the most important results of the country analysis:

- An overview of economic incentives and financing schemes for energy efficiency and renewable energy projects (national funds, international funding and support programmes, financing through commercial banks) that are available in each country of the project region;
- An overview of the barriers to the implementation of energy efficiency and renewable energy projects that were identified in each country. The identified barriers are presented and discussed according to a common structure:
  - Legal, institutional and administrative barriers;
  - Economic and financial barriers;
  - Lack of awareness, human capacities and professional skills.

These results are covered in the two last sections of each country analysis.

The last section of this chapter provides a regional summary of the barriers to investments that were identified in the project region and provides the background and starting point for the collection of Case Studies that will be presented, analysed and discussed in the next chapter.

Chapter 11: Country Analyses

11.1. Albania

11.1.1. Overview of economic situation

General demographic data

Albania is a country spreading over 28,748 km^2 and has a population of 3.173 million[22], which represents an average density of more than 125 inhabitants per km^2. 750,000 people (around 24 per cent of the total population) live in the capital, Tirana. In 2005, around 45 per cent of the population lived in urban regions, such as Durrës, Vlorë and Elbasan, up from 36 per cent in 1990. The population growth of the country averaged 0.5 per cent between 2001 and 2007, after being negative at the end of the 1990ies[28].

Current political situation and outlook

The Albanian Republic is a parliamentary democracy established under a constitution that was amended in 1998. Elections are held every four years to a unicameral 140-seat chamber, the People's Assembly. The government is currently headed by the Prime Minister and leader of the Democratic Party of Albania (DPA), Sali Berisha, who was elected as Prime Minister by a coalition government led by his party on 8 September 2005. On 28 June 2009, the Alliance of Change, the electoral coalition led by the DPA, won 70 of the 140 parliamentary seats. With the support of the Socialist Movement for Integration (SMI), which won four seats, Sali Berisha will be elected for another four years as Prime Minister of Albania[29]. The current President of the Republic, Bamir Topi, was elected by the parliament for a five-year term on 20 July 2007[30].

The next parliamentary elections are scheduled for 2013, while the next presidential elections will be held in 2012.

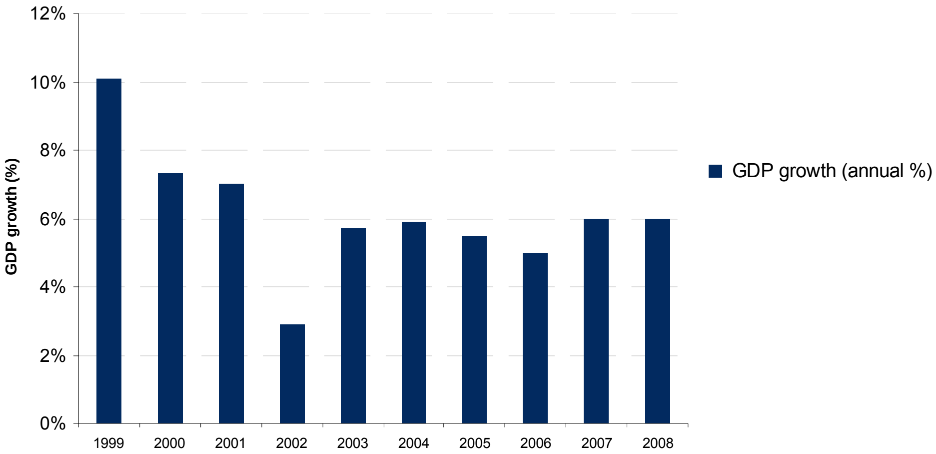
Albania is a candidate for accession to the European Union since January 2003, and it formally applied for EU membership on 28 April 2009.

Albania is divided into 12 administrative divisions called counties, 36 districts and 351 municipalities. Each region has its Regional Council and is composed of a number of municipalities and communes, which are the first level of local governance responsible for local needs and law enforcement.

Gross Domestic Product

Albania's GDP reached USD 11.3 billion in 2007, equivalent to an average of around USD 6,400/inhabitant based on Purchasing Power Parity. The economic growth has been over six per cent from 1999 to 2007 (see Figure 11.1). Due to the financial crisis the GDP growth for 2009 is expected to drop to one per cent. Furthermore, the current account deficit of Albania increased from 14 per cent to 17.5 per cent in 2008, mainly due to the decrease (-25 per cent) of remittances from abroad[31].

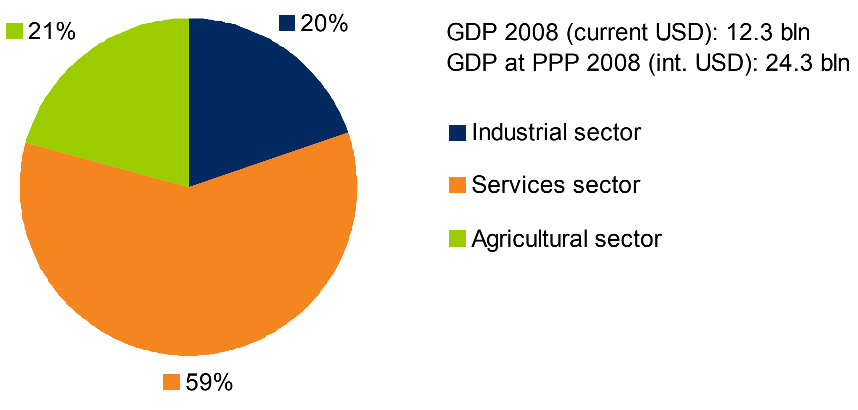
Figure 11.1: Real GDP growth of Albania



Source: World Bank[28] (2009)

The repartition of the GDP in 2008 can be seen in Figure 11.2. The Albanian economy is more than any other country in the project region based on agriculture, which has a GDP share of 20 per cent (whereas the average GDP share of agriculture in the project region is ten per cent). The contribution from the service sector to the GDP amounts to 59 per cent, while the industrial sector has a modest contribution to the GDP of 20 per cent. The main industrial activities in Albania are: mining, metallurgy, food processing, textiles, lumbering, and cement while the main natural resources are hydropower, petroleum, natural gas, timber, coal, bauxite, chromite, copper, iron ore, nickel, and salt[28].

Figure 11.2: Repartition of the Gross Domestic Product in Albania in 2008



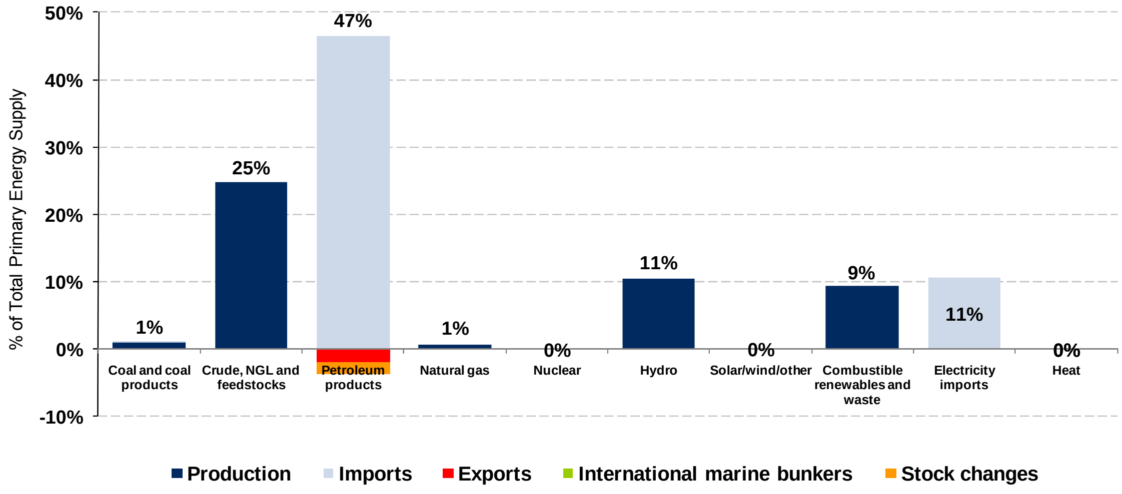
Source: World Bank[28] (2009)

11.1.2. Energy sector and development of energy markets

Energy supply

Albania is a net energy importer, mainly of petroleum products, and electricity (see Figure 11.3). Its total primary energy supply in 2007 amounted to 2,276 ktoe. Electricity imports accounted for 50 per cent of the total supply of electricity in 2007, due to a significantly lower hydro generation compared to previous years. Imports represent 57 per cent of the total primary energy supply of the country, while exports account for two per cent. Albania is a crude oil producer but not to an auto-sufficient extent. Albania is refining its whole crude oil production but still needs to import more than two-third of its petroleum products.

Figure 11.3: Energy balance of Albania by primary energy sources in 2007



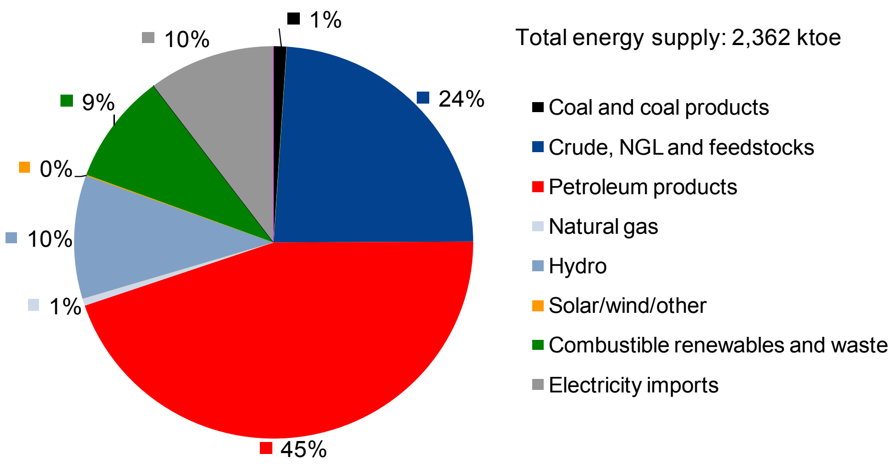
Source: IEA[5] (2009)

The large majority of primary energy sources in Albania consist of crude oil and derivate petroleum products, as shown in Figure 11.4 It is followed by hydro and biomass. The total energy supply amounts to 2,362 ktoe. Coal and gas have never represented a big share of the national energy supply.

In 2006, electricity generation in Albania amounted to 2,860 GWh, 97 per cent of which is produced through hydro power plants[5] (see Figure 11.5). The total installed capacity is 1,667 MW, 1,445 MW (87 per cent) of which is hydro capacity[32]. The list of Albanian power plants is shown in Table A.2.44.

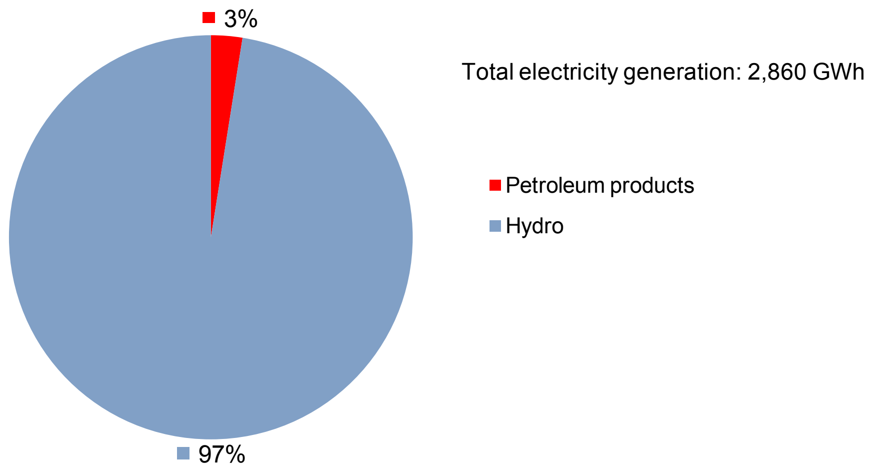
Heat production is very limited in Albania. Energy carriers for centralized heat production (both low and high temperature) are oil, solar thermal, and coal on a relatively balanced basis (see Figure 11.6).

Figure 11.4: Supply of primary energy by sources in 2007



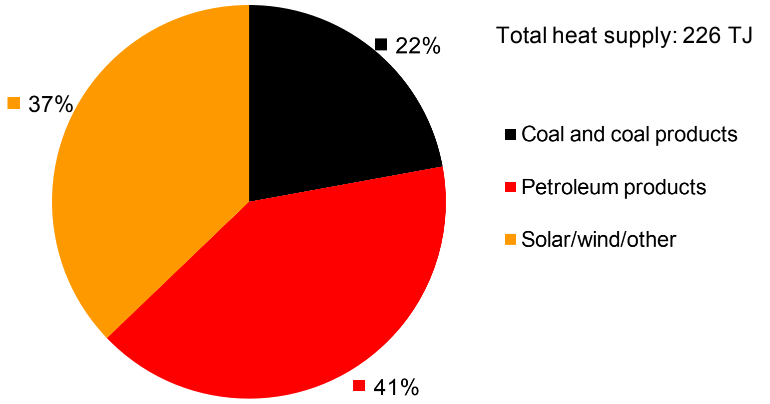
Source: IEA[5] (2009)

Figure 11.5: *Electricity generation by sources in 2007*



Source: IEA[5] (2009)

Figure 11.6: *Supply of heat by sources in 2007*

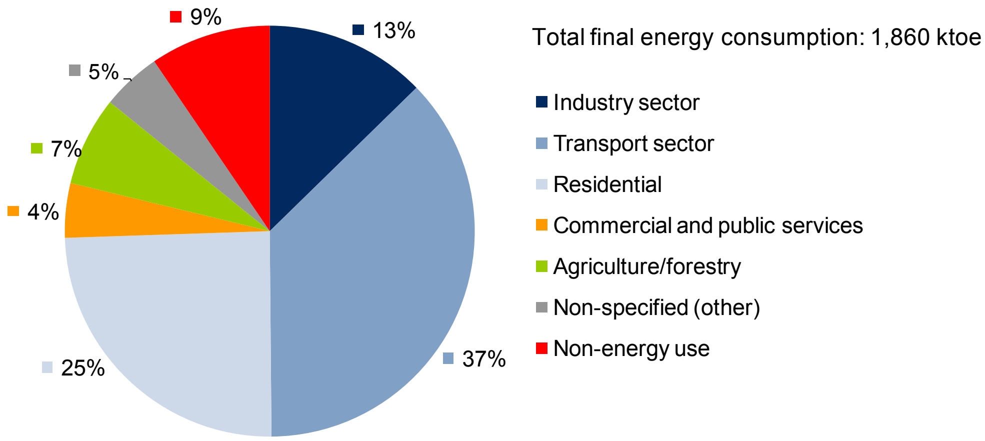


Source: IEA5 (2009)

Energy demand

The transport sector is the main consumer of energy in Albania with 36 per cent of the total final energy consumption, followed by the residential sector with 25 per cent, while the services sector, which accounts for 59 per cent of the GDP, only consumes four per cent of the total final energy consumption, as can be seen in the Figure 11.7.

Figure 11.7: Final consumption of primary energy sources by sectors in 2007



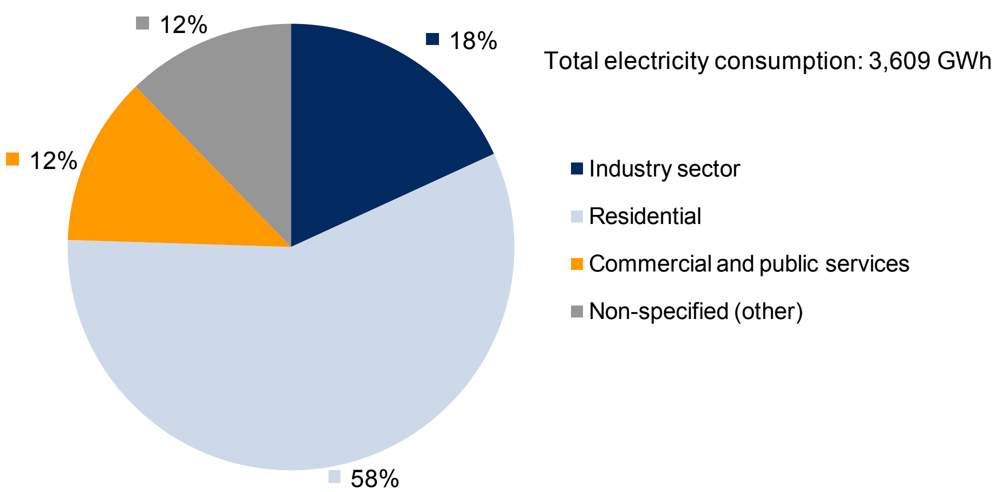
Source: IEA[5] (2009)

According to the IEA data of 2007, 58 per cent of the electricity demand is absorbed by the residential sector, while the industrial sector makes up to 18 per cent of the final consumption (see Figure 11.8). These values are in line with the Albanian Energy Balance 2007, which states that the residential sector accounted for 56 per cent of the electricity consumption in 2007, while the share of the services sector amounted to 12 per cent[33].

Despite domestic resources, gas plays only a minor role in the final energy consumption of Albania. Around 13 ktoe is currently used for technological purposes in refineries and oil production (on-site) facilities[5].

The 84 TJ final consumption of heat in Albania is absorbed entirely by the residential sector. 80 per cent of the Albanian centralized heat production is used directly by the combined heat and power plants that generate it for their own consumption[34]. Only one ktoe (42 TJ) of the centralized heat is actually used for heating purposes in the residential sector. The low availability of heat supply and the cheap prices for electricity have led to a substantial use of electricity for residential heating and subsequently to a further decrease in the demand for heat supply.

Figure 11.8: Final consumption of electricity by sectors in 2007



Source: IEA[5] (2009)

Energy markets

Electricity market

Electricity plays a very important role in the energy system in Albania since heating in the building sector is essentially achieved through electricity. The total power supply of around 5,700 GWh/year is not sufficient to satisfy domestic demand; therefore Albania is subject to frequent power cuts[22]. Neither new hydroelectric stations have been completed in the period of 1987 to 2006, nor any thermal power stations for the last three decades.

Nevertheless, in the past three years several power plant projects have been announced, especially in the field of hydro power (for detailed information see section 11.1.4 "Projects and initiatives in renewable energy sources") and for conventional power plants[35]. Currently a diesel fuelled power plant with a capacity of 97 MW is being built in Vlore. An increase of capacity to 350 MW by adding gas power units is envisaged, provided that the long-term gas supply can be ensured. A possible option could be construction of the South Stream gas pipeline from Turkey via Italy to Albania, which will be jointly owned by ENI and Gazprom[36].

The Government envisages the extension of current transmission interconnection lines and transforming Albania into an important energy hub. At present Albania is interconnected with Greece via a 400 kV interconnection line (1,000 MW capacity) and with Montenegro and Kosovo (both 220 kV). There are plans to develop three merchant lines between Albania and Italy; however these projects, promoted by private Italian investors (Moncada Construzioni and Marseglia Group), are still in an early development stage. A 400 kV line between Elbasan in Albania and Podgorica in Montenegro is already in the implementation phase. Another important project is the contruction of a 400 kV interconnection line between Albania (Tirana) and Kosovo (Prishtina)[35]. This project is currently in the bidding phase: the German bank KfW (Kreditanstalt für Wiederaufbau) has approved a loan for both countries for the construction of the line. The establishment of an auction office for the management of electric interconnection capacity based in Montenegro underlines the importance of Albanian plans to extend the transmission and interconnection lines[37].

As of 2004 the Albanian Power Corporation (Korporata Energjitike Shqiptare; KESH), which used to be a vertically integrated state-owned monopoly, has been unbundled and split up in the following organizations: KESH, owner and operator of power plants, the Albanian Distribution System Operator (OSSH) and the Transmission Grid Operator (OST).

KESH has formally no monopoly on power generation in Albania. However, KESH assets cover 98 per cent of the domestic electricity generation, which in practical terms means that the liberalization of the Albanian generation market is still at an early stage. A few Independent Power Producers (IPP) are at present active in the country and represent the remaining 2 per cent of total domestic production. These IPPs, such as ESSEGIE from Italy or the Albanian Wonder Power, exclusively own and operate small hydro power plants. Detailed information regarding upcoming projects is provided in the section 11.1.4 "Projects and initiatives in renewable energy sources".

The Albanian Distribution System Operator was unbundled from KESH in 2007 and has been privatized in 2009. Subsequently, on 28 May 2009, the Czech energy company CEZ bought a majority stake (76 per cent) in OSSH, while the remaining 24 per cent remained in the ownership of the Albanian Government. CEZ agreed to cover up all debts (EUR 123 million), that OSSH incurred due to customer non-payments since 1 January 2007[38].

Transmission activities are undertaken by the state-owned Transmission Grid Operator. OST owns all Albanian transmission assets with voltage level above 110 kV, as well as 120 substations[39].

Electricity tariffs

Electricity tariffs are set by the Energy Regulatory Entity (ERE) for different types of voltage customers and are still below market value. However, there has been a gradual price increase and ERE has developed plans to move to full-cost pricing in a gradual way that recognizes social impacts[40].

These plans have been implemented for the first time in 2008, when ERE implemented the electricity tariff and pricing methodologies based on the estimation of load factors for each customer group, according to levels of service, by using for this purpose the load curves model of the respective groups. The electricity customers connected to the power system at different voltage levels are characterized by different cost of service.

ERE also regulates the production, transmission, and distribution tariffs. The setting of tariffs undergoes a transparent and fair process with the participation of all the interest groups each time there is a tariff review case[33]. The final customer tariffs for 2008 are listed in Table A.3.1, while the production, transmission and distribution tariffs for 2009 are listed in Table A 3.2.

In order to prevent the excessive use of electricity for cooking and heating purposes and to encourage the use of liquid natural gas (LNG) and alternative energy sources, ERE introduced differentiated tariffs with two blocks of energy consumption. Based on this reasoning, the electricity tariff for household customers with consumption below 300 kWh per month was set at 56 EUR/MWh (7 ALL/kWh), while the electricity tariff for customers with consumption above 300 kWh per month was set at 95 EUR/MWh (12 ALL/kWh)[33]. However, since 2001 when the two-block tariff methodology has entered into force, no reduction on household electricity demand has been achieved. This can be explained by the limited availability of alternative energy sources at affordable prices for the final customers and by high price of LNG, which is linked to the way electricity tariffs are designed. Therefore, this tariff scheme has served mostly as a social policy instrument to mitigate effects of tariff increase on socially vulnerable consumers (in contrast with the Energy Community Treaty obligation to eliminate cross-subsidies and move towards non-tariff based social mechanisms for socially vulnerable consumers).

There is no tax on energy consumption and no internalization of environmental costs but a partial tax on CO_2 emissions has been established[40].

Gas market

There is no final gas market in Albania. However, in the current draft of the National Energy Strategy, natural gas supply is foreseen as an alternative energy source for the country, especially for the power generation industry. Furthermore, according to the obligations of the Energy Community Treaty for the gas sector, Albania is expected to develop all the necessary secondary legislation for the gas sector (primary legislation is already in place), in order to promote strategic investments in this sector.

Heating market

The district heating (DH) systems in Albania's main cities were built in the 1960s, but then abandoned in the early 1990s due to the lack of maintenance and high operating costs. Many coal-fired, combined heat and power (CHP) plants, which provided heat to oil refineries and industries, were also decommissioned. In their place, public buildings were equipped with heat-only boilers (at low efficiency); some continue to operate despite high costs of maintenance and input fuel[41].

Heating tariffs

Despite the lack of real market structure, heat prices have been liberalized in 1996 for both wholesale and retail markets[40].

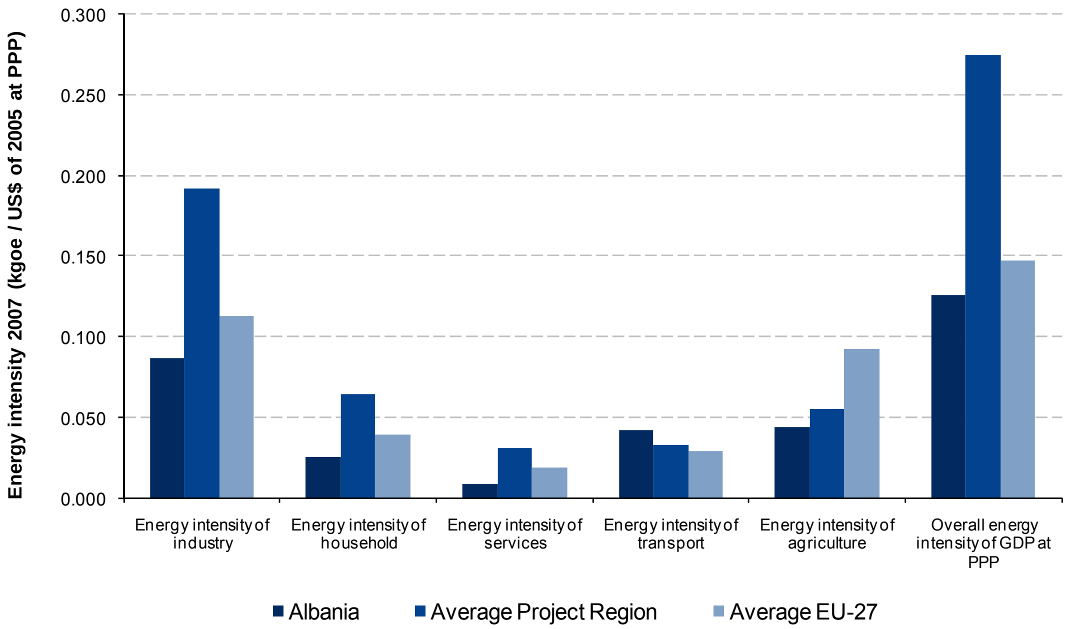
11.1.3. Current situation with respect to energy efficiency and future potential for energy savings and increase in efficiency

Energy intensity

The energy intensity of the GDP at Purchasing Power Parities for Albania in 2007 is considerably lower than the EU-27 average and the average of the project region (see Figure 11.9).

With exception of the transport sector, the energy intensities of all other sectors, i.e. industry, household, services, transport and agriculture are well below the average of the EU-27 and the project region, too (see Figure 11.9).

Figure 11.9: Primary energy intensity at Purchasing Power Parity in 2007



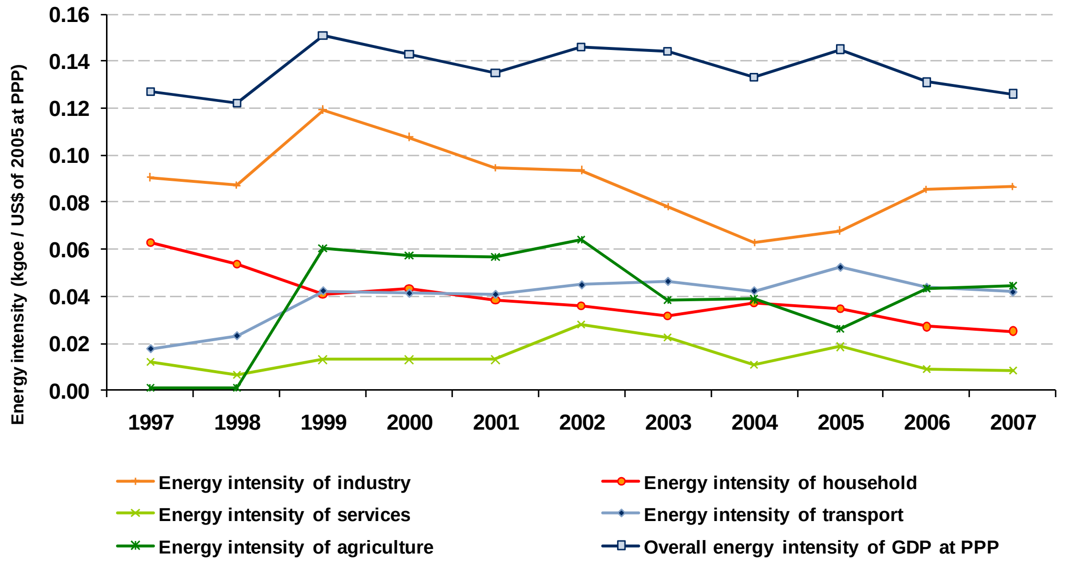
Source: Enerdata[6] (2007)

The main cause of the low Albanian energy intensity levels are more related to the growth in GDP based on foreign aid and income from Albanians working abroad, and the collapse of heavy industries than to improvements of energy efficiency[15].

Unlike other countries in the project region, the agriculture sector has a significant impact on the Albanian economy (21 per cent of the GDP), while the industrial sector only plays a limited role in the economy (20 per cent of the GDP), which also partly explains the lower energy intensity levels.

The relatively high energy intensity in the transport sector (see Figure 11.9) can be attributed to the fact that it is characterized by old and inefficient public transport infrastructure and increasing use of private vehicles, leading to a declining share of rail transport and a consequent increase in energy intensity[40].

Figure 11.10: Primary energy intensity in Albania by sector at Purchasing Power Parity



Source: Enerdata[6] (2007)

Energy losses from electricity and gas grids

According to Enerdata, in 2006, total losses on the Albanian transmission and distribution systems were estimated at around 52 per cent of the total generation[6]

The EnCharter PEEREA report states that technical losses in the distribution network were calculated to be more than 1,073 GWh/year (more than 18 per cent of total electricity production). Transmission losses have been calculated to be approximately 256 GWh/year (above six per cent of the of total electricity production) while the non-technical losses are 930 GWh/year (16 per cent of the electrical power of total electricity production)[40].

According to a third source, i.e. the Albanian Energy Regulatory Authority, technical and non-technical losses of electricity in the distribution network for 2007 have been 35.4 per cent, while the total losses including those in transmission resulted in 2.080 GWh or 36.4 per cent of the total electricity generation. For 2008, the total losses of electricity were 2,140 GWh, or 34 per cent of the total electricity generation. Of the mentioned losses, the technical losses in distribution amounted to 1,167 GWh, or 19.8 per cent, while non technical losses were 760 GWh, or 13.5 per cent[42].

The elimination of these high losses requires a strict control of the consumers, including increased invoice collections, reduction of illegal connections (even in the zones where new meters have been installed which from the installation point of view allows fraud and meter tampering), and the installation of meters where they are missing[40]. This aim might be achieved more thoroughly due to the market entry of CEZ, from the Czech Republic, which has recently bought the Albanian DSO OSSH in May 2009. CEZ is obliged to submit to the Albanian Energy Regulatory Authority a detailed study on distribution losses by the end of 2010. The company has an ambitious investment plan for the next three years (EUR 160 to 200 million). The first priority will be the reduction of the distribution losses, with a special emphasis on non-technical losses.

District heating grid

Many of the combined heat and power plants have very degraded heat distribution systems, preventing them from using their full capacity. Given the current economic crisis, it would make more sense economically to install other heating options (e.g. building or individual boilers, heaters or stoves using liquefied petroleum gas, fuel oil or wood) than to rehabilitate old district heating systems. The fact that the heating season is relatively short in Albania strengthens this argument[41].

Other sources of inefficiency

Other main sources of energy inefficiency are the outdated technologies and non-contemporary equipment and standards in industry, inadequate building insulation and low-efficiency appliances, particularly stoves and boilers in the household and service sector[40].

Estimated potential for energy savings by sector

In 2007, Albania adapted a model (LEAP software) to forecast its energy consumption and savings potential, which has been developed by the Stockholm Environment Institute. According to the model scenarios, total energy savings could reach up to 1,105 ktoe by 2020. This is more than 25 per cent of the total projected energy use in 2020. The power sector could considerably contribute to energy savings with savings as high as 3,337 GWh by 2020[40].

ESCOs and other initiatives in energy efficiency

There are still no energy services companies in Albania despite a strong political will. The Albania-EU Energy Efficiency Centre (EEC), as well as the Albanian National Agency of Natural Resources (AKBN) are the only specialized institutions in Albania that work in the energy efficiency and renewable energy fields. Both agencies currently do not provide ESCO services.

AKBN is a specialized governmental institution in Albania that works in the energy efficiency and renewable energy fields. Main duties of the AKBN as a public entity consist of energy planning, preparing the annual energy balance and establishing legal frameworks on energy efficiency and renewable energy. AKBN operates in the fields of mining, hydrocarbons, hydropower, as well as renewable energy and energy efficiency since 2006[43].

EEC, which was established in 1995 and has seven employees, has become a self-financed organization providing services in the field of the rational use of energy, renewable energies, and its involvement in various programmes and activities with the support of the Albanian Government and European Commission but it does not provide services based on Energy Performance Contracts and has very little financial capacities[22]. Since its establishment, EEC has realized over 38 international projects in the field of energy efficiency and renewable energy sources, worth EUR four million. Specific project examples include the set-up of energy databases for seven Albanian municipalities[44].

11.1.4. Current situation with respect to renewable energy sources and future deployment potential

Deployment of renewable energy sources

Hydro power accounts for 97 per cent of electricity generation in Albania (see Figure 11.5)[5]. Biomass accounts for approximately nine per cent (215 ktoe) of the primary energy supply and is mostly based on fuel wood[5].

Estimated potential for renewable energy sources

Following a competitive and transparent concession policy, and supported by a comprehensive legal and by-legal framework, from March 2007 on more than 170 new projects on small hydro power plants have been considered and 60 concessionary agreements have been approved. In the next three to six years it is expected that the commissioned hydroelectric generation capacity will amount to 530 MW with an expected annual production of 1.76 TWh, which represents about 28 per cent of the total renewable energy sources generation of Albania[33].

Albania has a Mediterranean climate with hot dry summers and mild rainy winters. These conditions rank Albania as a country with a high solar energy potential utilization for hot sanitation water. The installation of solar panels for water heating has already begun. Until 2005 around 9,000 m^2 of solar panels were installed in Albania, mainly in the services and household sectors. In 2007 an agreement has been signed with the United Nations Development Programme for the installation of 50,000 m^2 of solar panels for the coming five years[40].

Total proven reserves of fuel wood are considered to be approximately six Mtoe. There are uncertainties about the real cutting rate for fuel woods but it is believed to be at a level of 0.25 – 0.35 Mtoe/year[40].

Data taken from meteorological stations concerning wind potential are not reliable and do not cover all areas. As a result, a national estimated potential for wind power is not available.

Projects and initiatives in renewable energy sources

Several international investors are engaged in the development of renewable projects in Albania: in December 2008 EVN (Austria) and Statkraft (Norway) signed a concession agreement with the Ministry of Economy, Trade and Energy (METE) for the construction of three hydro power plants at the Devoll river (installed capacities will be 173 MW, 138 MW and 28 MW). The investment will be around EUR one billion. In September 2008 the Albanian Government signed an agreement with the Austrian utility Verbund for the development of the 48.2 MW hydro power plant Ashta in northern Albania. ERE gave a license for the development of 500 MW based on wind power on 95 thousand hectares in the Vlore province to the company EnpowerAlbania Ltd owned by the Italian company Moncada Construzioni. This project is part of a larger deal that also includes the construction of a 500 MW undersea transmission line to enable power sales to the Italian market[45].

Furthermore the Italian Marseglia Group, via its subsidiary Biopower Green Energy, plans to build an energy park in the Lezha district on the north-west coast. The energy park comprises a bio-diesel power plant with an installed capacity of 140 MW and two wind farms with a total capacity of 290 MW. The total investment is estimated to be more than EUR one billion and includes the construction of an undersea power line between Albania and Italy[46]

According to the Albanian Energy Regulatory Authority approximately two per cent of the electricity produced will remain in Albania for consumption. Furthermore 20 per cent of the capacity of the envisaged merchant lines between Albania and Italy are reserved for the Albanian Transmission System Operator[37].

Furthermore the Albanian Government plans to build a 350 MW hydro power plant in Skavica. Six international investors have already expressed their interest in building the power plant under the ongoing international tender process initiated by the Albanian Government in 2008[33].

11.1.5. Institutional, regulatory and policy framework for energy efficiency and renewable energy sources

Policymakers in the energy sector

Institutional policymakers

The Ministries in charge of energy policymaking in Albania are listed below.

- The Ministry of Economy, Trade and Energy supervises the operation of the energy sector, has specialized directories for electricity and hydrocarbons and is responsible for the management of public energy companies until their eventual privatization. Future activities of METE will focus on drafting norms and standards for the design, installation and operation of electrical installations and equipment, quality standards and security of energy resources and appliances used in the trading of oil by-products[40];
- The Ministry of Environment, Forests and Water Administration (MoEFWA) is responsible for drafting and proposing policies, strategies and action plans related to the energetic use of biomass and water resources as well as climate issues. MoEFWA is the Designated National Authority (DNA) in charge of Clean Development Mechanism projects[47].

The main governmental agencies in charge of energy policy making in Albania are listed below.

- The National Agency of Natural Resources (AKBN). Detailed information regarding the functions of the agency can be found in section "ESCOs and other initiatives in energy efficiency";
- The Albanian Energy Regulatory Authority (ERE) is responsible for issuing licences for electricity generation and trade and for setting electricity tariffs[37]. Furthermore, ERE is responsible for guaranteeing and developing an energy market based on objectivity, transparency and non-discrimination based on free competition principles, as well for the ensurance of continuity and security of supply to electricity final customers.

Non-Institutional policy makers

The main non-institutional policymaker in Albania is listed below.

- The Academy of Science of Albania and its subordinate institutes, such as the Hydraulic Research Center, conduct research work as well as theoretical-practical studies in the field of energy. Additionally it offers advice and expertise to the Council of Ministers.

Regulatory and administrative institutions at the regional and local level

Albanian municipalities administer their own budget and can therefore invest independently from the national government in energy efficiency and renewable energy projects or funds. Furthermore, they are allowed to take out loans on the capital market. For long-term investments and international borrowing, they need prior approval from the Ministry of Finance (MoF). Despite the possibilities to engage directly in energy efficiency or renewable energy projects, no Albanian municipality has so far made an investment in such activities[48].

Energy policy and regulatory framework

The regulatory framework of the energy sector in Albania is set by the National Power Law that established the regulator in 2003. In June 2008 the National Power Law was amended by the Albanian Council of Ministers[35]. Other relevant documents are the Laws on the Privatization of Local Hydropower Plants (1999), on the Privatization Strategy of Primary Importance Sectors (1998), on Concessions (1995 and 2006), and the Environmental Law (1993). Furthermore, with the adoption of the Natural Gas Law in 2008, which entitles the Albanian Energy Regulatory Authority with the regulation of the natural gas sector, the legal framework of the Albanian energy sector has been completed.

The amendment of the Concession Law determines that concessions for the construction of power plants are being granted through international public tenders. Furthermore, it introduced power purchase agreements enabling the sale of electricity to KESH at negotiated tariffs for up to 35 years (15 years for small hydro power plants)[35].

The National Energy Strategy was approved by the Government in June 2003, and subsequently the Action Plan for implementation was updated in June 2007[49]. The primary objective of the Strategy is the restructuring of the energy sector based on market economy principles and developing a modern energy policy.

Furthermore, ERE developed in cooperation with qualified international consultants a comprehensive and complete regulatory framework, which comprises: market rules; transmission, distribution, and metering codes; methodologies of electricity tariffs for all the services offered by the licensees in the electricity market; unification of accounts for the licensees according to the international accounting standards and procedures regarding licensing, transfer, and modification of licences[33].

The Law for Production, Transport and Trade of Biofuels and other Renewable Fuels in Transport adopted in February 2008, sets the following targets: the total amount of biofuels and other renewable fuels supplied to the market by 2010 shall not be less than three per cent, while by 2015 this amount shall not be less than ten per cent. In order to achieve these goals the use of biofuels will be exempted from VAT, custom duties, excise tax, and income tax[50].

Policy and regulation on energy efficiency

In April 2005 the Albanian Parliament approved an Energy Efficiency Law, which sets out plans to improve energy efficiency. The main goals are the reduction of transmission and distribution losses, enhanced enforcement of the energy provisions of the Building Code (2002), greater use of solar hot water, improved use of decentralized heating and hot water systems, and the promotion of public transport. Full implementation of these energy efficiency policies is expected to reduce energy demand by 26 per cent, thereby increasing domestic self-sufficiency from 25 per cent to 39 per cent, lowering energy sector investment needs by EUR 690 million, and reducing greenhouse gas emissions by 3.5 million tons per year[40].

As stated in the PEEREA report, the Energy Efficiency Law is formally in force but in fact is not fully operational, mainly due to the absence of secondary legislation for implementation. The Building Code approved in 2002, requiring better insulation and water based heating systems is implemented to a very low degree even in public buildings[22].

The National Energy of Natural Resources has submitted to the Ministry of Economy, Trade and Energy a draft document for a new Energy Efficiency Law, which contains certain improvement with respect to the existing law. Furthermore, the provisions of the Energy Community Treaty foresee that all member countries must approve a national action plan on energy efficiency, introducing obligatory measures to be implemented by regulatory institutions. The Albanian National Action Plan on Energy Efficiency is expected to be approved in 2010.

Policy and regulation on renewable energy sources

According to the National Energy Strategy renewable energy resources (solar, wind, biomass and especially small HPP) should be stimulated for a maximal use of indigenous resources.

As part of Albania's programme to achieve the aims of the National Energy Strategy, a National Strategy for Renewable Energy Sources and a Law on Renewable Energy Sources are currently under development[22].

According to the Transmission Grid Operator, prospective developers of renewable energy projects might be obliged to reinforce the transmission grid, i.e. the necessary connection to the transmission grid has to be paid by the developers, while OST will be obligated to connect renewable electricity plants to the grid[39].

At present, intermittent power sources (wind and solar) have no priority in dispatching[39].

International commitments and current status of implementation

EU Regulation

As stated in the National Energy Strategy, consistency with EU requirements is a key consideration in the development of the Albanian energy sector. As a step towards the European Union, Albania ratified the Energy Community Treaty as a Contracting Party in 2006. The Contracting Parties have committed themselves to implement the relevant *acquis communautaire*, to develop an adequate regulatory framework and to liberalize their energy markets in line with the acquis under the Treaty until 2015. The latter includes key EU legal acts in the area of electricity, gas, environment and renewable energy.

Kyoto Protocol

Albania is a party to the United Nations Framework Convention on Climate Change as a Non-Annex I Country and to the Kyoto Protocol as an Annex B country and is eligible for the implementation of Clean Development Mechanism projects and the sale of Certified Emission Reduction Units. The issuing of letters of endorsement and approval of CDM projects is the responsibility of the Ministries of Economy, Trade and Energy and of Environment, Forest and Water Administration. As already mentioned, MoEFWA is the Designated National Authority.

Other international commitments

Albania signed the Energy Charter Treaty and its related Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects in 1994 and 1996, respectively. Both entered into force in 1998 requiring Albania to formulate a national energy efficiency strategy and policy aims, to establish appropriate regulatory frameworks, and to develop specific programmes for the promotion of efficient energy usage and the reduction of harmful environmental practices in the energy sector[14].

11.1.6. Economic incentives and financing schemes for energy efficiency and renewable energy projects

General investment climate in the country

Albania benefits from the presence of the Albanian Foreign Investment Promotion Agency (AlbInvest). AlbInvest has been assigned by the Albanian Government to assist and accelerate the inflow of foreign investment to improve the competitiveness of Albanian exporters and to provide professional services to assist the growth of small- and medium-sized Albanian businesses. The agency provides prospective investors with up-to-date information on the investment climate, investment incentives and the legal framework related to the investment process in Albania. Furthermore it assists in the identification of suitable greenfield and brownfield site options and to obtain the permits and licences required by national and local authorities[51].

According to the Heritage Foundation[52], foreign and domestic firms are treated equally under the law, and nearly all sectors are open to foreign investment. Foreigners may own 100 per cent of Albanian companies and monetary expatriation is legal. The state can expropriate an investment or asset for the purpose of public interest, but there are legal provisions for compensation. However, non-transparent regulations, inefficient bureaucracy, and corruption discourage foreign investment.

According to Transparency International the current Albanian Government has been actively pursuing anti-corruption reforms over the past years. An official task force created to fight corruption and economic crime has increased the number of officials prosecuted and sentenced for corruption, also building confidence among the public that corruption can be punished in Albania. The implementation of electronic systems for tax administration, procurement and business licenses reduced opportunities for blackmail. Due to this progress Albania was awarded with a Corruption Perceptions Index (CPI) score of 3.4 for 2008, improving from 2.9 in 2007, ranking it fifth best within the project region[53].

Incentives for energy efficiency

According to the Ministry of Finance[48] currently there are no incentives for energy efficiency in Albania. Direct subsidies to end-consumers for the acquisition and installation of energy efficiency equipment might be introduced at a later stage. The introduction of tax exemptions for energy efficiency projects or for the purchase of energy efficiency equipment is not foreseen for the near future.

Incentives for renewable energy sources

A model for calculation of feed-in tariffs has been established by the Ministry of Economy, Trade and Energy in January 2007 and KESH is obliged to buy electricity produced by small hydro power plants with a capacity below 15 MW. The tariff is calculated on the basis of the previous yearly average import prices plus ten per cent. For 2008, this feed-in tariff was approximately 81 EUR/MWh lower than the tariff for some end users[22].

However, other renewable energy sources do not benefit from such incentives. In August 2006 the Italian Ministries of Economic Development and Environment entered into a bilateral treaty with Albania, which guarantees that Albanian production from renewable sources will be fully integrated into the Italian Green Certificates Scheme once a link is established between the countries[54].

Financing mechanisms for energy efficiency and renewable energy projects

National financing schemes

Currently no national financing schemes have been established by the Albanian Government.

International financing schemes

There are several international projects in place, aiming at fostering energy efficiency and renewable energy sources[22]:

- The Energy Sector Programme of Kreditanstalt für Wiederaufbau (KfW) provides partial loan guarantees for participating local commercial banks (EUR seven million) and provides advisory services (EUR two million) in terms of assistance to banks in conducting loan appraisals and to investors in the preparation of bankable projects. Other noteworthy projects (completed in 2008) financed by the KfW are the rehabilitation of the two hydro power plants Bistrica I and II, and the installation of meters for customers in the region of Southern Albania[55].
- The World Bank conducted in the period 2006 to 2009 a Country Assistance Strategy (CAS) for the fourth consecutive three-year term. This fourth CAS for Albania guides the World Bank's programme of policy and investment lending. A further project financed jointly by the EBRD and the World Bank is the Second Energy Community of South East Europe (APL) Programme which aims to provide investment support and technical assistance for Albania. The objective of the investment is to extend the lifetime and improve the quality, reliability, safety and efficiency of the bulk power transmission system by replacing ageing existing facilities with new ones[56].
- Finally, the European Bank for Reconstruction and Development provides access to three facilities in the western Balkans:
  - Local Enterprise Facility (LEF): was established in 2006 as a EUR 32 million investment channel, to which Italy initially contributed EUR 12 million. The aim is to provide mainly loan and equity financing to promising small- and medium-sized enterprises in the region;
  - Small and Medium Enterprises Finance Facility: Provides loans to local banks and leasing companies in the region, with donor support from Italy;
  - Sustainable Energy Direct Financing Facility: EUR 50 million to provide direct individual loans between EUR one million and six million to industrial energy efficiency and renewable energy projects.

Commercial financing schemes

The Albanian commercial banking sector suffered severely from the international financial crisis. In October 2008 the Albanian banking sector witnessed a record ten per cent withdrawal rate of deposits. According to the National Bank of Albania, the Albanian banking sector was nevertheless able to withstand the crisis so far. In May 2009 the deposits of Albanian banks increased by two per cent, thereby signaling a slight improvement compared to the previous months[31].

According to the Albanian Bank Association[22], commercial banks have little experience in financing energy projects in general and renewable and energy efficiency projects in particular. Some local banks are in discussions regarding lending to small hydro power plant projects.

Other support mechanisms

Additionally to the commercial funding provided, international finance institutions offer direct assistance programmes in Albania[22]:

- The World Bank CAS for Albania mentioned above also provides analytical and advisory services for the country. It plans to provide energy efficient lamps to households as soon as the electricity distribution company will be fully privatized;
- The United Nations Development Programme launched a project, aiming at building capacity to access carbon finance in Albania (June 2007 to June 2009). Additionally the UNDP Climate Change Unit in Albania launched a project seeking to accelerate the market development for solar water heating in Albania with the objective to achieve the level of 50,000 m^2 of installed solar water heating capacity. The main project components consist of raising awareness, facilitating the financing of solar water heating investments, creating a more transparent market and building the capacity of solar water heating manufactures, distributors, and installers[57];
- The Italian Government has provided EUR five million to an Energy Efficiency and Renewable Energy Sources Fund within the Ministry of Economy, Trade and Energy providing 30 per cent grant to projects with high reductions of CO_2;
- The EBRD Sustainable Energy Direct Financing Facility mentioned above is also complemented with grant funding for technical assistance for project identification, preparation, and implementation verification.

11.1.7. Barriers to the implementation of energy efficiency and renewable energy projects

Box 1: Summary of barriers to the implementation of energy efficiency and renewable energy projects in Albania

Legal, institutional and administrative barriers

1. Complex authorization procedures, non-transparent regulations, inefficient bureaucracy and corruption still discourage foreign investment.
2. The regulatory framework is in place, but currently a dedicated law on renewable energy sources is missing indicating that the development of renewable energy sources does not appear among the main targets.
3. The National Energy Strategy appears to be rather generic in its objectives and is more declaratory than operational.
4. The power infrastructure in Albania is inefficient and needs rehabilitation. Without significant efforts in rehabilitation and enlargement of the Albanian electricity transmission and distribution, wind power projects above all are very unlikely to be realized.

Economic and financial barriers

5. The absence of public funding for projects and initiatives in Albania is an obstacle for the development of energy efficiency and renewable energy projects.
6. The tariffs in Albania are too low to grant project profitability for project developers and/or municipalities. Furthermore Albania is suffering from high commercial electricity losses due to electricity theft and non-payment.
7. The Albanian power sector is characterized by state intervention in price formation and in private business activities.
8. The feed-in tariff in Albania does not include new renewable energy sources such as solar or wind and only applies to hydro power.

Lack of awareness, human capacities and professional skills

9. The widespread habit of energy fraud and the highly inefficient use of electricity for heating purposes are signs of a scarcely existing awareness among the population, public administration and policymakers for the final value of energy and national resources.
10. The market for energy services is virtually inexistent in Albania, despite the availability of international programmes for technical assistance and financial support.
11. Commercial banks have no experience in financing projects in energy efficiency and renewable energy projects.

Legal, institutional and administrative barriers

Several legal, institutional and administrative barriers for investments could be identified in Albania:

- Despite strong efforts by the government to improve the situation, according to international observers, non-transparent regulations, inefficient bureaucracy, and corruption still discourage foreign investment;
- At the same time, while encouraging foreign investors to realize projects in the country, the Albanian Government should be attentive to maintain sustainability standards and ensure that profits from the investments are maintained within the country: in the case of large hydro power projects the criteria defined by the World Commission of Dams should be applied; furthermore, particular attention should be dedicated to the avoidance of depletion of local natural resources for electricity generation for mere export purposes;
- Without significant efforts in rehabilitation and enlargement of the Albanian electricity transmission and distribution, wind power projects above all are very unlikely to be realized. Therefore, a clear commitment by the Albanian energy company KESH as well as from the foreign investors to provide financial support to these activities is necessary. This improvement of the electricity network will allow the subsequent realization of additional

renewable energy projects and at the same time increases the energy efficiency of the country;

- The National Energy Strategy appears to be rather generic in its objectives and appears to be more declaratory than operational; furthermore, the development of renewable energy sources does not appear among the main targets;
- Despite partial privatization of the electricity distribution grid and the measures to attract foreign investors to the electricity generation market, the Albanian market is still at a very initial phase of its deregulation and liberalization: the state-owned monopolist KESH has neither been privatized nor restructured and there are no declared plans for market liberalization, despite the commitment to the European Community Treaty, which foresees full market opening until 2015;
- A feed-in tariff for electricity from small hydro power plants with an installed capacity below 15 MW has been developed but currently there is no support scheme for electricity from other renewable energy sources such as wind, biomass, geothermal or solar;
- The Law on Energy Efficiency of 2005 has been barely set in force, and the same consideration applies for the provision of the Building Code of 2002. The foreseen financing instruments for energy efficiency are very vague and do not appear to be much more than awareness-raising measures.

Economic and financial barriers

One major economic and financial barrier to the development of energy efficiency and renewable projects is the difficult economic situation of the country, combined with its modest growth in the last years. This is certainly a reason for the absence of public funding as well as for the implementation of a low-price pricing policy in the energy sector (this latter fact is characteristic for markets with a state monopoly). At the same time, the presence of price subsidies and cross-subsidies in the energy sector and the diffuse practice of energy theft are very unlikely to yield profitable and financially attractive energy projects.

Lack of awareness, human capacities and professional skills

Lack of awareness seems to be one of the main bottlenecks for the development of a domestic market for energy efficiency and renewable energy projects in Albania:

- The widespread habit of energy fraud and the highly inefficient use of electricity for heating purposes are signs of a scarcely existing awareness for the final value of energy and national resources. Until now, the public administration has failed to develop a culture of sustainable and responsible use of energy;
- The insufficient supply of heat and gas in the residential sector and frequent power cuts in the electricity supply have led to a very low level of comfort in the households and in public buildings (especially hospitals, schools, and kindergartens). Any proposed energy efficiency measure will therefore only be accepted if they are combined with an increase of living comfort;
- The market for energy services is virtually inexistent in Albania, despite the availability of international programmes for technical assistance and financial support;
- Commercial banks have no experience in financing projects in energy efficiency and renewable energy projects.

11.2. *Belarus*

11.2.1. Overview of economic situation

General demographic data

The State of Belarus has a territorial extension of 207,600 km^2. At the end of 2007, the population amounted to 9.69 million inhabitants, over 70 per cent of which live in urban areas. The capital city is Minsk, with a population a little below two million, while other cities around 300,000 inhabitants are Gomel (481,000), Mogilev (365,100), Vitebsk (342,400), Hrodna (314,800) and Brest (298,300). The average population density is low compared to European standards with 47 inhabitants/km^2. From 2000 to 2007 the population decreased annually by 0.6 per cent[58].

Current political situation and outlook

Belarus attained its independence from the former Soviet Union in 1991. Belarus and the Russian Federation signed a treaty on a two-state union on 8 December 1999 envisioning greater political and economic integration, which has not materialized so far.

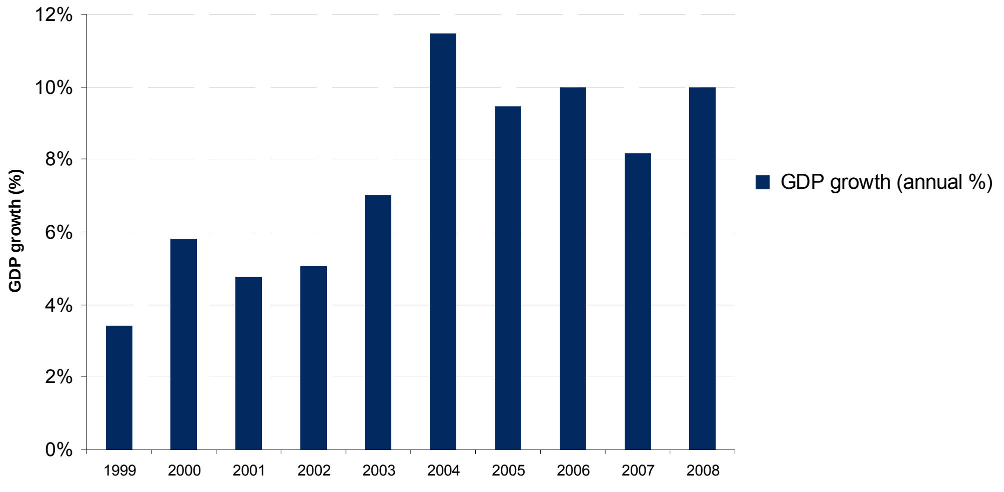
The Belarussian Constitution, which was adopted in March 1994, was amended by referendum in November 1996 to increase presidential power and set up a bicameral parliament. The last national elections were held on 17 October 2004 (legislative) and on 19 March 2006 (presidential); the next presidential election is scheduled for 2011. President Alexander Lukashenko was elected for a third consecutive term in March 2006 with 83 per cent of the popular vote[22].

Belarus is divided into six regions (vobłast) and the special administrative district of Minsk. Each region has a provincial legislative authority, called an oblsovet, which is elected by the region's residents, and a provincial executive authority called a voblast administration, whose leader is appointed by the president. The regions are further subdivided into raions. There are six regions and 118 raions in Belarus.

Gross Domestic Product

The GDP of Belarus reached USD 44.8 billion in 2007[22]. In 2008 the average GDP per capita was of around USD 12,000 based on Purchasing Power Parity[58]. The economic growth has been accelerating in the last five years with a yearly average GDP growth of 9.2 per cent (see Figure 11.11), positioning Belarus as the fastest-growing economy in the project region in the period 2003 to 2008.

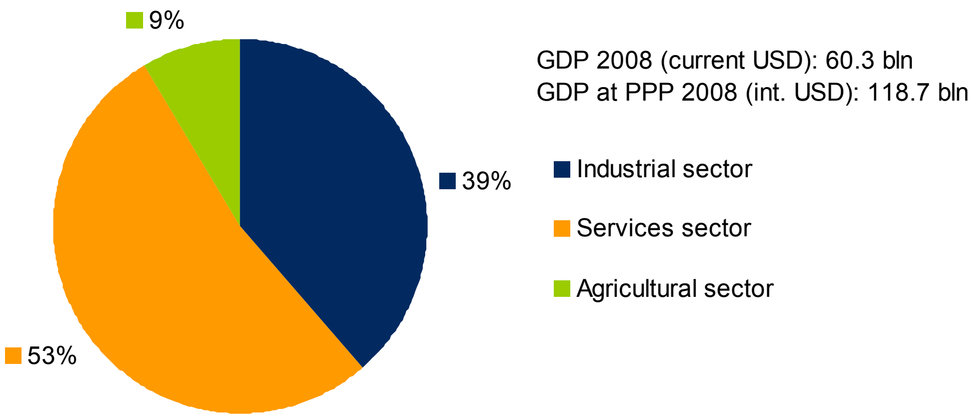
Figure 11.11: Real GDP growth of Belarus



Source: World Bank[58] (2009)

The repartition of the GDP in 2008 can be seen in Figure 11.12 and shows the very strong influence of the industrial sector and the comparatively modest contribution of the services sector[58]. The agricultural sector plays a strong role in the economy of Belarus, with a share of nine per cent of the GDP. The industrial sector is mostly focused on the following sub-sectors: engineering, machine tools, agricultural equipment, fertilizer, chemicals, defense-related products and prefabricated construction materials.

Figure 11.12: Repartition of the Gross Domestic Product in Belarus in 2008



Source: World Bank[58] (2009)

11.2.2. Energy sector and development of energy markets

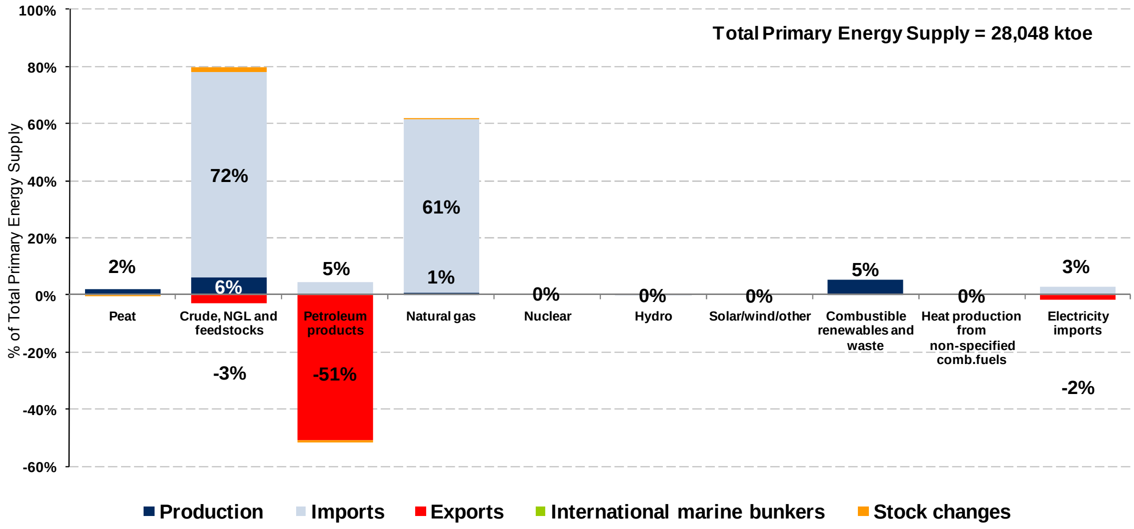
Energy supply

Belarus is a strong net energy importer, mainly for crude oil and gas which generates an energy dependency of more than 85 per cent for the country (see Figure 11.13)[5]. Its total primary energy supply in 2007 amounted to 28,048 ktoe. The own resources (including renewable energy sources) account for only 13 per cent of country demand and include small amounts of crude oil, biomass (mainly wood), peat, coal, natural gas, and hydropower[22]. Most of the demand for primary energy is covered with imports from the Russian Federation[22].

Belarus produces less than ten per cent of the crude oil it imports. Once in Belarus, this crude oil is refined. 90 per cent of the refined petroleum products are meant to be exported. Belarus is an important refining actor on the Russian oil value chain.

Almost all natural gas is imported (99 per cent), while this primary energy resource represents 62 per cent of final energy consumption in the country, mainly used for production of heat and electricity.

Figure 11.13: Energy balance of Belarus by primary energy sources in 2007



Source: IEA[5] (2009)

Crude oil is the main energy source in Belarus, followed by gas. Fossil fuels, including their use for petroleum derivates, represent altogether a share of 95 per cent of country's primary energy (see Figure 11.14).

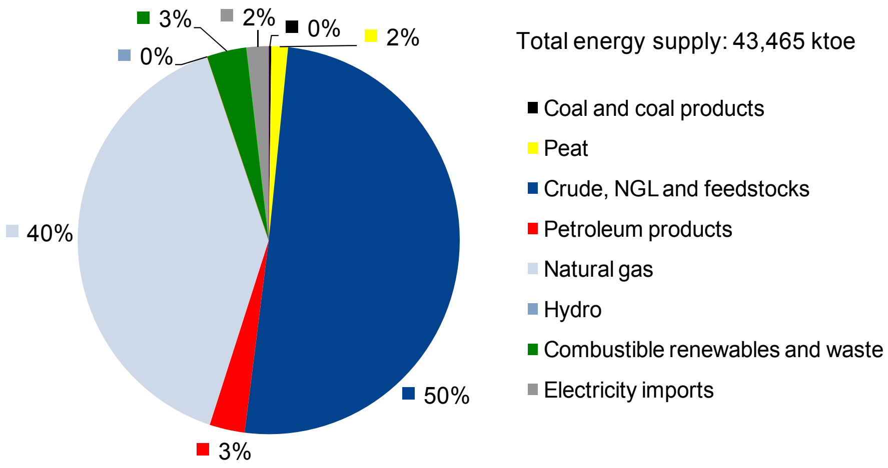
In 2007, electricity generation in Belarus amounted to 31,829 GWh, 99 per cent of which was produced with gas[5] (see Figure 11.15). The total installed capacity is 8,024 MW, 8,011 MW of which is thermal capacity[59].

44 per cent of the total generation capacity of Belarus consists of condensing thermal power plants, 53 per cent of combined heat and power plants and the rest of small thermal and hydropower plants. The installed capacity is currently higher than the country's domestic demand but to meet the growing demand it is planned to build additional 1,500 MW of generating capacity by 2011 and additional 4,000 MW of generating capacity by 2020. Belarus plans to diversify its generation park, since it is a priority of the country to reduce the dependency from gas imports[60]. There are plans to commission the first unit of a nuclear power plant with a capacity of 1,000 MW in 2016[61]. Furthermore, Belarus is in discussions with a Polish investor regarding the construction of a 800 MW coal power plant close to the Belarussian-Polish border[60].

Heat supply in Belarus amounted to 270,862 TJ in 2007. Like electricity, heat is mainly produced through fossil fuels and in particular gas in heat-only boilers or in combined heat and power plants (see Figure 11.16).

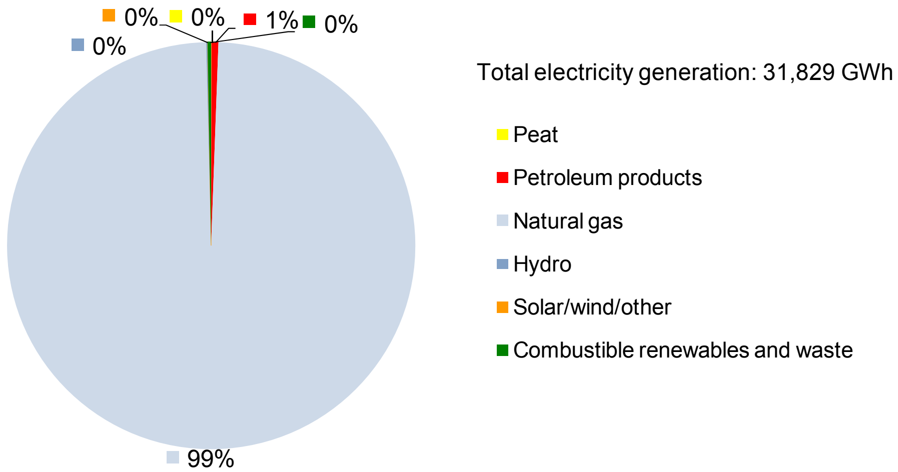
According to the current renovation programmes, state-of-the-art technologies are being gradually introduced to improve the heat generation facilities[61]. For instance, the Minsk combined heat and power plant No. 5 will be rehabilitated by a Chinese contractor, while the Grodno combined heat and power plant No. two will be rehabilitated by an Indian contractor[62].

Figure 11.14: Supply of primary energy by sources in 2007



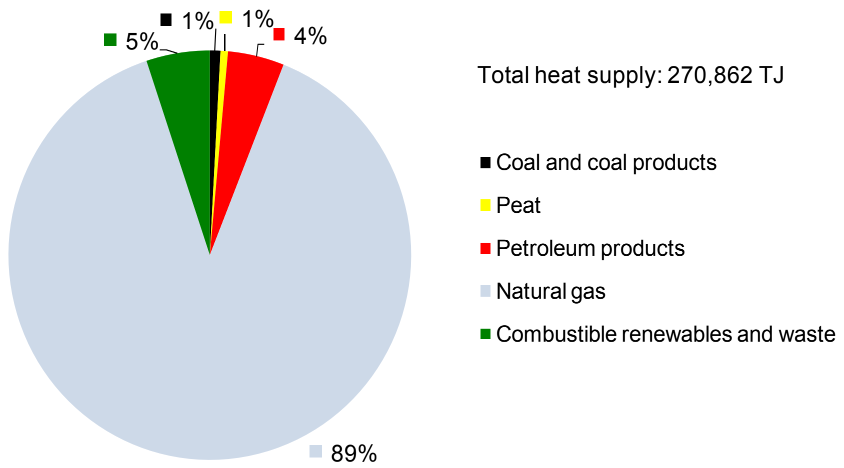
Source: IEA[5] (2009)

Figure 11.15: Electricity generation by sources in 2007



Source: IEA[5] (2009)

Figure 11.16: Supply of heat by sources in 2007

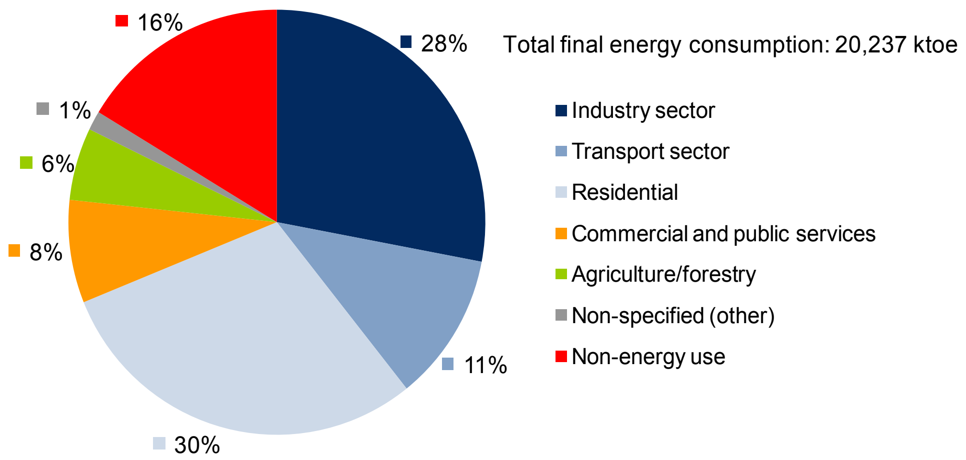


Source: IEA[5] (2009)

Energy demand

The largest share in final energy consumption in Belarus is represented by the residential sector, with a share of 30 per cent of the total final energy consumption, followed by the industry sector with 28 per cent, as shown in Figure 11.17. The transport sector covers a small share of the energy consumption, while the non-energy use of primary energy sources is remarkably high in Belarus due to the extensive oil refining activities of the country[5].

Figure 11.17: Total final energy consumption by sectors in 2007



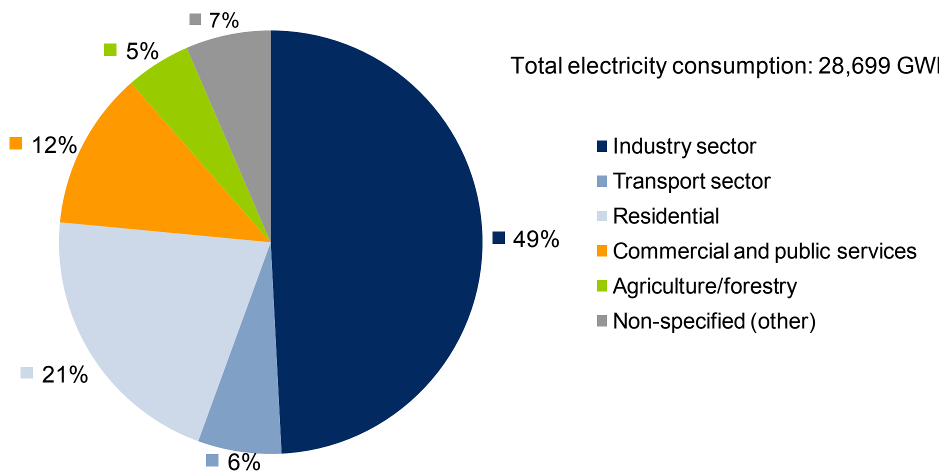
Source: IEA[5] (2009)

The industry sector covers the largest share of the final electricity consumption of Belarus, as shown in Figure 11.18. It represents half of the country's final consumption that reached around 28.7 TWh in 2007[5].

The demand for gas in Belarus derives mainly from industry sector and from non-energy processes, such as cracking and reforming of natural gas for the purpose of producing ethylene, propylene and other non-energy hydrocarbon based raw materials (see Figure 11.19)[5].

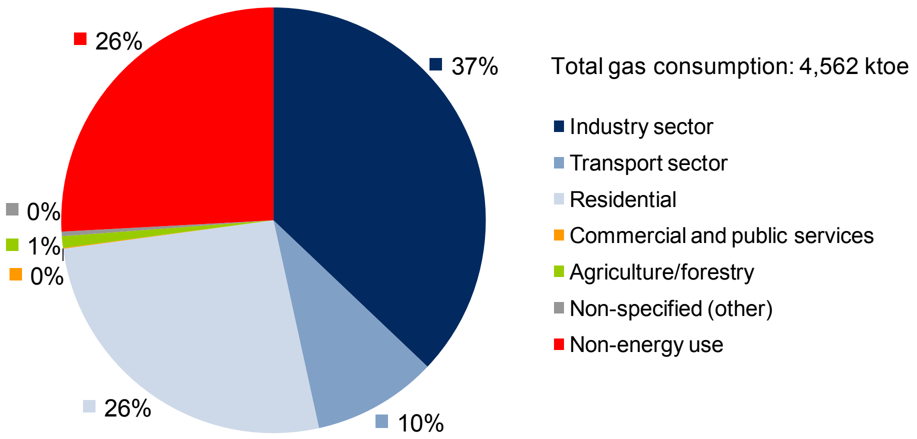
Demand for heat in Belarus amounted to around 230,000 TJ in 2007[22]. The largest share of the final heat consumption in Belarus is represented by the residential sector with 40 per cent, while the industry sector represents 36 per cent of the overall consumption. Heat demand is expected to reach 339,000-368,000 TJ by 2020, thus representing an increase of 47-60 per cent[22].

Figure 11.18: Final consumption of electricity by sectors in 2007



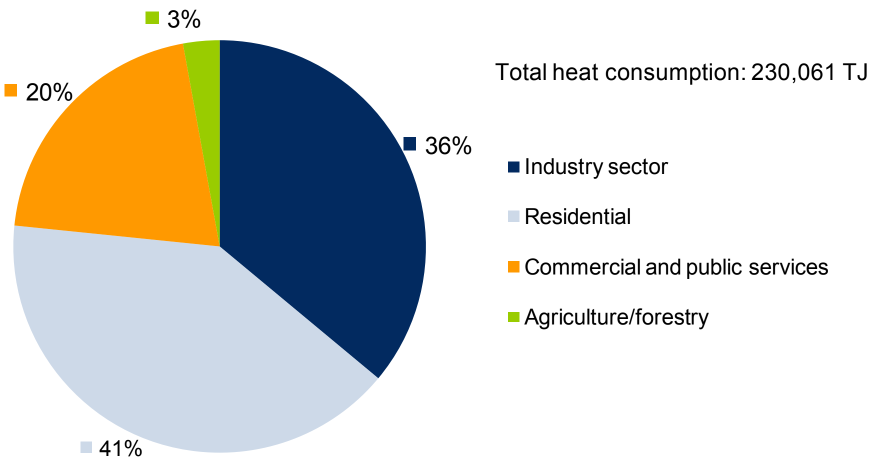
Source: IEA[5] (2009)

Figure 11.19: Final consumption of gas by sectors in 2007



Source: IEA[5] (2009)

Figure 11.20: Final consumption of heat by sectors in 2007



Source: IEA[5] (2009)

Energy markets

Electricity market

The dominating operator in the Belarussian electricity sector is the state-owned company GPO Belenergo. At the moment six unitary[xii] state enterprises (part of Belenergo) are responsible for the distribution of electricity in the six regions of Belarus. The electricity distribution is managed separately from the gas and heat distribution.

At present, independent power producers are gradually emerging, especially in the field of combined heat and power plants and small hydro power plants[61].

Electricity tariffs

While the tariffs for the residential users are set by the Council of Ministers and for industrial users by the Ministry of Energy, there is no regulation of wholesale electricity prices in Belarus[61]. The Ministry of Economy performs the role of independent regulatory body and regulates the tariff for energy for end users. The Ministry of Justice provides legal expertise on the regulations. The rates for electricity depend on the type of consumer and the use of the building, the time and period of use (day/night and heating/non-heating season). The following type of customers apply in Belarus:

[xii] Note: unitary enterprises are state and municipal business entities which operate state or municipal property, but have no ownership rights to the assets they use in their operations

industrial consumers with installed consumption capacity of 750 kVA or more (dual tariff); industrial consumers with installed consumption capacity up to 750 kVA (single tariff); transport; non-industrial users, including budget organizations; hospitals; street lighting; households; agriculture; hot water use; and energy system use[22].

For households, the tariffs for electricity at the end of 2008 were 46 EUR/MWh (145 BYR/kWh) and were increased at the beginning of 2009 to 54 EUR/MWh (BYR 173.3/kWh) [22].

The current payment system will undergo a modification after the introduction of new procedures and measuring equipment, based on modern, automated measurement systems. A new set of differentiated tariffs shall be applied to all economic sectors after a large scale deployment of electric meters[22].

Gas market

The gas transport network is one of the most important strategic infrastructure assets in the country. The volume of transit gas was 49.5 billion m^3 in 2007. The capacity of the network is 63 billion m^3 per year[22].

The commercial activities are performed by state-owned enterprises: AOA SP Beltransgas, GPO Beltopgas and GPO Belenergo. The gas transit system is partially owned by the Open Joint Stock Company (OJSC) Gazprom. Design, research, installation, and maintenance of the gas assets are undertaken by dedicated organizational units within the Ministry of Energy[22].

Similarly to the electricity sector, the gas distribution in Belarus is performed by six regional unitary state enterprises, while the gas supply in Minsk is organized by an additional seventh enterprise[61].

Gas tariffs

Gas prices are regulated by the same state bodies as electricity. The gas prices vary for each type of consumer (industrial, residential). Generally the tariffs for final customers are set depending on the gas import and transport costs[61].

Heating market

GPO Belenergo supplies around 50 per cent of the heat in Belarus. The remaining 50 per cent is supplied by local heating companies, which belong to municipalities or industrial enterprises[22]. These local heating companies operate around 8,161 departmental boiler plants with a capacity from 0.1 to 10 Gcal/h and 560 boiler plants with a capacity exceeding ten Gcal/h.

District heating systems based on heat power plants with heat load ranging from 100-2,050 Gcal/h are used in 14 cities in Belarus, while district heating systems based on regional boiler plants with heat load from 10 – 320 Gcal/h are used in 20 cities[63].

4,500 km of the main-line heat network are operated by Belenergo, while the Ministry of Housing and Communal Services is responsible for 5,800 km[63].

Heating tariffs

The heat tariffs of Belenergo for residential users are set by the Council of Ministers, and for industrial users they are set by the Ministry of Energy. However, the tariffs for locally generated and sold heat energy are coordinated by the local municipal bodies.

The rates for heating, like for electricity, depend on the type of consumer and the use of the building, the time and period of use (day/night and heating/non-heating season), and other factors. The prices for heat energy produced at GPO Belenergo depend on the type of use and the parameters of the heat carrier. It is different for different consumers (households, budget organizations, industrial companies, etc) and different regions. The price of the heat energy produced by the Minskcommunalteploset (Minsk communal heat network) is different for the households and other consumers[22].

For households, the tariffs for heat at the end of 2008 were 13.7 EUR/Gcal (37,580.70 BYR/Gcal) and were increased at the beginning of 2009 to 12.0 EUR/Gcal (43,458.30 BYR/Gcal)[22]. Despite this small increase, heat prices remain significantly lower than in the European Union.

11.2.3. Current situation with respect to energy efficiency and future potential for energy savings and increase in efficiency

Energy intensity by consumption sector

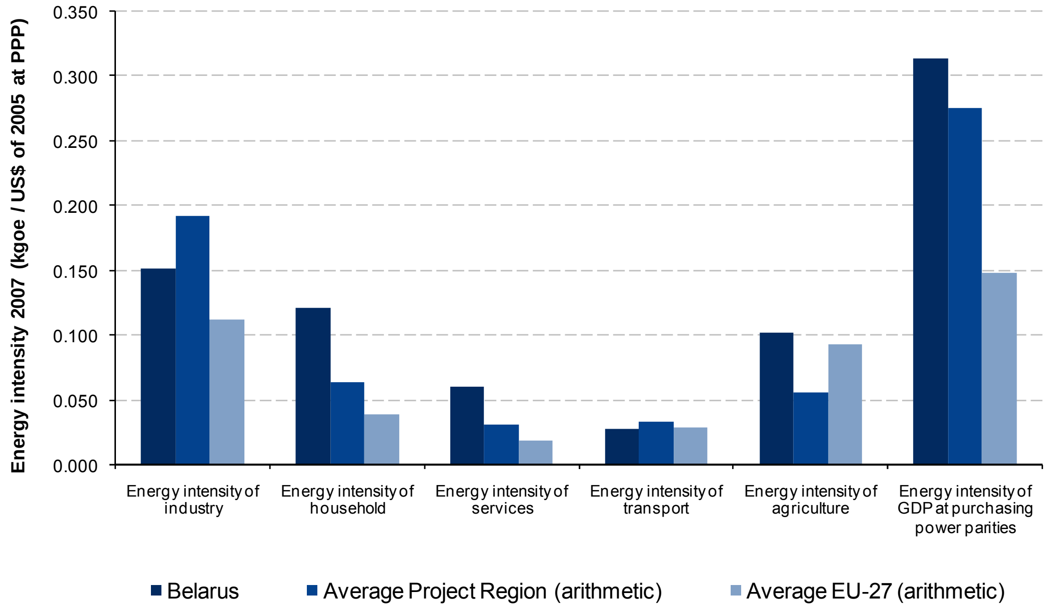
According to Enerdata[6] the energy intensity of GDP at Purchasing Power Parity for Belarus in 2007 is higher than the EU-27 and the project region average. However, if the specific weight of each of the project countries in the total gross consumption of fuel and energy resources in the entire project region is taken into account, the energy intensity of Belarus is approximately 84 per cent of the weighted average of the energy intensity of the project region. According to data provided by the Department of Energy Efficiency of the State Committee on Standardization of the Republic of Belarus, the energy intensity of Belarus equals 0.34 toe per $1,000 at PPP 2000 while the weighted average energy intensity of the overall project region amounts to 0.405 toe per $1,000 at PPP 2000.[64]

The same considerations apply to the energy intensities of the industry, household, services, transport and agricultural sectors, which are shown in Figure 11.21 and are consistent with the methodology used for all project countries.

Despite discrepancies in the methodologies for calculation of energy intensity, international data sources show clearly that Belarus has managed to significantly reduce its overall energy intensity from 1997 to 2007[65] (see Figure 11.22). This has been achieved mainly by the application of a combination of administrative and market measures.[66]

Energy efficiency has been a top priority for the Government of Belarus since mid-1990s. This has brought tangible results, with the overall energy intensity being almost halved from 0.559 kgoe per $1,000 at PPP 2005 in 1997 to 0.313 kgoe per $1,000 at PPP 2005 in 2007.

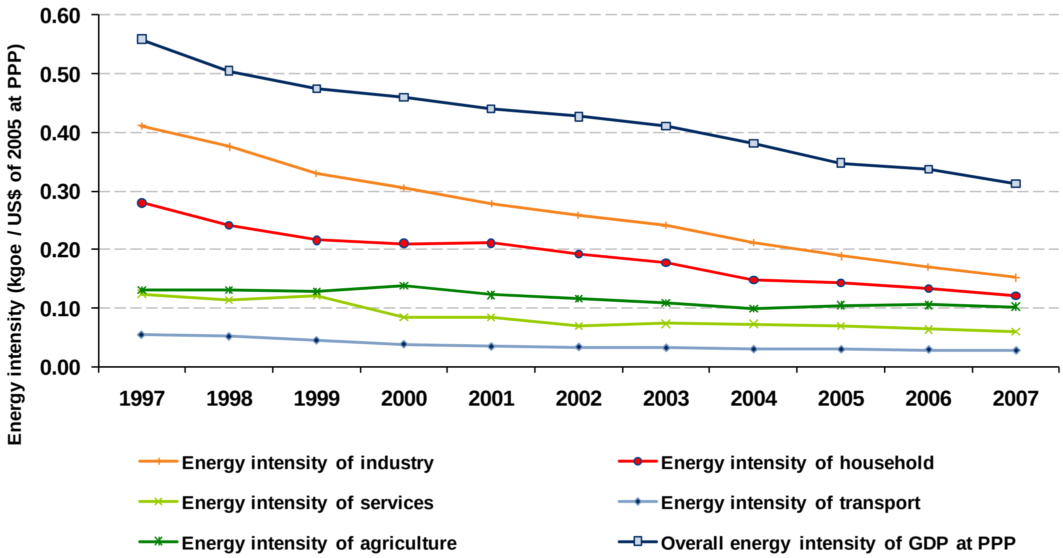
Figure 11.21: Primary energy intensity at Purchasing Power Parity in 2007



Source: Enerdata[6] (2007)

The energy intensities of all sectors have declined significantly over the past decade. The biggest progress has been achieved in the industry, household, services, and transport sectors, where a reduction of between 50-60 per cent could be witnessed between 1997 and 2007. The energy intensity of the agricultural sector declined in the same period by 20 per cent (see Figure 11.22).

Figure 11.22: Primary energy intensity in Belarus by sector at Purchasing Power Parity



Source: Enerdata[6] (2007)

Energy losses from electricity and gas grids

In 2008, total losses on the Belarussian transmission and distribution systems were 11 per cent of the electricity supply, thereby improving slightly from the 2006 values (11.25 per cent)[61] and showing no need for action for energy efficiency improvement. The origins of these electricity losses can be localized within the equipment status and means of metering[61].

Gas distribution losses represent slightly over one per cent of the primary gas supply. The main reasons for these losses lie within unforeseen changes in the delivery of gas on part of the exporting company and hence sub-optimal regimes[61].

Generally, all electricity consumers are equipped with meters. Automatic systems for metering and monitoring energy consumption are being introduced to industrial consumers. Most of the industrial enterprises have such systems. Significant parts of the industrial, agriculture and commercial consumers have induction or electronic meters. The residential consumers are equipped with induction or electronic meters. There are some experimental zones in which electronic meters are used and in which ‘clever’ houses with remotely read meters are constructed[61]. It is possible to disconnect customers from the electricity grid who do not pay their bills.

All industrial and most of the residential gas consumers are equipped with conventional gas meters[61]. Similarly to the electricity sector, gas consumers can be disconnected from the grid in case of failure to pay their bills.

District heating grid

The heat losses from the distribution system in Belarus account for less than ten per cent of the domestic supply[5]. The main reasons for these losses can be found within the partially obsolete state of the heat pipelines, the non-optimal hydraulic and thermal regimes of heating grids and finally the impossibility of regulating heat-carrier parameters and heat metering in old buildings. At present, different programmes are being in use to improve the current state of the district heating systems: new pre-insulated pipes are being installed (1,000 km per year)[60], the maintenance is being improved, automatic regulation systems and modern accounting and dispatching control systems are being introduced[61].

Heat is mostly produced through gas and coal in heat-only or combined heat and power plants. Biomass provides around four per cent of the heat in Belarus, through more than 400 boiler plants, operating in the country using the combined combustion of wood and other fuels such as coal.

Other sources of inefficiency (industrial production, housing, other sectors)

The main sources of energy inefficiency in the industrial sector can be attributed to the partial use of inefficient technologies, lack of financing for investment in modern equipment and inadequate management resources for implementation of optimized asset management procedures.

Inefficient technologies used in some of the Belarussian power plants are the main sources of inefficiency in the power generation, while insufficient engineering infrastructures especially in old houses, can be identified as the main sources of inefficiency in the housing sector. Partially obsolete vehicles are the cause of inefficiencies in the transport sector[61].

In order to overcome the abovementioned deficits, Belarus is in the process of implementing some specific measures, including the monitoring of heat and energy consumption and energy audits of industrial enterprises. Furthermore a special programme for the rehabilitation in the housing and utilities sector has been developed, while a programme for the implementation of pre-insulated pipes in the housing and utilities sector is in the development phase.

Estimated potential for energy savings by sector

Although Belarus has already achieved considerable energy savings by halving its energy intensity over the past decade, there is still considerable potential for energy savings in the country[67].

A large contribution to energy savings could come from the rehabilitation of conventional power plants and the construction of new and more efficient gas power plants[67].

The mid- and long-term goals to realize energy saving potentials were set in The Basic Principles of the Republic of Belarus Energy Security (President of the Republic of Belarus Decree No. 433 of 17 September 2007) and are shown in Table 11.1.

Table 11.1: Mid- and long-term energy saving goals of Belarus

Year	Reduction of the GDP energy intensity compared to 2005	Estimated GDP growth compared to 2005	Estimated energy savings
2010	31%	156%	7.55 million tce
2015	50%	229%	7.00 million tce
2020	60%	319%	5.20 million tce

Source: Research and Production Communal Unitary Enterprise BelVIEC[61] (2009)

ESCOs and other initiatives in energy efficiency

Several Energy Service Companies are operating in Belarus, including BelinvestESCO, Vneshenergoservice and Gmmotory. They are implementing projects under Energy Performance Contracting Schemes[22].

BelinvestESCO has been established in 2005 as the first ESCO in Belarus by the Belinvestbank and the Department for Energy Efficiency of the State Committee for Standardization. In the past four years the company conducted over 20 feasibility studies for different energy companies and is currently constructing two small combined heat and power plants (2 MW each), jointly with the local municipalities of Lido and Birosa[68].

11.2.4. Current situation with respect to renewable energy sources and future deployment potential

Deployment of renewable energy sources

Renewable energy sources do not account for a significant part of the energy supply in Belarus. Hydro energy accounts for only 0.1 per cent of total electricity generation. Combustible renewables and waste account for three per cent of the total energy supply[5].

Estimated potential for renewable energy sources

As a large range of water-heating boilers (with a capacity from 60 to 5,000 kW) fueled by wood and timber waste is currently in operation in Belarus, there is a good basis and technological know-how for the further deployment of biomass in energy conversion[22]. However, the overall potential for further deployment of renewable energy sources is limited in Belarus, since the country has a relatively low potential for solar, geothermal, wind, and hydropower. The most significant renewable energy resource is wood and other biomass sources (about 1,000 MW technical potential)[22].

The main renewable power plant projects currently ongoing in Belarus are based on hydropower, as shown in Table 11.2. In addition, several small wind projects are under development.

Table 11.2: Current renewable power plant projects in Belarus

Plant name	Capacity	Construction costs
Vitebsk	50 MW	USD 230 million
Beshenkovichi	30.5 MW	USD 145 million
Verkhnyaia Dvina	29 MW	USD 138 million
Polotsk	23 MW	USD 109 million
Rechitsa	24 MW	n.a.
Mogilev	15 MW	n.a.
Vilyakovka	11 MW	n.a.
Zhlobin	9 MW	n.a.
Shklov	5.5 MW	n.a.
Orsha	4.9 MW	n.a.

Source: UNECE[22] (2009)

Projects and initiatives in renewable energy sources

The market for renewable energy sources in Belarus is still in an early stage. One recent foreign investor is the German energy company Teldafax, who jointly with the Ministry of Agriculture of Belarus entered a public-private partnership, with the aim of constructing and operating ten biogas power plants[60]. Teldafax is supported in this project by the Belarussian project developer ENECA. A further Belarussian project developer is Malaja Energetica, which is especially active in the field of small hydro power plants (< 2MW)[69].

11.2.5. Institutional, regulatory and policy framework for energy efficiency and renewable energy sources

Policymakers in the energy sector

Institutional policymakers

The ministries in charge of energy policy in Belarus are listed below:

- The Ministry of Energy is the main institutional policymaker in the Belarussian energy sector. It is responsible for preparation and implementation of the overall energy regulatory framework. Additionally, it oversees nine state institutions which are accountable to the Ministry of Energy, such as Beltopgaz and Belenergo. Apart from these state institutions, there are 25 Belarussian business entities which are owned by the Republic of Belarus and operated by the Ministry of Energy[70];
- The Ministry of Economy performs the role of independent regulatory body and regulates the energy tariffs for end users;
- The Ministry of Natural Resources and Environmental Protection of the Republic of Belarus is a national state administration body in charge of exploitation of natural resources and environmental protection, pursuing the state ecology policy[71];
- The Ministry of Housing and Communal Services is responsible for the preparation and implementation of the state policy of housing and communal services. It is for instance responsible for the communal heating system and the ongoing replacement of the old heating pipes with pre-insulated pipes[60];

- The Department for Energy Efficiency of the State Committee for Standardization is the main institution responsible for monitoring the implementation and the overall final results of the government policy regarding energy efficiency and reports directly to the Council of Ministers. The Department is inter alia responsible for the development and implementation of state policy in the field of energy efficiency, and ensuring state supervision of rational use of fuel, heat and electrical power. Overall, 37 people are working for the central department of the Department for Energy Efficiency, while further 133 employees are working in its regional offices. Additionally, there are seven republican unitary enterprises under the umbrella of the Department for Energy Efficiency. One of these enterprises is a co-founder of BelinvestESCO. The other enterprises are active in the fields of renewables, combined heat and power plants, metering, and energy audits[60].

Regulatory and administrative institutions at the regional and local level

The Belarussian regions and municipalities have the possibility to provide individual support in the field of energy efficiency and renewables. Nevertheless, large-scale projects require the approval of the Council of Ministers[62].

Energy policy and regulatory framework

Since the adoption of the Energy Programme of the Republic of Belarus for the period up to 2010, which was approved in 1992, several strategy and policy documents have been adopted and a large number of programmes and action plans have been and are being implemented. Three state Republic programmes for energy savings were adopted covering the periods 1996 to 2000, 2001 to 2005, and 2006 to 2010. The common major goal of these programmes was the reduction of energy intensity and improvement of energy efficiency on the supply and demand side. The current programme gives particular emphasis also on development of renewable energy sources[61].

The specialized law for the energy sector, the Law of the Republic of Belarus on Power Saving was adopted in 1998.

In 2007, the President of the Republic of Belarus approved two strategic documents that determine the country's policy and strategy in the energy sector until the year 2020, i.e. The Strategy of the Energy Security of the Republic of Belarus (Decree No. 433 of 17 September 2007) and the Directive No. 3 Economy and Thrift as the Main Factors of Economic Security of the State (Directive No. 3 of 14 June 2007)[61].

In addition, a number of documents were approved in order to define the organizational structures and tools for the implementation of the Strategy and the Directive No. 3. They include:

- The national complex programme of updating the basic production assets of the Belarussian energy system, power saving and raising the share of domestic fuels used in the Republic for the period up to 2011 *(*Decree No. 575 of 11 November 2007*)*;
- The Resolution No. 1122 of the Council of Ministers "On measures aimed at implementing the Directive No. 3 of the President of the Republic of Belarus of 14 June 2007 adopted on 31 August, 2007;
- The target programme ensuring the production of at least 25 per cent of electricity and heat through the use of domestic fuels or alternative sources of energy for the period up to 2012 (Resolution No. 1860 of 30 December 2004);
- The national programme ensuring transformation of local boilers into mini-combined heat and power plants for the years 2007 – 2010 (Resolution No. 1225 of 28 September 2007).

The key priorities of the energy strategy and policy of Belarus are based on the aims to ensure security of energy supply and to reduce dependency on energy imports, especially from the Russian Federation, with parallel use of the geopolitical position of Belarus as energy transit country between the Russian Federation and the EU.

The strategy goals are defined as follows[61]:

- Ensuring a reliable sustainable energy supply to the national economy;
- Upgrading of the country's energy system on the basis of modern energy efficiency know-how and equipment;

- Overcoming the dependency on imports of natural gas from the Russian Federation through diversification of energy supplies;
- Maximal use of domestic and renewable sources of energy;
- Efficient use of energy and power savings.

The Strategy and the Directive No. 3 of 14 June 2007 describe in detail the measures to be implemented as well as quantitative targets (indicators) for monitoring their achievement. 12 indicators and threshold levels are listed in the Strategy for this purpose including the energy intensity, the level of physical ageing of energy systems and the share of natural gas in the boiler fuel consumed[61].

Policy and regulation on energy efficiency

The Department for Energy Efficiency of the State Committee for Standardization is responsible for the policy regarding energy efficiency[22].

The regulatory framework for the support of energy efficiency in Belarus is set by the Law on Energy Saving developed in 1998, the National Programme on energy saving for the period of 2006-2010 *(*Resolution No.137 of 2 February 2006*)* and specific ministerial plans in their respective industries.

On 25 August 2005, the President of the Republic of Belarus adopted Decree No. 399 The Strategy of Energy Security and Raising Energy Independence of the Republic of Belarus. The Strategy is related to the upgrading of basic production assets, energy conservation and the broader usage of the Republic's domestic fuel and energy sources. The estimated total financial amount for the implementation of all measures of the programme in 2006-2010 will be around USD 5.2 billion[70].

The main targets of the programme are listed in Table 11.1.

Policy and regulation on renewable energy sources

The Department for Energy Efficiency of the State Committee for Standardization and the Ministry of Natural Resources and Environmental Protection are responsible for the policy regarding renewable energy sources[22].

The Presidential Decree No. 399/2005 mentioned with respect to energy efficiency, is also related to the development of renewable energy sources. The programme envisages the use of hydro power in order to reduce the import dependency of Belarus. Several small hydroelectric power plants are planned to be built. Additionally, there is a Special Purpose Programme for providing not less than 25 per cent of the electricity and heat from local fuel and use of alternative sources of energy for the period until 2012[22]. In order to achieve this goal new hydro power plants are being planned, as already mentioned in Table 11.2.

Currently a law on renewable energy sources is under development and should be approved by the Belarussian parliament by 2010[60].

International commitments and current status of implementation

EU Regulation

Currently the compliance to the energy regulation of the European Union is not a priority for the Republic of Belarus. However, the Republic of Belarus is cooperating with the EU in the field of energy. For instance, the EU financed part of the Annual Action Programme of the Republic of Belarus in 2007, which aims at providing support to the implementation of a comprehensive energy policy of Belarus[72]. Belarus is neither a member nor an Observer of the Energy Community Treaty (EnC).

Kyoto Protocol

After signing the United Nations Framework Convention on Climate Change as an Annex I country in 1992, Belarus ratified the Kyoto protocol in 2005. Belarus adopted the Amendment to Annex B of the Kyoto Protocol with emission reduction targets compared to 1990 levels of eight per cent but has not been included in the Annex B yet. Belarus' emission trading potential would be considerable with an estimated emission allowance surplus of over 170 $MtCO_2eq$. Belarus cannot currently trade emissions or participate in Joint Implementation projects, as the amendment to the Protocol allowing that, needs to be ratified by 75 per cent of the parties to the Protocol (as of July 2009 only 16 from the 175 countries ratified it)[71].

Belarus actively prepares Joint Implementation Projects. A pipeline of 114 projects has been identified (see alsoTable 11.3)[71]. The Ministry of Natural Resources and Environmental Protection has provided expertise for small heat and power plants that use wood, cogeneration and biogas plants, small hydro, waste utilisation, and buildings efficiency. Currently a number of Project Design Documents are under preparation. Among the advantages of the Belarussian Joint Implementation Projects are the large portfolio of available projects, state guarantees for implementation, defined national procedures for approval and the possibility for portfolio diversification by the purchaser. Currently, some projects are being implemented under voluntary emission trading schemes[22].

Table 11.3: Preliminary list of JI projects in Belarus (extract)

Extract of preliminary list of projects to be implemented (2008-2012)	Year to commence	Emission reduction in 2008-2012
Minsk CHP-5 (combined cycle, gas turbine of 450 MW)	2010	490,000 tCO_2eq
Grodno CHP-2 (combined cycle, gas turbine of 110 MW)	2010	585,000 tCO_2eq
Beryoza CHP (reconstruction, introduction of cogeneration scheme with two gas turbine units of 175 MW total)	2010	345,000 tCO_2eq
Restoration of biospheric functions of three thousand hectares of degraded peatland in Bulev Mokh deposit	2009	300,000 tCO_2eq
Totol amount of projects of Belenergo (26)		4,964,000 tCO_2eq
Total amount of projects of Belneftekhim (20)		2,347,000 tCO_2eq
Total amount of projects of Bellesbumprom (13)		1,185,000 tCO_2eq
Total amount of projects at enterprises of the Ministry of Agriculture (6)		1,125,000 tCO_2eq
Total amount of projects at enterprises of the Ministry of Communal Services (19)		2,970,000 tCO_2eq
Total amount of projects at enterprises of the Ministry of Transport and the Ministry of Industry (11)		413,000 tCO_2eq
Total amount of projects at enterprises of the Ministry of Architecture and Construction (19)		728,500 tCO_2eq

Source: Ministry of Natural Resources and Environmental Protection of the Republic of Belarus[71] (2009)

Other international commitments

Belarus signed the Energy Charter Treaty and the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects in 1994; but the ratification of the Energy Charter Treaty is still pending[73].

11.2.6. Economic incentives and financing schemes for energy efficiency and renewable energy projects

General investment climate in the country

Belarus has established a National Investment Agency, whose mission is to support foreign companies in Belarus and Belarussian companies when doing business abroad. The main services of the National Investment Agency comprise the turn-key management of investment projects, the provision of information and research services, and the interaction with governmental authorities and national institutions[74].

Furthermore, Belarus created six free economic zones in each of the six Belarussian regions in 2002. Companies, located within one of the six free economic zones profit from tax exemptions for a period of five years since their foundation. After this period of five years, the tax level was increased slightly, but it is still lower than in other regions of Belarus. Additionally, exports from the free economic zones are exempt from custom duties. In addition to these free economic zones, a high-tech park has been created in 2005 close to Minsk. The high-tech park is aimed at boosting the competitive power of the national new and high technology-based sectors, developing modern technologies and expanding their exports as well as attracting to the sector both Belarussian and foreign technologies[75].

According to the Heritage Foundation, there is no explicit discrimination against foreign investors. However, state-owned enterprises have preferences compared to private businesses (both national and foreign). Numerous industries remain in the exclusive domain of the state, with strategic sectors under governmental control. Foreigners and businesses may not own land. Furthermore, capital transactions, resident and non-resident accounts, and current transfers are subject to strict controls[76].

The President and the Government of the Republic of Belarus have taken a number of decisions concerning the implementation of policy for stimulating and attracting foreign investments. To achieve this goal, investment fora have been regularly organized in Belarus and abroad, including the fora in London in 2008 and in Minsk in 2009, to promote attractiveness of Belarus as a country with significant potential for foreign investments. As a result of measures taken, Belarus has risen in the Ease of Doing Business Rank from 115 in 2007 to 58 in 2009 according to the World Bank's Doing Business Report[77]. The country aims at reaching the Top-30 rank in this list. At the investment forum in Minsk, several dozen projects out of almost 200 projects proposed to foreign investors were aimed at the increase in energy efficiency and/or use of renewable energy sources.[78]

Incentives for energy efficiency

There are a number of legal norms and acts to stimulate the activities of enterprises to reduce the consumption of fuel and energy and implement energy saving technologies. These include preferential loans, state subsidies in form of reduced interest rates, use of savings to pay bonuses, systems of penalties, and sanctions for non-rational use of energy sources[22]. Additionally, tax exemptions for imports of energy efficiency equipment have been introduced[60].

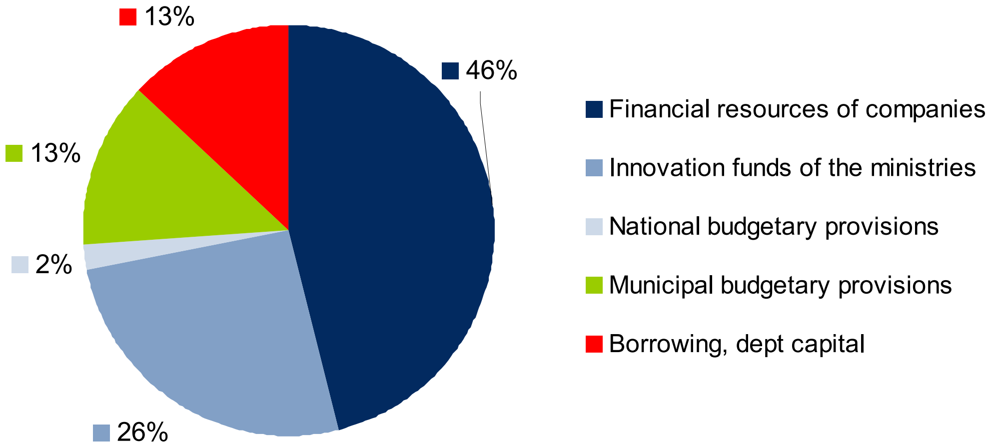
Incentives for renewable energy sources

In 1994, Belarus introduced a standard feed-in tariff for renewable-generated electricity in a law modeled on Germany's Electricity Feed Law. Electricity from renewable energy sources is bought by Belenergo from the producers of electricity from renewable energy sources at a base price of 80 EUR/MWh (255.2 BYR/kWh), which is multiplied by a coefficient of either 0.85 or 1.3. The coefficient of 1.3 is only applied for a period of five years since the commissioning of the renewable power plant and applies only to producers who did not receive any state support during the construction phase of the renewable power plant. After the initial five years the coefficient is reduced to 0.85 for another five years, while for the following ten years a coefficient of 0.7 will be applied. However, producers who received state support during the construction phase receive only a coefficient of 0.85 for the first ten years which will then be reduced to 0.7 for the following ten years. The two mentioned coefficients apply to all renewable energy sources, i.e. also to hydro power plants regardless of their size. This feed-in tariff methodology is financed via a proportional increase of the final customer tariffs[75].

National financing mechanisms

As stated in the previous section, the estimated total financial investment for the implementation of all measures of the Belarussian energy savings programme for 2006-2010 will be around USD 5.2 billion. The structure of the capital investments for these measures is shown in Figure 11.23[22]:

Figure 11.23: Structure of capital investments for 2006-2010



Source: UNECE[22] (2009)

International financing mechanisms

Additionally, a number of projects are being implemented using assistance, i.e. loans from the World Bank and the European Bank for Reconstruction and Development[22].

Due to the fact that the business sector in Belarus is mainly dominated by state-owned enterprises, the EBRD is exclusively investing into the private sector to encourage the country's transition towards a market economy. In particular, the EBRD is focusing its efforts on small- and medium-sized enterprises (SMEs) through SME credit lines opened to six private banks. The EBRD has so far not specifically invested in energy efficiency or renewable energy sources projects in the country, but is currently considering lending a senior corporate loan of up to USD 15 million to Pinskdrev, the largest private sector wood processing and furniture group in Belarus. The EBRD financing will be used to upgrade Pinskdrev's wood processing and furniture manufacturing facilities, including investments in energy efficiency enhancements and environmental improvements[79].

On 29 May 2009, the World Bank approved a USD 125 million loan to the Republic of Belarus to support a USD 193 million energy efficiency project aimed at improving energy efficiency in heat and power generation in selected towns in Belarus. The project's main objective is the conversion of six existing heat-only boiler plants to combined heat and power plants. It is expected that about 90 MW of additional electric capacity based on modern combined cycle gas turbines and gas engines will be installed. Furthermore, the efficiency of heat and power generation at the project sites is expected to increase by about 30 per cent. It is expected that about 90 million m^3 of natural gas will be saved annually, which would lead to the reduction of about 165,000 tonnes of carbon dioxide emissions per year[80].

Commercial financing mechanisms

At present the commercial banks in Belarus do not provide specific lending facilities for energy efficiency or renewable energy sources projects[81].

According to the National Bank of Belarus, the stability of the Belarussian banking sector, which comprises 31 banks, is threatened by the global financial crisis. The percentage of credit-risk-weighted assets in the banking sector increased from 47.5 per cent on 1 January 2008 to 62.2 per cent on 1 November 2008, dropping to 53.7 per cent by the end of 2008. The growth of credit-risk-weighted assets was accompanied by the increasing amount of problem loans, i.e. loans 90 days or more past due. Problem loans owned by legal entities, excluding banks, increased by 29.4 per cent, and the loans owned by individuals by 260 per cent[82].

Among factors behind increased risks facing the country's financial market, the National Bank quoted inflation that accelerated last year against the backdrop of loan and deposit interest rates remaining relatively unchanged, and a high concentration of borrowers. The currency exposure of the banking sector might grow as increasingly more individuals opt for foreign-currency deposits and outstanding foreign-currency loans are growing[83].

Other support mechanisms

The United Nations Development Programme/Global Environment Facility launched in 2006 a programme called Removing Barriers to Energy Efficiency Improvements in the State Sector of Belarus. The aim of this project is to address capacity and awareness issues amongst state enterprises and local authorities by building capacity to provide information and consulting services and training to local authority and state enterprise employees in energy efficiency. The project will support the efforts to identify energy efficiency opportunities and increase internal investments to realize such opportunities in the district heating and CHP sector, including the utilization of concessional financing opportunities being offered by the central government. The implementing partner of this project is the Department for Energy Efficiency of the State Standardization Committee of Belarus. The total budget of the project is close to USD ten million, jointly provided by GEF (USD 1.4 million), the Department for Energy Efficiency (USD 3.15 million) and several project partners (USD 5.1 million), such as the Belarussian railways[63].

11.2.7. Barriers to the implementation of Energy Efficiency and Renewable Energy projects

Box 2: Summary of barriers to the implementation of energy efficiency and renewable energy projects in Belarus

Legal, institutional and administrative barriers

1. Despite the existence of a National Investment Agency, there is no regulatory framework supporting private investments (both domestic and foreign), however there exist selective financial incentives such as free economic zones.
2. Monetary savings achieved in an organization that receives state funding for its operations must be returned to the state budget and cannot be made available to the organization, thus they cannot be used for repayment of the investment.
3. The main regulatory and institutional barrier to private investments in Belarus is represented by the lack of a clear framework in the energy sector.
4. Furthermore, apart from the Presidential Decree Nr. 399/2005, there is no framework regulation in place regarding renewable energy sources.

Economic and financial barriers

5. The main economic barriers are the very low, state-subsidized domestic tariffs for electricity and heat, which endanger the profitability of bankable projects.
6. The lack of liberalization and privatization processes and the extensive influence of the state in all energy activities will hardly provide for an attractive financial environment for private investments.
7. The unitary feed-in tariff coefficient, i.e. all renewable energy sources receiving the same coefficient, is unfavorable for the development of costlier renewable technologies such as photovoltaics.

Lack of awareness, human capacities and professional skills

8. Lack of implementation of international commitments, such as the Energy Community Treaty or the Energy Charter Treaty, hampers the exchange of regulatory and market know-how and expertise with countries which implemented successful renewable energy and energy efficiency policy instruments.
9. The very low development of market structures and of the private business in the Belarussian economy indicates a general lack of awareness on the importance of financial mechanisms and instruments for private investment projects.

Legal, institutional and administrative barriers

Despite a clear commitment by the Belarussian government to support energy efficiency which is witnessed by the remarkable progress in the increase in energy efficiency over the last ten years and by the several administrative reforms undertaken (such as the introduction of bonuses and penalties to promote rational use of energy, the definition of the energy saving programme for 2006 to 2010), the main regulatory and institutional barrier to private investments in Belarus is represented by the lack of a clear framework in the energy sector and by the strong influence of the state in the energy sector:

- There is no framework law regarding the electricity sector (a draft version is currently under development) nor is there, apart from the Presidential Decree No. 399/2005, any framework regulation regarding renewable energy sources;
- Despite the existence of a National Investment Agency in order to facilitate foreign investment in Belarus, there is no regulatory framework supporting private investments (both domestic and foreign) and the massive influence of the state in the Belarussian economy (over 75 per cent of Belarussian economy is state-owned[22]) hinders the development of a private sector to the extent that some international observers[76] claim that private businesses are being frequently discriminated by public administrations against state-owned businesses;
- Another administrative barrier in the development of energy efficiency investments has been pointed out during the UNECE assessment missions and refers to the provision that monetary savings achieved in an organization that receives state funding for its operations must be returned to the state budget and cannot be made available to the organization, thus they cannot be used for repayment of the investment, unless the investor is the state itself.

Economic and financial barriers

No major economic or financial barriers for energy efficiency and renewable energy sources appear at first sight in Belarus: the feed-in tariff for electricity produced from renewable energy sources provides an attractive premium on customer tariffs and in the area of energy efficiency several incentive instruments (bonuses, subsidies and preferential loans) are available. However, in the perspective of an international investor, the main economic barriers are the very low, state-subsidized domestic tariffs for electricity and heat, which endanger the profitability of bankable projects. In the same perspective, undeveloped market structures in the energy sector, the lack of liberalization and privatization processes and the extensive influence of the state in all energy activities will hardly provide for an attractive financial environment for private investments. Furthermore, the unitary feed-in tariff coefficient, i.e. all renewable energy sources receiving the same coefficient, is unfavorable for the development of costlier renewable technologies such as photovoltaics.

Lack of awareness, human capacities and professional skills

The progress done in Belarus for the improvement of the situation regarding energy intensity witnesses a strong commitment by the Belarussian government and therefore a high degree of awareness and presumably also the presence of sufficient human capacities in the relevant organizations; the presence of several ESCOs in Belarus operating on an energy performance contracting base, the existence of an ad hoc department for energy efficiency within the State Committee for Standardization, and the presence of dedicated organizations within the Ministry of Energy for design, development, realization and maintenance of energy infrastructure also is an indicator of technical capabilities and awareness of the importance of energy efficiency. Regarding renewable energy sources, the degree of awareness appears to be lower. However, they are mentioned in the Presidential Decree No. 399/2005 as a valuable resource to be further exploited in order to reduce dependency from energy imports.

At the same time, the Belarussian government does not seem to be very favorable to the implementation of international commitments or standards, such as the Energy Community Treaty or the Energy Charter Treaty; the only international commitment undertaken by Belarus is the ratification of the Kyoto Protocol as an Annex I party to the United Nations Framework Convention on Climate Change, which is economically very favorable to Belarus, providing extensive possibilities of trading of emission certificates and hosting Joint Implementation projects. This lack of international commitments could hinder the exchange of regulatory and market expertise with other countries in more advanced stages of market development.

Finally, the very low development of market structures and of the private business in the Belarussian economy indicates a general lack of awareness on the importance of financial mechanisms and instruments for private investment projects and subsequently also the lack of understanding of this kind of instruments on behalf of the state administration and the management of state-owned companies. The private business sector, which is developed to a very limited extent (less than 25 per cent of the national economy) and represented mostly by small- and medium-sized enterprises, would probably strongly benefit from training and assistance programmes related to the preparation of bankable projects.

11.3. *Bosnia and Herzegovina*

11.3.1. Overview of economic situation

General demographic data

Bosnia and Herzegovina is a country spreading over 51,209 km^2. It is located in the Western Balkans.

The capital city is Sarajevo, with a population slightly above 500,000 inhabitants. Other cities with a population above 100,000 are Banja Luka, Tuzla, Bijeljina, Zenica, Mostar and Prijedor. At the end of 2007, according to the Economist Intelligence Unit estimates, the population of Bosnia and Herzegovina was 3.8 million inhabitants[84]. There are uncertainties concerning the exact number of inhabitants because of the ethnic problems the region faced in the mid-1990ies and some estimates give numbers as high as 4.5 million, with around 47 per cent of Muslim Bosniaks, 40 per cent of Orthodox Serbs and 13 per cent of mainly Catholic Croats.

The population density of Bosnia and Herzegovina is 74 inhabitants per km^2. The annual growth rate of the population between 2000 and 2005 was 1.13 per cent[85].

Current political situation and outlook

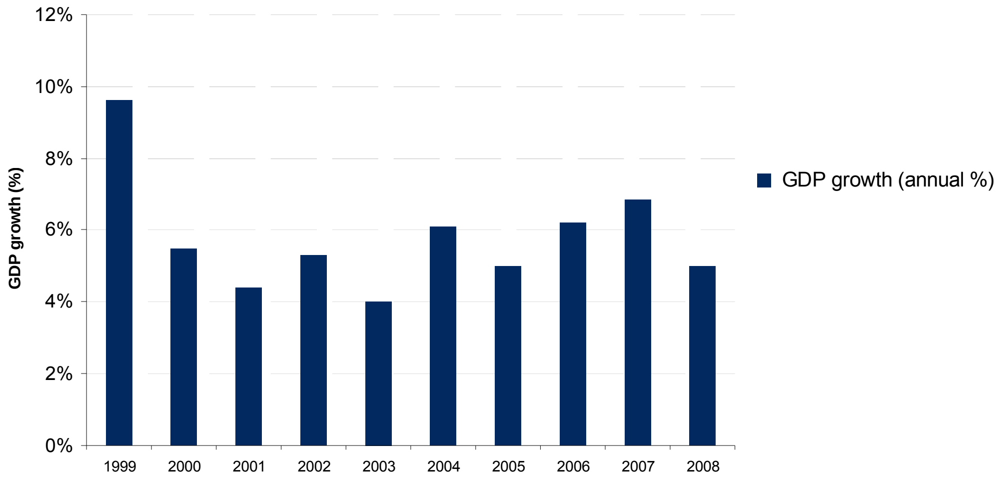
The state of Bosnia and Herzegovina is composed by two separate entities: the Federation of Bosnia and Herzegovina and the Republika Srpska, set up by the Dayton Peace Agreement of 14 December 1995. It also includes a self-governing district, Brcko, under the sovereignty of the Central State Government. The Federation of Bosnia and Herzegovina and the Republika Srpska are unequally structured. While the Federation of Bosnia and Herzegovina is organized at the sub-entity level into a cantonal (10) and a municipal (79) administration level, in the Republika Srpska only the municipal (63) administration is present below the entity level. Bosnia and Herzegovina signed an EU stabilization and Association Agreement (SAA) on 16 June 2008.

As a result of the Dayton Agreements, the civilian peace implementation is supervised by the High Representative for Bosnia and Herzegovina selected by the Peace Implementation Council, an international body charged with implementing the Dayton Peace Agreement for Bosnia and Herzegovina. The High Representative for Bosnia and Herzegovina is currently Valentin Inzko. The Chair of the Presidency of Bosnia and Herzegovina rotates among three members (Bosniak, Serb, Croat), each elected as the Chair for an eight-month term within their four-year term as a member. The three members of the Presidency are elected directly. The actual President of the Republika Srpska is Rajko Kuzmanović, while the actual President of the Federation of Bosnia and Herzegovina is Borjana Krišto. The most recent national elections took place in October 2006, electing new state presidency members, entity governments and state, entity, and cantonal (only in the Federation of Bosnia) parliaments. The next national elections are scheduled for October 2010.

Gross Domestic Product

Bosnia and Herzegovina's GDP is estimated by the Economist Intelligence Unit to have reached USD 18.3 billion in 2008[84], which represents an average of around USD 3,500/inhabitant (USD 8,300/inhabitant based on Purchasing Power Parity). After recovery from the civil war, Bosnia and Herzegovina has seen a steady economic growth over the last five years, with an average real gross domestic growth between 2003 and 2008 of 5.2 per cent (see Figure 11.24)[86].

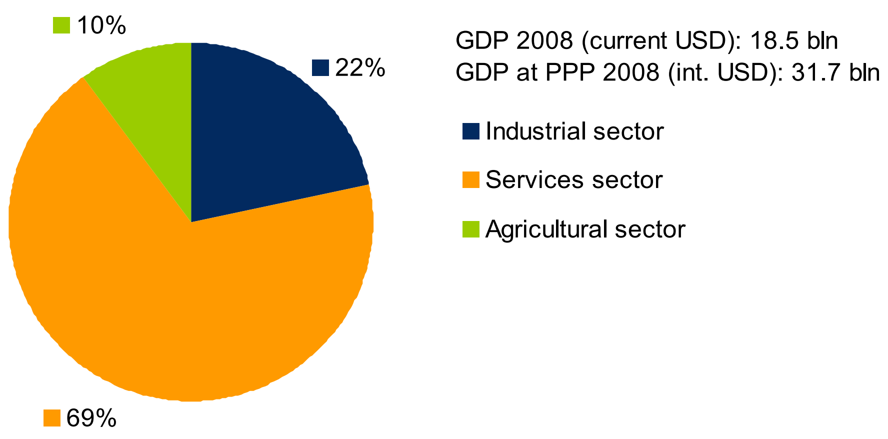
Figure 11.24: Real GDP growth of Bosnia and Herzegovina



Source: World Bank[86] (2009)

The repartition of the GDP in 2007 can be seen in Figure 11.25 and is clearly dominated by the services sector with 69 per cent of total GDP. The industrial sector, with a share of 22 per cent, is mostly focused on the following sub-sectors[86]: mining (steel, coal, iron ore, lead, zinc, manganese, bauxite), vehicle assembly, textiles, tobacco products, wooden furniture, tank and aircraft assembly, domestic appliances, and oil refining.

Figure 11.25: Repartition of the Gross Domestic Product in Bosnia and Herzegovina in 2007[xiii]



Source: World Bank[86] (2009)

11.3.2. Energy sector and development of energy markets

Energy supply

Bosnia and Herzegovina is a net primary energy importer with an overall modest import dependency of around 26 per cent[5]. Its total primary energy supply in 2007 amounted to 5,605 ktoe. The imported energy sources are limited to petroleum products, gas (imported from the Russian Federation via pipelines crossing Ukraine, Hungary and Serbia), and petroleum products, while coal and electricity are equally exported as well as imported.

Figure 11.26 shows the energy balance of the country. Bosnia and Herzegovina is mainly covering its energy needs with extensive coal extraction and a good utilization of its hydro potential.

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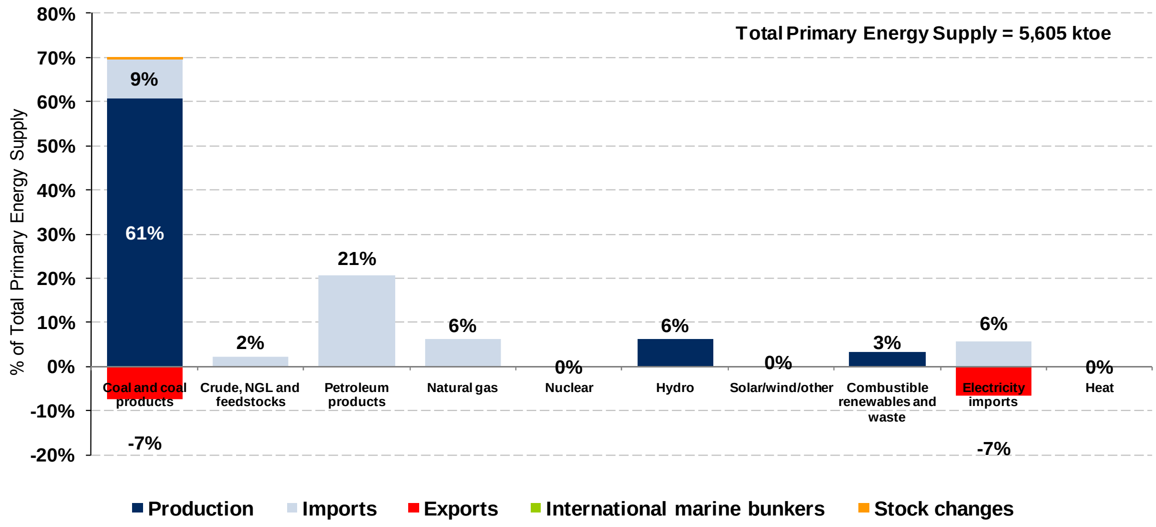
xiii For Bosnia and Herzegovina the repartition values of the GDP per sector are only available for 2007, while absolute GDP values are from 2008.

Figure 11.26: Energy balance of Bosnia and Herzegovina by primary energy sources in 2007



Source: IEA[5] (2009)

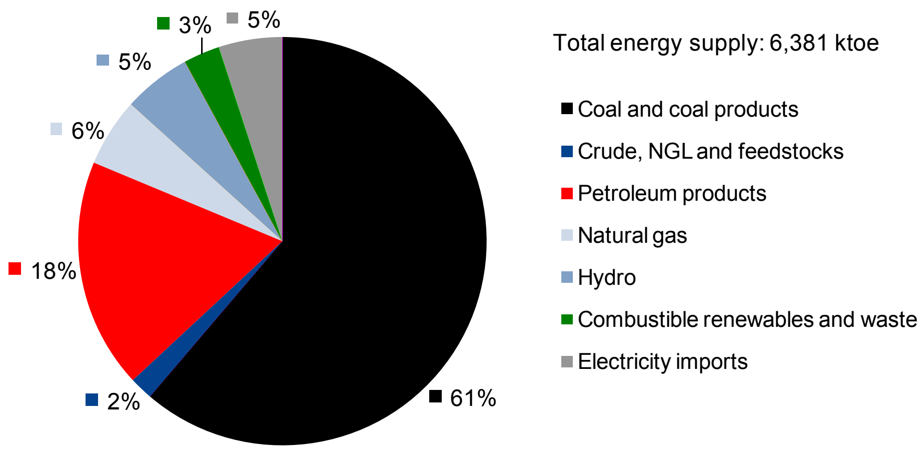
According to the International Energy Agency, coal accounts for 62 per cent of the total energy supply of the country (defined as the sum of production and imports) in Bosnia and Herzegovina. The remaining 38 per cent of the energy is supplied through a diversified mix of primary energy sources (see Figure 11.27)[xiv].

In 2007, electricity generation in Bosnia and Herzegovina amounted to 11,824 GWh, 65 per cent of which is produced through lignite and brown coal, 34 per cent through hydro (mainly large hydro) plants and the remaining one percent being produced from oil (see Figure 1.28)[5].

The installed generation capacity is 4,341 MW, 2,411 MW (70 per cent) of which is hydro capacity[87]. Bosnia and Herzegovina has a surplus in power generation, however, without new generation assets growing demand could match the existing supply as early as 2013[88]. The country has good electric interconnection capacities with neighbouring countries as its power system was developed to supply power to other parts of former Yugoslavia[22].

Heat supply in Bosnia and Herzegovina amounts to 4,162 TJ [5]. Heat comes from public heating plants as well as thermal power plants, which are fueled with coal, gas and oil (see Figure 11.29)[89].

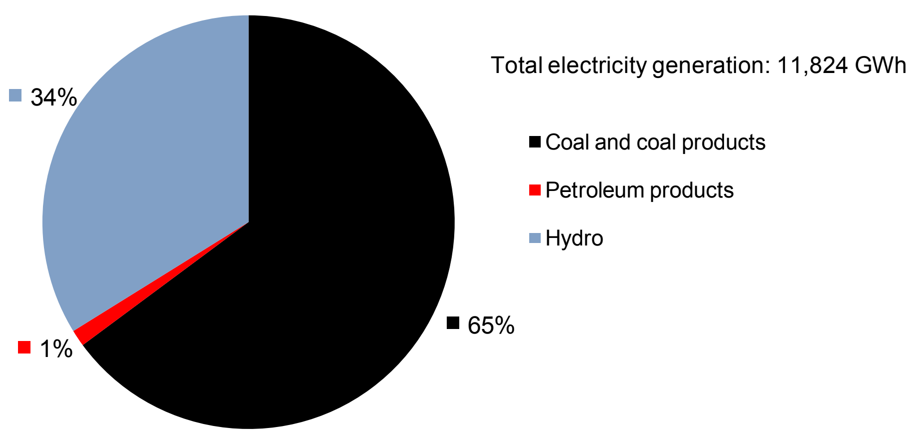
Figure 11.27: Supply of primary energy by sources in 2007



Source: IEA[5] (2009)

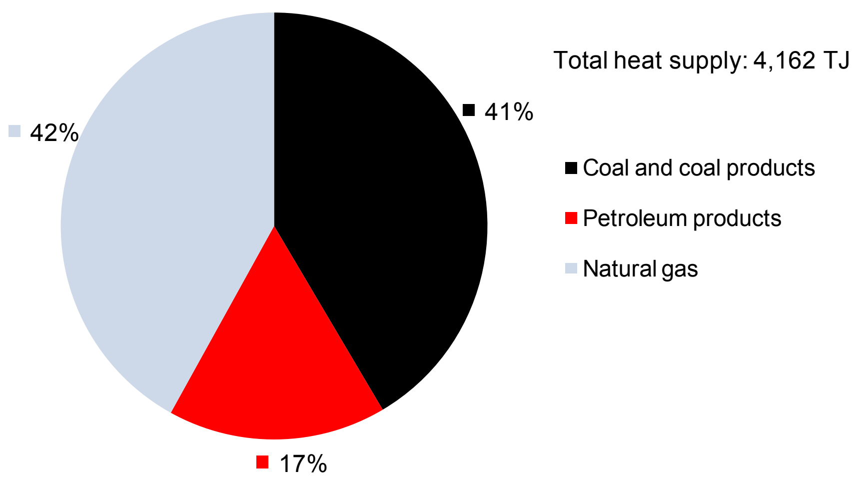
[xiv] There are inconsistencies between different sources, i.e. IEA and the Energy Study for Bosnia prepared by EIHP. For the purpose of consistency in data format, the data of the IEA was adopted.

Figure 11.28: Electricity generation by sources in 2007



Source: IEA[5] (2009)

Figure 11.29: Supply of heat by sources in 2007



Source: IEA[5] (2009)

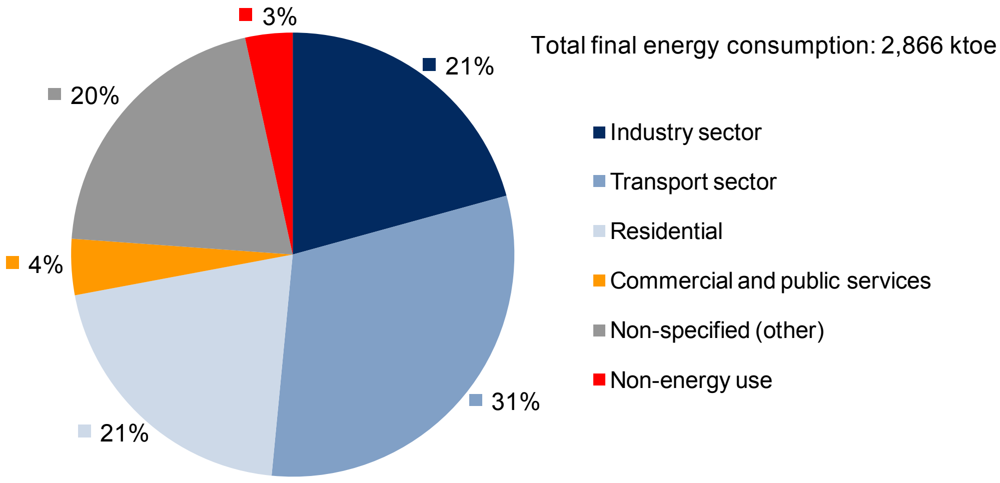
Energy demand

After an absolute decline of energy demand as consequence of the recent war, energy consumption has risen in almost every sector in Bosnia and Herzegovina following the reconstruction of the country. The industry sector saw a large decline of its energy consumption between 1990 and 2000, but between 2001 and 2005, energy consumption increased by an average annual rate of 4.4 per cent. A decrease was achieved only in fuel wood consumption which fell at an average annual rate of -7.5 per cent. Consumption of all other forms of energy increased. Consumption of electricity increased by an average annual rate of 6.1 per cent, coal and coke consumption by a rate of 7.9 per cent and natural gas consumption by an average annual rate of 10.4 per cent[90], suggesting a fuel substitution of gas instead of fuel wood.

As can be seen in Figure 11.30, the main consumer of final energy in Bosnia and Herzegovina is the transport sector, followed by the industrial and the residential sectors. Services account for only four per cent of the final energy consumption although they account for approximately two-thirds of the GDP.

Amongst industries, metal manufacturing represents around 50 per cent of the industrial sectors' energy consumption[89].

Figure 11.30: *Total final energy consumption by sectors in 2007*



Source: IEA[5] (2009)

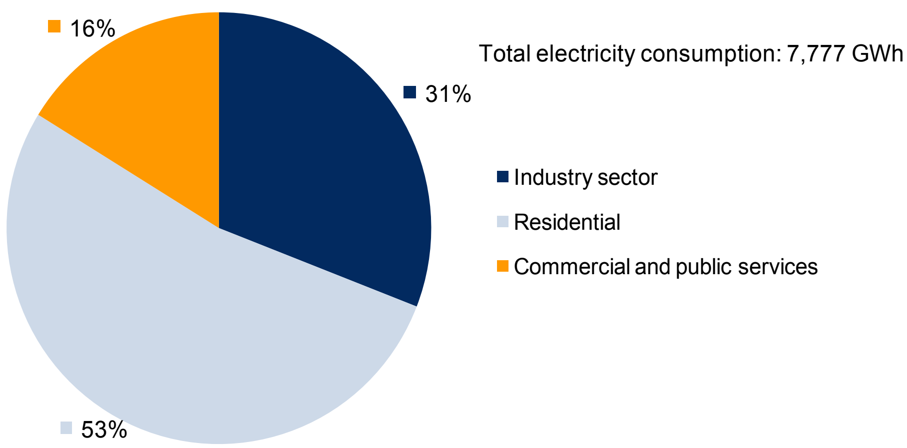
The 20 per cent of "non-specified" consumption come from coal and peat, petroleum products and to a small extent from heat, whose consumption is entirely classified by the IEA as "non-specified". The numbers given by the Energy Study for Bosnia and Herzegovina (EIHP) in 2008 enable to fill this gap partially: the non-specified consumption comes from the residential sector for heating purposes. The country's heat generated through heat-only boilers fueled with heavy fuel oil (and combined heat and power plants for the district heating system of Tuzla) is injected in district heating systems while households often have their individual coal-fueled stoves and boilers[22].

Most of the electricity is consumed by the residential sector, absorbing 53 per cent of the country's final consumption. The industry sector comes second with a share of 31 per cent while the services sector absorbs 16 per cent of the electricity consumed in Bosnia and Herzegovina (see Figure 11.31).

Demand for gas in Bosnia and Herzegovina derives mainly from the industrial sector and in particular from the metal production industry. Gas is also used to fuel the district heating system of Sarajevo (see Figure 11.32)[22].

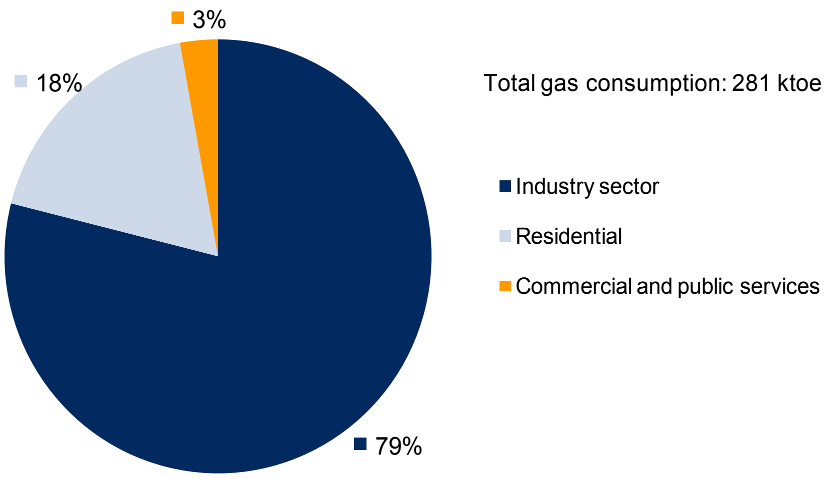
The totality of the commercial heat final consumption (4,162 TJ) is categorized by the IEA as "non-specified". However, according to data from the Energy Sector Study for Bosnia and Herzegovina, it seems that commercial heat supplied is mostly used by the residential and to a lesser extent by the services sector[89].

Figure 11.31: *Final consumption of electricity by sectors in 2007*



Source: IEA[5] (2009)

Figure 11.32: Final consumption of gas by sectors in 2007



Source: IEA[5] (2009)

Energy markets

Electricity market

There are three power utilities covering three geographic areas of Bosnia and Herzegovina as well as a state-wide transmission company (Transco) and an independent system operator (ISO). The three power utilities (Electroprivreda) are the Electricity Company of Bosnia and Herzegovina (EPBIH), the Electricity Company of Herzeg-Bosnia (EPHZHB) and the Electricity Company of the Republika Srpska (EPRS). Each power utility has its own generation, distribution and retail facilities. Transco is jointly owned by the two entities (Federation of Bosnia and Herzegovina and Republika Srpska), and is responsible for the operation and maintenance of the transmission system while ISO operates the system in terms of dispatching and cross-border trading[91].

Electricity tariffs

Energy prices were traditionally set by the Governments of the entities and kept low, particularly for the household sector for social reasons. This approach is now undergoing change and the tariff methodology is set by the entity regulators. The methodology must take into account cost transparency, non-discrimination and justified operation and maintenance costs[90].

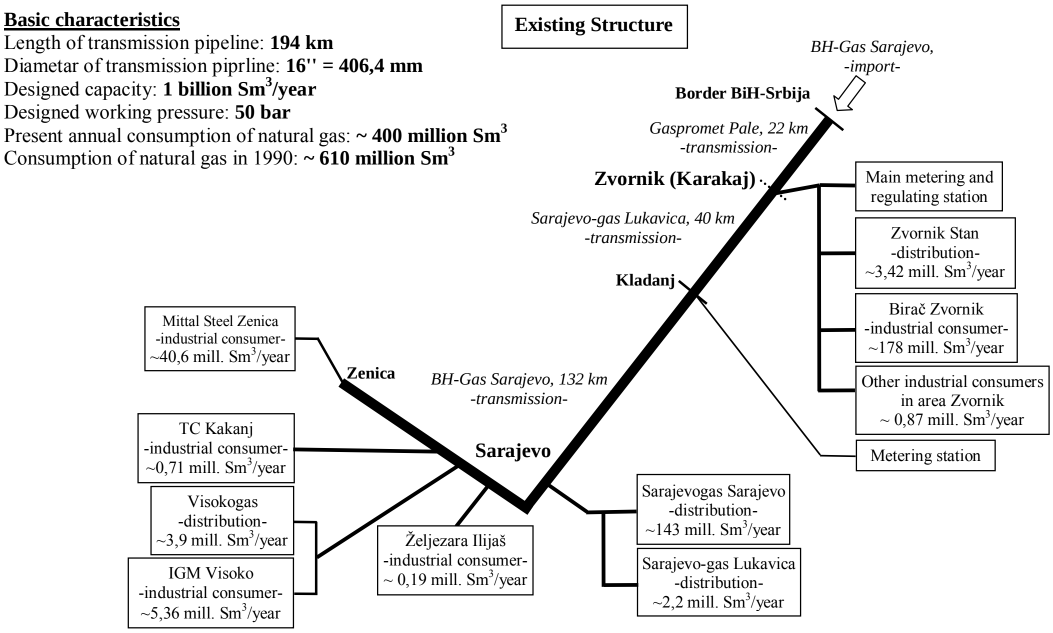
Actual electricity tariffs for consumers are set by regulators at the entity level (FERK in the Federation of Bosnia and Herzegovina and RERS in the Republika Srpska) with transmission costs regulated by the state regulator (SERK). In both entities, there are different rates for different categories of consumers, season and day time. Tariffs for household consumers range from around 45 EUR/MWh in summer to around 60 EUR/MWh in the winter. A typical large consumer connected at 35kV pays between 20 and 50 EUR/MWh depending on time of day and season for energy in addition to a demand charge (year 2007)[90].

Subsidies for customers belonging to socially vulnerable categories are available both in the Federation of Bosnia and Herzegovina and in the Republika Srpska. Despite this, cross-subsidies between consumer categories still exist, mainly from the larger consumer towards the smaller consumer, although these cross-subsidies are being addressed in the electricity sector and modified over time. There are no direct taxes related to CO_2 emissions[90].

Gas market

The gas sector in Bosnia and Herzegovina is relatively small. Gas consumption in 2005 was 380.5 million m^3, or 309 ktoe. Only a few parts of the country currently have access to gas supply. There is effectively only one gas import company, BH Gas. All natural gas is imported from the Russian Federation through Gazprom[90]. Four gas distributors are responsible for the distribution and retail sale of gas, i.e. Sarajevogas Sarajevo (serving 94 per cent of the distribution to customers), Zvornik Stan (two per cent), Sarajevo-gas Lukavica (one per cent) and Visokogas Visoko (three per cent)[89].

Figure 11.33: Transport and distribution structures of natural gas in Bosnia and Herzegovina



Source: Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina[91] (2009)

Gas tariffs

In Bosnia and Herzegovina prices of natural gas are regulated at multiple levels[89]. The price of natural gas for large industrial consumers is set up at market principles (contracts between suppliers and consumers) while the prices for distribution in the Federation of Bosnia and Herzegovina are determined by the Government of the Federation and prices for consumers at distribution level are determined by the cantonal, town and municipal administrations. According to the Energy Sector Study of Bosnia and Herzegovina, the price of gas does not reflect the actual costs of purchase and transport. For instance at distribution level, households pay up to four times lower distribution prices than commercial consumers.

The main consumer of natural gas is the canton of Sarajevo and the selling prices in 2007 (including tax) can be seen in Table 11.4.

Table 11.4: Gas prices in the canton of Sarajevo in 2007

Customer category	Price (EUR/m^3)
Households	0.36
District heating companies	0.37
Commercial consumers	0.47
Industrial consumers	0.46

Source: Energy Charter[90] (2008)

Heating market

There are 22 district heating companies in Bosnia and Herzegovina[89]. District heating facilities fall under the responsibility of municipal (in the Republika Srpska) and cantonal authorities (in the Federation of Bosnia and Herzegovina). There is no regulatory oversight of the district heating sector at the state level[88]. A rough estimate regarding the proportion of the population connected to district heating is ten per cent[91].

High heat losses coupled with low collection rates of energy bills and the artificially low prices of heat constitute serious problems for the financial situation of the district heating companies. Shortage of financial resources and lack of investments eventually affect the quality of services.

Low quality district heating services lead consumers to other more polluting but more reliable energy forms, while the district heating systems cannot expand to supply more consumers[90].

Heating tariffs

Heating prices in Bosnia and Herzegovina vary by each district heating company. For instance in Sarajevo, the price for households is 0.5 EUR/m^2 (0.99 BAM/m^2, without VAT) and the price for companies is 1.6 EUR/m^2 (3.21 BAM/m^2, without VAT). The price for users with the possibility of measuring consumption (with calorie meters) is 30.6 EUR/MWh (60 BAM/MWh) along with the fixed cost according to engaged capacity (MW). The conditions have been determined based on the tariff rules, while the price is approved by the city council[89].

11.3.3. Current situation with respect to energy efficiency and future potential for energy savings and increase in efficiency

Energy intensity

Unfortunately, no detailed data on energy intensity by sector for Bosnia and Herzegovina have been established so far. Several sources report an overall energy intensity level of GDP at Purchasing Power Parity of 0.19 kgoe/USD of 2005 in 2005, which is considerably lower than the project region average but above the EU-27 average[89].

Energy losses from electricity and gas

According to Enerdata, in 2006 total losses on transmission and distribution systems of Bosnia and Herzegovina were estimated at around 17 per cent of the electricity supply[92]. This figure probably also comprises the commercial losses. According to ISO and Elektroprivreda Bosne i Hercegovine (EPBiH) the estimated losses at the transmission level are three per cent, while the distribution losses are estimated to be ten per cent[91]. Gas distribution losses represent slightly over one per cent of the primary gas supply.

Practically all final electricity and gas customers are equipped with conventional meters. In case of non-payment of bills, customers can be disconnected from the grid[91].

District heating grid

Despite its importance, the necessary reforms and investments for rationalization and modernization of the district heating systems have not been implemented. Existing district heating systems are very inefficient. As an example, the space heating average energy consumption in the Sarajevo district heating system is reported to be 140-160 kWh/m^2 for domestic heating. The average in Western Europe would be 90-120 kWh/m^2 for similar climatic conditions. Out of the 22 district heating systems in Bosnia only the Sarajevo district heating system (supply side) has been reasonably rehabilitated in the last decade. Even in the case of the Sarajevo district heating system significant losses occur in the consumer's internal installations. Limited rehabilitation works are also reported in other district heating systems such as Tuzla, Doboj and Banja Luka. With the exception of Sarajevo, virtually all of the other district heating systems suffer high energy losses – which in many cases exceed 60 per cent[90].

Home heating is mainly provided by individual coal-fired stoves and boilers. The district heating system in Tuzla derives its heat from the Tuzla power plant, being the only example of an operational cogeneration installation for domestic heating. District heating is supplied by heavy fuel oil (mazut) fired in heat-only boilers. The Sarajevo district heating system uses natural gas for heating purposes[22].

The district heating system does not use individual metering, thus it does not provide any incentive to consumers to save energy or reduce losses. The Law on Consumer Protection (Official Gazette of Bosnia and Herzegovina, 17/02*)* states that the supplied energy charges must be based on individual actual consumption, which will require the system to be switched to individual metering[90].

Other sources of inefficiency

Despite good production capacities and a role of electricity exporter in the region, electricity production in Bosnia and Herzegovina is fairly inefficient due in particular to the thermal power plants. The most efficient coal power plants, Ugljevik and Gacko, have heat rates of about 11,500 kJ fuel/kWh electricity, which corresponds to an efficiency factor of 31 per cent[22].

Due to poor insulation and lack of modern control systems, the housing sector is another significant source of energy inefficiency[22].

Estimated potential for energy savings by sector

There is a significant potential of energy efficiency measures in the residential sector. The average annual growth rate of household energy consumption was 3.4 per cent from 2000 to 2005. This is related to the fact that the housing stock in Bosnia and Herzegovina has suffered severe damages during the war; in addition, the majority of apartments and houses are already relatively old and need substantial refurbishment. For example, data for Sarajevo show that the average age of housing units is 25 years, 55 per cent of them were partly damaged and eight per cent completely devastated during the war[90]. Considering that space heating is the largest share of energy use in buildings and that specific energy consumption for heating is considerably higher than in EU countries, it is clear that there is a very significant potential for energy efficiency improvement and energy savings with measures such as insulation, double glazing and central heating. In the Sarajevo region, where a number of flats use gas central heating systems with older (pre-war) gas boilers, new improved boilers of much higher efficiency (even condensing boilers) could be promoted[90].

The Sarajevo district heating system plans to introduce certain energy efficiency measures by investing approximately EUR 18 million. The planned interventions include a metering system of heat consumption in 750 locations, reconstruction of roof boiler rooms (block heating) aiming at 10 to 15 per cent savings and satisfying air pollution limits, as well as the installation of thermostatic valves[90].

In the services sector, through the construction of new buildings by 2020 and a likely increase in the required equipment standards of heaters and air-conditioners, it could be possible to achieve a decrease in thermal needs of up to ten per cent, and in the non-thermal needs of up to five per cent[90].

ESCOs and other initiatives in energy efficiency

At present, there are officially no ESCOs operating in Bosnia and Herzegovina, though there is at least one company using the ESCO concept in implementing a small-scale boiler biomass heating project, and a number of other ESCO projects have taken place. ESCO projects range from installation of mini-heating systems, through boiler exchanges to the establishment of tri-generation plants. The example projects have involved guarantees on energy savings by an ESCO-type private company and the simple payback time has been less than five years[18].

11.3.4. Current situation with respect to renewable energy sources and future deployment potential

Deployment of renewable energy sources

The share of renewable energy sources in the electricity production is 34 per cent, which is a good level and one of the highest in the project region. However, if large hydro power plants (1,992 MW) were taken out of consideration, only an insignificant share would be remaining[89].

The tradition of wood use for home heating in Bosnia and Herzegovina has existed for a long time and it is used mainly in rural and sub-urban areas as the primary source for heating and cooking purposes in households and buildings[90].

At present, there are no geothermal power plants in Bosnia and Herzegovina. It must be said though that the temperature at the known locations is too low (< 90 ºC) for electricity generation, which is why the reserves are currently only in consideration for thermal exploitation. In 2005, a spa owned by the Slovenian company Terme Catez, started to work in Ilidza near Sarajevo where geothermal energy is used for heating of swimming pools[90].

In addition, there are no photovoltaic power plants in Bosnia and Herzegovina (apart from a small PV installation fitted on the roof of an orphanage in Trebinje). The use of solar energy for hot water and heating in the residential sector is insignificant and the exploitation of solar energy with flat-plate collectors is also limited. At this moment, only very small-scale consumers in Bosnia and Herzegovina use solar energy for water heating needs. The main reasons for this situation lie in the fact that the capital costs are still too high (450 to 550 EUR/m^2, depending on the type of system and collectors) and at the same time there is no legislation that promotes and subsidizes the use of such type of renewable energy systems[90].

There is no production or consumption of biofuels in Bosnia and Herzegovina[91].

Estimated potential for renewable energy sources

The development of small hydro power plants (up to five MW) is the most promising renewable energy source in Bosnia and Herzegovina at the moment. Bosnia and Herzegovina's gross theoretical hydro power potential is 69 TWh/year (equivalent to 8,000 MW), while the technically feasible potential is 24 TWh/year (6,800 MW) and the economically feasible potential is 19 TWh/year (5,600 MW). About 37 per cent of the technically feasible potential has been developed so far. Small hydro potential should account for 2.5 TWh/year[93]. Table 11.5 shows the total planned small hydro capacity in Bosnia and Herzegovina.

Table 11.5: Total planned small hydro capacity in Bosnia and Herzegovina

Supply area	Total planned capacity	Total planned annual generation
EP HZHB	40 MW	186 GWh
EP BIH	34 MW	127 GWh
ERS	212 MW	650 GWh
Total Bosnia and Herzegovina	286 MW	963 GWh

Source: Energy Institute Hrvoje Pozar[89] (2008)

The investigation of the potential wind power plant locations has shown that there are 27 locations in the southern part of Bosnia and Herzegovina within the area of 50 km from the Croatian border. This area presents the highest wind energy potential in the country with an estimated potential of 900 MW. The total technical wind energy potential in Bosnia and Herzegovina is significantly higher and is estimated to be 2,000 MW. It is estimated that a realistic objective of wind energy use in 2015 should be between 400 and 600 MW[89]. The infrastructure offers adequate conditions for connecting possible locations to the grid, as the high- and medium-voltage network is well developed[90].

The most significant source of biomass for energy production is wood from forestry (firewood, forestry residues) and wood waste from the wood processing industry. However, agricultural residues also have a significant energy potential in the regions of Northern, Central and Southern Bosnia and Herzegovina[90].

Bosnia and Herzegovina belongs to the European countries that receive a significant amount of solar irradiation of around 1,240 kWh/m^2 in the North and reaching 1,600 kWh/m^2 in the south. Bosnia and Herzegovina has on average 1,841 hours of sun annually, while in the South, this number reaches 2,352 hours annually. Neum, the only coastal town in Bosnia and Herzegovina, has on average 270 sunny days annually. The total potential of solar energy in Bosnia and Herzegovina is estimated at 67,200 TWh, assuming that 3.6 kWh of radiation energy falls daily on every square meter of horizontal surface. This value exceeds several times the total energy consumption in Bosnia and Herzegovina[90].

Overall, 44 geothermal locations have been identified in Bosnia and Herzegovina, with a potential of nine MWth if used for space heating only and 90 MWth if used for space heating, recreational needs, and bathing[89]. Current activities relating to geothermal energy continue to be limited to exploitation for thermal use. For example, a group of buildings in Illidza (a suburb of Sarajevo) is to be heated with geothermal energy. If higher temperatures are discovered in the course of the exploratory drilling, there are also plans for partial conversion to electrical energy. Also, there are plans to attempt finding an investor for one geothermal borehole near Banja Luka[90].

Projects and initiatives in renewable energy sources

A small number of foreign investors, mainly from Germany, Austria and Italy, have already entered the market for renewable energy sources in Bosnia and Herzegovina. Their focus is mostly based on the development and the operation of small hydro power plants[88].

11.3.5. Institutional, regulatory and policy framework for energy efficiency and renewable energy sources

Policymakers in the energy sector

Institutional policymakers

According to the Constitution of Bosnia and Herzegovina, main energy issues fall under responsibility of the two autonomous entities, while the state government institutions only coordinate this work including relationships with international and regional bodies and programmes. The state cannot impose any policy or strategy to the entities, but can recommend, suggest and adjust the entities' policies and strategies. It is important to note that since the state government is obliged to involve the entities in the definition of regulatory frameworks, the implementation of new laws and guidelines is only possible with the approval of the entities' governing bodies. Basically the two entities are supposed to implement state decisions, but many relevant legislation documents are blocked due to political conflicts between the entities[94]. At present, the interaction between the two entities is very low and therefore policy implementation is conducted in parallel and with low level of coordination. Each entity possesses its own institutions, procedures, guidelines and regulatory framework. It can be stated that the regulatory definition is done in a bottom-up process, i.e. the entities develop drafts of the regulations independently from each other and then the regulation needs to be harmonized and consolidated at the state level in order to be approved and implemented at the entity level[94].

The relevant ministries at the state and entity level are listed below.

- The Ministry of Foreign Trade and Economic Relations (MoFTER) is the main institution in charge of energy policy at the state level. MoFTER is responsible for activities and tasks within the jurisdictions of Bosnia and Herzegovina which are related to policy definition, basic principles, coordination of activities and harmonization of entities' authoritative bodies and institutions on the international level in the field of agriculture, energy, environmental protection, development, and usage of natural resources and tourism[22];
- A similar regulatory structure exists at the entity level with two responsible ministries, the Ministry of Industry, Energy and Mining in the Republika Srpska, and the Federal Ministry of Energy, Mining and Industry in the Federation of Bosnia and Herzegovina.

Other relevant governmental agencies at the state and entity level are listed below.

- The State Electricity Regulatory Commission (SERK) is the electricity regulator at the state level and regulates the electricity transmission system in Bosnia and Herzegovina and has jurisdiction and responsibility over transmission of electricity, transmission system operations, and international trade in electricity in accordance with international norms and EU standards;
- There are also two energy regulators active at the entity level, created in 2002 in accordance with the Law on Electricity (Official Gazette of Republika Srpska number 66/02, 29/03 and 86/03). They were created in order to regulate the monopolistic behavior of the energy utilities and provide the transparent and non-discriminatory position of all participants in the electricity market. They are autonomous, independent, and non-profit organizations in their respective entity. In their work, they both cooperate with the State Electric Power Regulatory Commission, with the Independent System Operator, and with the Transmission Company of Bosnia and Herzegovina;
- In the Federation of Bosnia and Herzegovina, the jurisdictions of the Regulatory Commission for Electricity in the Federation Bosnia and Herzegovina (FERK) are responsible for the supervision and regulation of:

- the relations between electricity generation, distribution and electricity customers including electricity traders;
- the definition of the methodology and criteria for setting supply prices for non-eligible customers;
- the definition of distribution tariffs;
- the issuing and revocation of licences for generation and distribution;
- the issuing of preliminary construction permits and licences for usage of power facilities (except the facilities for power transmission);
- the definition of the general conditions for electricity supply.

- The Regulatory Commission for Energy of the Republika Srpska (RERS) has to provide the conditions to open the market for free competition in those activities which are not inherently monopolistic by their nature and, as far as the monopolistic activities are concerned, to provide equal access to all parties, quality of services, and fair prices accompanied by the profitable running of a business of the participants, respecting the generally accepted international standards. Duties within the scope of competences regarding electricity of the Regulatory Commission for Energy of the Republika Srpska are the same ones as stated previously for the Regulatory Commission for Electricity in the Federation Bosnia and Herzegovina.

Regulatory and administrative institutions at the regional and local level

Although municipal authorities are given full autonomy on certain energy issues, such as district heating, there are no initiatives in place regarding energy efficiency. Furthermore, big municipalities could have the necessary skills and resources to identify energy conservation measures but not enough skills for project development. Municipal operations and management staff could have technical skills for energy saving opportunities but not enough knowledge of methodologies to develop and conduct necessary assessments for saving potential and financial needs[17].

Energy policy and regulatory framework

No common energy strategy or policy at the state level exists so far in Bosnia and Herzegovina. Some actions are taken to prepare terms of reference on these issues. In November 2008, Bosnia and Herzegovina's leaders reached a first landmark agreement on a national energy policy. Bosnia and Herzegovina’s two autonomous entities have so far conducted separate economic policies thereby decelerating the creation of a single economic region requested by foreign investors[22].

The Law on Electric Power Transmission, System Regulator and Operator in Bosnia and Herzegovina (Official Gazette of BiH, 7/02 and 13/03) was adopted and implemented in 2002. Even though it was developed to modernize the structure of the power sector, the legislation does not specifically address issues of energy efficiency or environment. It neither addresses the technical issues related to the generation, distribution and use of electricity[22]. Besides the Law on Electric Power Transmission, System Regulator and Operator, there are a number of secondary legislation laws that are considered the cornerstones of the electric sector development in Bosnia and Herzegovina. At state level the following laws have been adopted:

Table 11.6: Relevant energy sector laws in Bosnia and Herzegovina

Publication	Name of the legislation
Official Gazette BiH 48/06	Market Rules
Official Gazette BiH 48/06	Grid Code
Official Gazette BiH 35/04	Law Establishing the Company for the Transmission of Electric Power in Bosnia and Herzegovina
Official Gazette BiH 35/04	Law Establishing an Independent System Operator for the Transmission System of Bosnia and Herzegovina

Source: UNECE[22] (2009)

At the entity level, the following laws have been adopted:

Table 11.7: *Relevant energy sector laws at entity level*

Publication	Name of the legislation
Official Gazette RS 66/02	Republika Srpska Law on Electricity
Official Gazette BiH 41/02	Federation of Bosnia and Herzegovina Law on Electricity

Source: UNECE[22] (2009)

Additionally, at the entity level, action plans for restructuring the power sector were adopted by the respective parliaments in 2002 (Republika Srpska) and 2004 (Federation of Bosnia and Herzegovina). The Action Plan for Restructuring the Power Sector of the Republika Srpska has been in force since 2003 (Official Gazette 69/03) while the Action Plan for Restructuring the Power Sector of Federation of Bosnia and Herzegovina (Offcial Gazette 05/05), was updated and revised and is in force since June 2005[22].

The liberalization of the electricity market in Bosnia and Herzegovina is under development in accordance with the Energy Community Treaty. The liberalization progress has not been as rapid as envisaged, but is ahead of the liberalization progress in the gas market[91]. Large consumers, covering a total of 57 per cent of the electricity demand of the country, are now designated as "eligible"[88]. However, due to the existing tariff structure and low electricity prices for tariff customers, eligible consumers prefer to remain in the protected status of tariff customers[22].

Policy and regulation on energy efficiency

There are no energy efficiency laws in place at the state or entity level in Bosnia and Herzegovina, although a Law on Energy Efficiency has been proposed on entity level[88]. Only indirectly is energy efficiency covered by other legislation. Regulators for example have the responsibility of considering both environmental and energy efficiency issues in their tariff making and investment approval regulations and decisions. There are no energy efficiency targets in place at the national level. The assumption at this stage is that Bosnia and Herzegovina will aim to comply with EU efficiency targets and will conform to the Energy Charter Treaty and applicable EC Directives[22].

The existing legal regulations and tax policy in the civil engineering, construction, and building industry do not encourage energy saving (such as greater use of construction insulation materials and more cost-efficient heating systems). There are no specialized agencies for energy efficiency or renewable energy in place. Due to the use of gas in cogeneration, the efficiency is rather low. Several studies have shown that significant progress can be made in this area. The Energy Community Treaty has been signed and Bosnia and Herzegovina has committed itself to develop an appropriate energy efficiency strategy accordingly[90].

The Energy Law of the Republika Srpska foresees the obligation of energy distribution companies to make annual reports on the current progress in the rational use of energy. Additionally, information campaigns and mailing of information brochures to customers must be organized[88].

Policy and regulation on renewable energy sources

Similarly to energy efficiency, there is no policy or strategy regarding renewable energy sources in Bosnia and Herzegovina so far, but targets to be achieved for renewable energy sources have to be met indirectly through international obligations, such as the Energy Community Treaty, the Energy Charter Treaty and applicable EC Directives. It is expected that the renewable sources sector will be arranged through a set of municipal by-laws[91].

International commitments and current status of implementation

EU Regulation

Compliance with the EU-Regulation is expected to be the main driver for the development of the energy regulatory framework, in particular in the fields of energy efficiency and renewable energy sources, but there is still no adopted legal basis in Bosnia and Herzegovina to such a development[90]. Bosnia and Herzegovina is a Contracting Party of the Energy Community Treaty. This treaty, establishing the Energy Community, was signed on 25 October 2005 in Athens by the European Community and then nine Contracting Parties from South-East Europe. Following ratification, the Treaty entered into force on 1 July 2006. It aims at a broader adoption of the EU *acquis communautaire* and a convergence of South-Eastern energy sectors towards EU standards with the underlying objective to establish a single regulatory framework for trading energy across southeast Europe and the EU.

Kyoto Protocol

Bosnia and Herzegovina ratified the United Nations Framework Convention on Climate Change in 2000 as a Non-Annex I Country (Official Gazette of BiH, 19/2000) and signed the Kyoto Protocol on 15 July, 2007, as a Non-Annex B Country. However, the ratification of the Kyoto Protocol is necessary before Bosnia and Herzegovina can participate in project-based transactions under the Kyoto Protocol. The creation of the Designated National Authority required under the Kyoto Protocol has not been determined yet, but will be established soon[94]. The nation-wide action plan for the implementation of the Convention and the first national communication, which resulted in a project proposal to Global Environment Facility/United Nations Development Programme, is in the final phase. The implementation agency is the United Nations Development Programme[90].

Other international commitments

Bosnia and Herzegovina has entered other international commitments in the energy sector by signing the Energy Charter Treaty and Protocol on Energy Efficiency and Related Environmental Aspects[14].

The Energy Charter Treaty and Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects was signed in June 1995 and ratified in July 2000. The Energy Charter Treaty is a European initiative dating from 1990, which plays an important role as part of an international effort to build a legal foundation for energy security, based on the principles of open, competitive markets and sustainable development. It aims at mitigating risks associated with energy-related investment and trade.

11.3.6. Economic incentives and financing schemes for energy efficiency and renewable energy projects

General investment climate in the country

Bosnia and Herzegovina has a dedicated law in place to support direct foreign investment (Official Gazette of BiH, 17/98 and 13/03), which ensures that foreign investors are ensured the same rights as local investors and are in no way discriminated. Additionally, the Foreign Investment Promotion Agency (FIPA) ensures the active facilitation and promotion of foreign investments in the country[88].

According to the Heritage Foundation, foreign and domestic investors are accorded national treatment. With the exception of armaments and media, where foreign control is limited to 49 per cent, there are no restrictions on investment. The Law on Foreign Direct Investment guarantees the immediate right to transfer and repatriate profits and remittances, and permits local and foreign companies to hold accounts in one or more banks authorized to initiate or receive payments in foreign currency. There are few restrictions on capital transactions and foreign exchange accounts. The law prohibits expropriation and nationalization of assets, except under special circumstances and with due compensation[95].

Despite extensive reforms and external incentives in the framework of the European Union pre-accession process, Bosnia and Herzegovina is not perceived as having significantly improved its anti-corruption stance and was therefore awarded with a score of 3.2 by Transparency International's Corruption Perceptions Index for 2008, ranking Bosnia and Herzegovina seventh best among the 12 countries of the project region[53].

Incentives for energy efficiency

There are currently no energy efficiency incentives, such as tax incentives, in place in Bosnia and Herzegovina[91].

Incentives for renewable energy sources

There is a purchase obligation for two of the three power utilities in Bosnia and Herzegovina for electricity produced from renewable energy sources. A decision on methodology for determination of purchase prices level of electricity from renewable energy sources (feed-in tariff) for plants with installed capacity of up to five MW was adopted in 2003 (Of. Gazette FB&H 32/2002, Of. Gazette RS 71/2003). Compared to other European countries the feed-in tariffs, presented in Table 11.8, are rather low and are not likely to be sufficiently attractive for foreign investors; they may, however, be an incentive for local developers.

Table 11.8: Feed-in tariffs for electricity from renewable energy sources in Bosnia and Herzegovina

Renewable energy source	Feed-in tariff (EUR cent / kWh)
Small hydro (under 5 MW)	3.96
Landfill biogas and biomass	3.81
Wind and geothermal	4.95
Photovoltaic	5.45

Source: UNECE[22] (2009)

Financing mechanisms for energy efficiency and renewable energy projects

National financing mechanisms

In Bosnia and Herzegovina the financing environment for energy efficiency and renewable energy sources is still at its preliminary stage and no existing operational funds are accessible at the State or entity levels. The budgets available to address energy efficiency issues are very limited and compete with other critical areas of the economy for limited funds[22].

The energy efficiency programme Energy sanitation of Sarajevo was defined for the period 2007 to 2010 with a project budget of EUR 500,000 (financed by the district heating company Sarajevo). The main aim of this programme is to implement and control some pilot and demonstration projects in the energy efficiency field within the residential sector in the canton of Sarajevo[22].

The Government of the Federation of Bosnia and Herzegovina has established the Fund for Environmental Protection, the purpose of which is to finance and support projects reducing emissions and improving the environmental conditions. Energy efficiency and renewable energy sources supply could be financed through this Fund. It is foreseen that the Fund will be funded from penalties to pollutants (vehicles, industry and power plants); however, the Fund is not fully operational yet[22].

A similar situation, in terms of financing energy efficiency projects exists in the Republika Srpska. According to the Energy Sector Study in Bosnia and Herzegovina[89], there are, however, no elaborate mechanisms for collecting financial resources that would be used to finance the preparation, implementation, and development of energy efficiency and renewable energy sources projects. For correct and transparent functioning of the Environmental Protection Fund, unit fees, corrective, incentive coefficients, criteria, and measures for defining the CO_2 emission fees have to be established[89].

International financing mechanisms

The European Bank for Reconstruction and Development plans to dedicate around EUR 20 million to Bosnia and Herzegovina targeting small- and medium-sized enterprises for energy efficiency and renewable energy sources projects through two credit lines. Grants should cover part of this financing envelope[22].

Furthermore the EBRD is considering providing debt financing for the reconstruction of power distribution networks and facilities and upgrade of metering system in the Banja Luka region of the Repubika Srpska of Bosnia and Herzegovina. This project will increase energy efficiency by reducing the technical and commercial distribution network losses. Furthermore it will facilitate the enforcement of payment discipline and the reduction of commercial losses through remote meter reading, relocation of meters, and remote disconnection. The EBRD Board already approved the project, but signature is still pending[96].

Commercial financing mechanisms

The main financing sources for energy efficiency and renewable energy sources for the time being are regular commercial loans that investors do not consider favorable since the interest rates for long-term loans reach up to 12 per cent. The difficult financial situation of many companies in the industry and services sectors, combined with low level awareness, does not make energy efficiency investments a priority[22].

From the banking sector in Bosnia and Herzegovina, the Raiffeisen Bank is the only bank engaged in energy efficiency and renewable energy sources projects in the country. This private bank is present in all neighbouring countries and initiated, jointly with the European Bank for Reconstruction and Development, some actions related to energy efficiency in the residential sector[22].

Other support mechanisms

There are several international organizations sponsoring development programmes aiming at capacity building and awareness-raising[22]:

- The European Commission through the Instrument for Pre-Accession Assistance, over the period 2007 to 2010 (IPA) aims to support Bosnia and Herzegovina to harmonize their legislation with the EU, particularly with regards to the energy performance of building directives as well as the energy end-use efficiency and energy services (including renewable energy sources) directives. In addition, the IPA focuses to increase public awareness on energy efficiency and the potential for energy savings.
- USAID SynEnergy Project: Capacity Building and Institutional Network Development is the regional project in scope and aims at advancing and strengthening the energy efficiency and renewable energy sectors of EnC Treaty countries, promoting the Rational Use of Energy (RUE) and developing technical and institutional networks to support planning, policy making, programme development, and implementation.
- The Alliance to Save Energy sponsored by USAID is active at the municipal level in Bosnia and Herzegovina through the Municipal Network for Energy Efficiency (MUNEE). It is concentrating on raising awareness on energy savings benefits and on capacity building.

11.3.7. Barriers to the implementation of energy efficiency and renewable energy projects

Box 3: Summary of barriers to the implementation of energy efficiency and renewable energy projects in Bosnia and Herzegovina

Legal, institutional and administrative barriers

1. The absence of decisional competences in energy matters at the state level hinders and slows down any progress in the policy development at national level.
2. The lack of interaction and coordination between the entities leads to the absence of an harmonized plan for investments at the national level and to the impossibility for companies of one entity to invest in projects located in another entity for lack of adequate authorization procedures.
3. Bosnia and Herzegovina faces a lack of secondary legislation for operative support of project development and policy implementation, such as construction standards and simplified authorization procedures for small plants.
4. Another consequence of the political division of the country is the absence of reliable national data sources such as energy statistics and consumption databases.

Economic and financial barriers

5. The electricity generation costs are still very low, especially taking into consideration that they do not include environmental components (costs for CO_2-emission abatements, costs for carbon, etc.).
6. With exception of a feed-in tariff for electricity from renewable energy, there are no incentives, funds or credit lines in place for energy efficiency or renewable energy projects.
7. The current feed-in tariff is significantly below the values for feed-in tariffs in other countries of the project region and therefore will very likely not appear attractive to foreign investors.

Lack of awareness, human capacities and professional skills

8. Lack of awareness and capacities to successfully develop energy efficiency and renewable energy projects can be ascertained at all administrative levels as well as among energy customers.
9. The energy efficiency market is not well established to drive the activities and create needs for project development, i.e. there is no private company with solid record for energy audit development or investment grade audit experience in the local market.
10. Commercial financial institutions do not have the required skills for energy efficiency and renewable energy sources project evaluations and are reluctant to enter long-term project financing.

Legal, institutional and administrative barriers

Bosnia and Herzegovina faces several institutional barriers which are related to the enduring political division of the country following the war and the subsequent Dayton agreements of 1995:

- Absence of decisional competences in energy matters at the state level: the Dayton agreements allocate full autonomy to the entities in the definition of their energy policies, regulations, and procedures, leaving the state administrative level with a mere coordination function, but with no real power of action. The subsequent bottom-up process in policy formation and the constant need for intermediation hinders and slows down any progress in the policy development at national level. As a result, there is currently neither a national policy framework for energy efficiency and renewable energy sources in Bosnia and Herzegovina, a national energy strategy with subsequent implementation plan, nor any targets to be reached;
- Lack of interaction and coordination between the entities: there is no interaction between the two entities; therefore policy implementation is conducted in parallel and without coordination. Each entity has its own institutions, procedures, guidelines and regulatory frameworks. This leads to the absence of a harmonized plan for investments at the national level and to the impossibility for companies of one entity to invest in projects located in another entity for lack of adequate authorization procedures;

- Lack of centralized information sources: another consequence of the political division of the country is the absence of reliable national data sources (energy statistics, consumption databases, ongoing projects), since there is no obligation for the entities to share any information with the institutions at the state level. The situation is even more difficult in relation to district heating projects, since district heating falls entirely in the competence of municipal authorities and therefore cannot be regulated even at the entity level.

Besides barriers that are a consequence of the specific historic and political development of Bosnia and Herzegovina, there are other institutional barriers that are common to other countries in the project region (and beyond):

- Lack of coordination between institutions involved in energy efficiency and renewable energy sources: there are no agencies or dedicated institutions that may coordinate with other ministries or institutions and the regulatory commissions of the entities operate independently from the relevant ministries;
- Lack of secondary legislation for operative support of project development and policy implementation, such as: construction standards, simplified authorization procedures for small plants, and requirement to consider energy efficiency projects in public procurement processes (currently not foreseen in the Public Procurement Law). In particular, difficulties in the connection of renewable power plants (very often located in remote areas) to the electric grid as a result of the lack of implementation of the grid code on behalf of the distribution companies need to be addressed.

Economic and financial barriers

The main economic and financial barriers for investments in energy efficiency and renewable energy sources in Bosnia and Herzegovina lie mainly in the low price level and in the limited availability of incentives or financing mechanisms for projects:

- The electricity prices and tariffs are too low to ensure an adequate return on investment: while on one side the methodology for tariff definition has been changed in order to ensure cost transparency and is based on effective electricity generation costs, at the same time, due to the availability of low-cost technologies (domestic lignite, large hydro), the electricity generation costs are still very low, at least as long as they do not include environmental components (costs for CO2-emission abatements, costs for carbon, etc.);
- The same consideration applies for the feed-in tariff that is paid for electricity produced from renewable energy sources: while it may be in line with domestic electricity prices and therefore may provide an incentive for locally based investors, it is significantly below the values for feed-in tariffs in other countries of the project region and therefore will very likely not appear attractive to foreign investors and presumably not cover the high technology costs linked with renewable energy sources;
- There are no incentives or credit lines for energy efficiency projects, except for the commercial loans proposed by the Raiffeisen Bank: no public budgets or funds are foreseen, the two dedicated funds developed in the entities are not yet fully operational and the credit line foreseen by the European Bank for Reconstruction and Development is not yet active.

Lack of awareness, human capacities and professional skills

Lack of awareness and capacities to successfully develop energy efficiency and renewable energy projects can be ascertained at all administrative levels as well as among energy customers and financing institutions:

- At the state and entity level, the lack of awareness regarding the relevance of energy efficiency and renewable energy issues is very likely a consequence of the abundance of energy resources and related infrastructure in the country, so that after the destruction from the war the priorities were given to other more urgent issues. This resulted in a dramatic lack of personnel in the institutions involved in energy projects: at the State level, the Energy Department within the Ministry of Foreign Trade and Economic Relations only counts four employees, while the Environment Department has a headcount of six (and both have no dedicated resources for energy efficiency and renewable energy). The available resources do not have the necessary experience and tools to develop the necessary procedures and processes (such as project evaluation or supporting framework for project financing) and without proper financing they will hardly have a chance to attract and hire experienced personnel. The situation does not appear to be better at the entity level, as is shown from the example for the Republika Srpska, where in the last year over 100 applications for concessions for renewable energy projects have been submitted to the Ministry of Industry, Energy and Mining, but so far only one project has been realized due to lack of resources to process the applications. However, in the Federation of Bosnia and Herzegovina several small hydro power plants are in operation;

- At the municipal level, despite the fact that municipal authorities are given full autonomy on certain energy issues such as district heating, there are no initiatives regarding energy efficiency. An additional obstacle is the provision on public procurement, which does not foresee energy efficiency services and the fact that ESCOs cannot be project owners in the public sector. Additional capacity building for the municipal staff in the administrative and operation and maintenance levels is still needed. Big municipalities could have the necessary skills and resources to identify energy conservation measures but don't have enough skills for projects development. Municipal operations and management staff could have technical skills for energy saving opportunities but do not have enough knowledge of methodologies to develop and make necessary assessment for saving potential and financial needs;
- Lack of awareness and capacity in the banking sector: the commercial financial institutions do not have the required skills for energy efficiency and renewable energy sources projects evaluation. This lack of understanding regarding energy efficiency and renewable energy sources projects by the financial side reflects the lack of available financing with appropriate incentives and the lack of adequate regulatory guarantees. Moreover, the banks are reluctant to enter long-term project financing;
- Lack of awareness on customers' side: the abundance of low-cost electricity and the slow progress of market liberalization in Bosnia and Herzegovina do not provide an incentive for consumers (residential, commercial or industrial) to change their consumption behavior towards a more rational use of energy or the deployment of renewable energy sources. The absence of clear incentives for energy efficiency measures and of any obligation to perform energy audits constitute further obstacles to the development of customers' awareness;
- Lack of skills for energy auditing and the development of energy efficiency projects in the private sector: there is a good level of expertise and know-how in the Bosnian private sector regarding renewable energy project development, as documented by several initiatives that have succeeded in the realization of projects despite the lack of a supporting regulatory framework and a positive financial environment. On the other side, the energy efficiency market is not well established to drive the activities and create needs for project development. In Bosnia and Herzegovina, there is no private company with solid record for energy audit development or investment grade audit experience in the local market.

11.4. *Bulgaria*

11.4.1. Overview of economic situation

General demographic data

Bulgaria has a population of 7.64 million and a surface area of 110,910 km². The population density of Bulgaria is 69 inhabitants per km². Bulgaria has experienced a strong decrease in its population, which can be traced back to 1989. While the population was 7.64 million in 2008, in 1989 it used to be nine million. The main reason for this population decline, which still persists today (-0.51 per cent in 2007) are high emigration and low fertility rates (1.42 children per woman)[97].

The capital is Sofia with 1.241 million inhabitants[22]. Other major cities include Plovdiv (341,000), Varna (308,000) and Burgas (195,000).

Current political situation and outlook

Bulgaria is a parliamentary republic and is a member of the European Union since 1 January 2007.

On 5 July 2009, parliamentary elections were held in Bulgaria. The new centre-right party Citizens for the Development of a European Bulgaria (CEDB), headed by Boyko Borisov, won Bulgaria's general elections with 39,7 per cent of the popular vote. Despite falling short of a majority, the CEDB decided to form a minority government headed by new Prime Minister Boyko Borisov[98].

The head of state is the President, who is directly elected every five years for a maximum of two terms. Georgi Purvanov, a previous leader of the Bulgarian Socialist Party, won a second term as President in an election in November 2006[22].

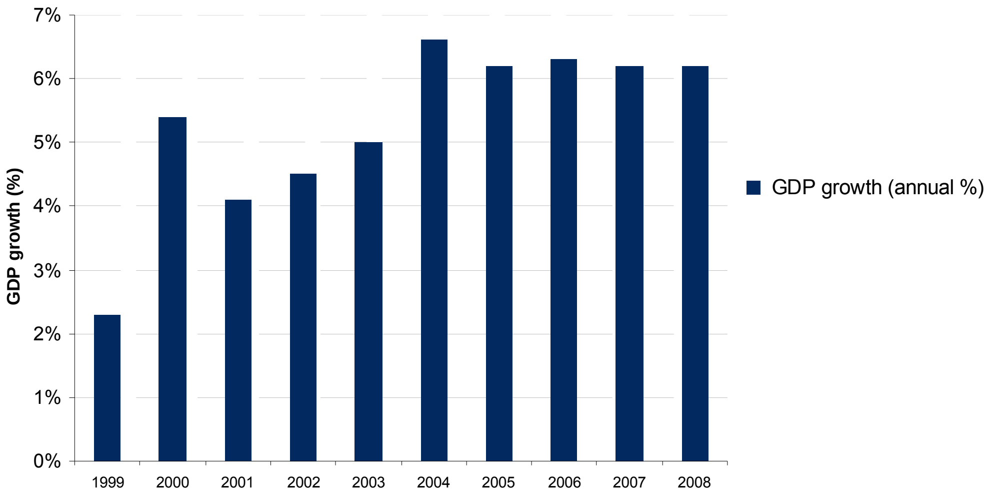
The next parliamentary elections are scheduled for 2013, while the next presidential elections will take place in 2011.

Since 1999, Bulgaria consists of 28 provinces, which are subdivided into 260 municipalities.

Gross Domestic Product

Bulgaria has experienced strong economic growth since a major downturn in 1996. Successive governments have demonstrated commitment to economic reforms and responsible fiscal planning, but have not been able to curtail rising inflation and large current account deficits. Bulgaria has averaged more than 5.5 per cent gross domestic growth between 2000 and 2007 (see Figure 11.34), attracting significant amounts of foreign direct investment, but corruption in the public administration, a weak judiciary, and the presence of organized crime remain significant challenges[99]. Despite this impressive rate of growth Bulgaria's per capita income was only 37 per cent of the EU-27 average in 2007[99].

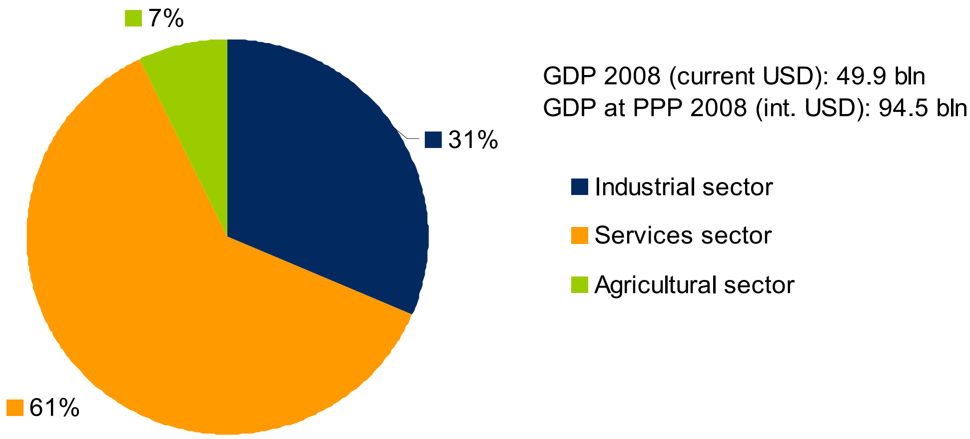
Figure 11.34: Real GDP growth of Bulgaria



Source: World Bank[100] (2009)

The repartition of the GDP in 2008 can be seen in Figure 11.35. While agriculture plays only a minor role in the Bulgarian economy, with a share of only six per cent of the GDP, the industrial sector has a significant share of 31 per cent. Bulgarian industry is mostly focused on the following sub-sectors: food, beverages, tobacco, machinery and equipment, base metals, chemical products, coke, refined petroleum, and nuclear fuel[100].

Figure 11.35: Repartition of the Gross Domestic Product in Bulgaria in 2008



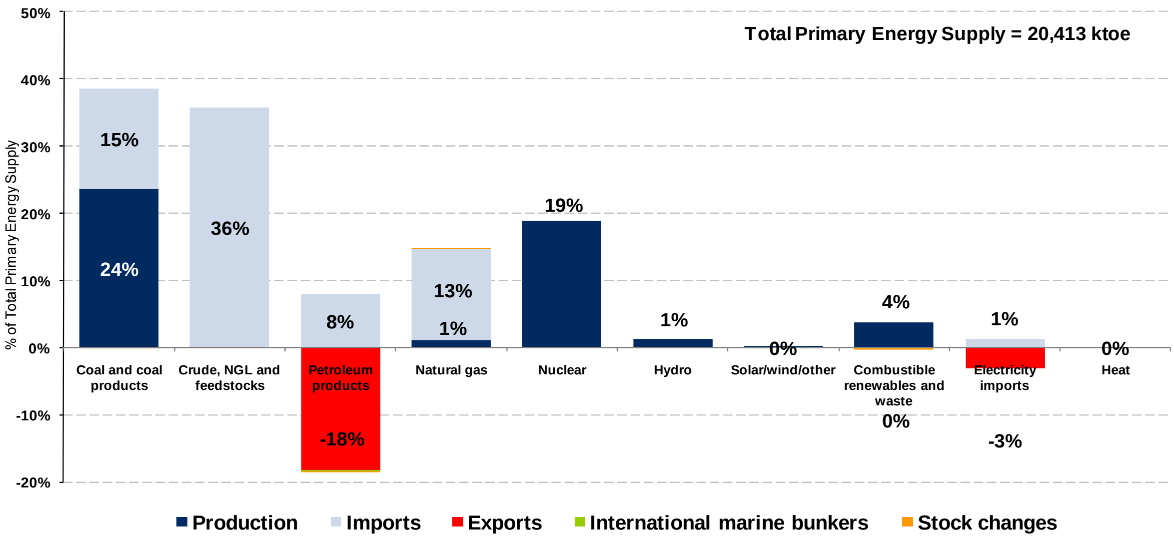
Source: World Bank[100] (2009)

11.4.2. Energy sector and development of energy markets

Energy supply

The energy balance for Bulgaria is shown in Figure 11.36 Its total primary energy supply in 2007 amounted to 20,413 ktoe. Since Bulgaria has no domestic oil and petroleum products resources, only limited natural gas reserves, and modest hydroelectric resources, the country's import dependency on primary energy imports is 52 per cent [5]. Especially oil and natural gas, as well as solid fuels are being imported from the Russian Federation.

Figure 11.36: Energy balance of Bulgaria by primary energy sources in 2007



Source: IEA[5] (2009)

Bulgaria's total energy supply (sum of national production and imports) amounted to 24,937 ktoe in 2007 and is relatively well diversified, with fossil fuels holding the majority share (80 per cent), followed by nuclear (15 per cent), and a modest contribution of hydropower (one per cent), as shown in Figure 11.37[5].

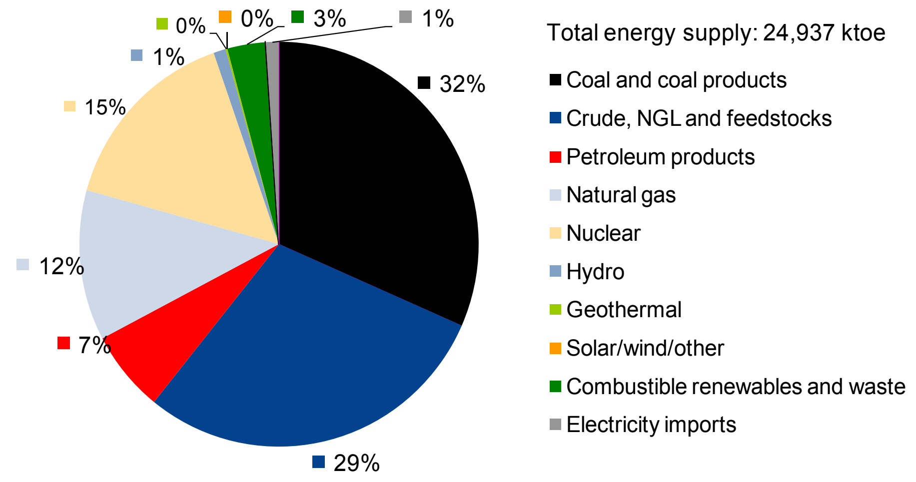
Domestic energy utilization is based on nuclear energy and solid fossil fuels, which comprise the main fuels for electricity generation. Currently, the shares of solid fossil fuels and nuclear energy are significantly above the corresponding EU-27 average values[99]. The contribution of new renewable energy sources (biomass and hydro) has increased in recent years, although it is still below EU average. Overall, Bulgaria's electricity generation amounted to 42,937 GWh in 2007, dominated by coal (53 per cent), nuclear (34 per cent), and hydropower (seven per cent) as shown in Figure 11.37. The share of gas and oil in electricity generation has been steadily decreasing, whereas the share of renewable sources has been increasing. The total installed capacity for electricity production is 8,566 MW in the beginning of 2007. The thermal power plants have an installed capacity of 4,860 MW: 4,280 MW (coal), 220 MW (oil), 360 MW (gas) and an annual production of 21.6 TWh in 2006. Nuclear accounted in 2006 for 1,906 MW and 19.5 TWh, hydro for 1,800 MW and 4.3 TWh[99].

The Kozloduy nuclear power plant provided more than 40 per cent of generated electricity in 2006. Originally the Kozloduy nuclear power plant consisted of six reactor units. Under a 1993 agreement between the European Commission and the Bulgarian Government, units one and two were taken off-line at the end of 2003. Prior to joining the European Union on 1 January 2007, Bulgaria shut down units three and four by the end of December 2006. Since 2007 the remaining two reactor units five and six, still are providing 34 per cent of generated electricity; however, the operating licences of the two remaining units of the Kozloduy nuclear power plant will expire in October 2009[101]. In 2005, the Bulgarian Government approved the construction of a new 2,000 MW nuclear power plant in Belene by the Russian company Atomstroyexport. Construction of the Belene nuclear power plant started in autumn 2008; the first unit of the plant is expected to start operation in 2013 and the second one in 2014[101]. The Bulgarian state will retain a 51 per cent interest stake in the project, while the German RWE Power acquired a 49 per cent stake in 2008[102].

Gas accounts for 43 per cent of the heat supply in Bulgaria, while coal is the major source for heat supply with a share of 52 per cent, as shown in Figure 11.37. The electrical generation capacity installed in gas fuelled combined heat and power plants is 775 MW.

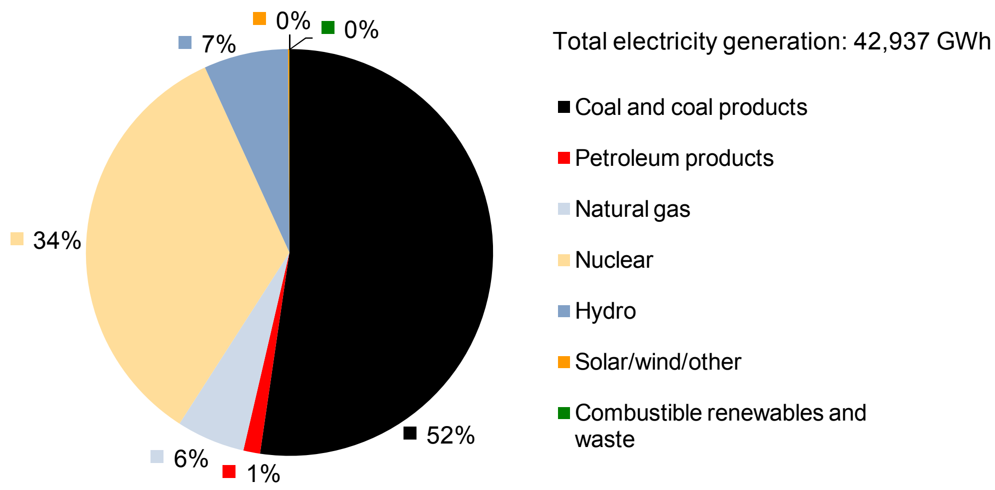
District heating is the principal form of heat supply in multi-family and commercial buildings in bigger cities. District heating output has been decreasing continuously from around 210,000 TJ in 1990 to only 52,186 TJ in 2007. Currently there are 16 systems for central district heating in the country. About 38 per cent of the heat produced for district heating in Sofia is from non-cogeneration thermal plants. The average ratio of electricity to heat released by the cogeneration installations is 0.386; for Sofia it is 0.32. The total energy efficiency of the cogeneration systems is 58 per cent (natural gas ≥ 75 per cent, coal 33-58 per cent, gas-engines over 80 per cent)[99].

Figure 11.37: *Supply of primary energy by sources in 2007*



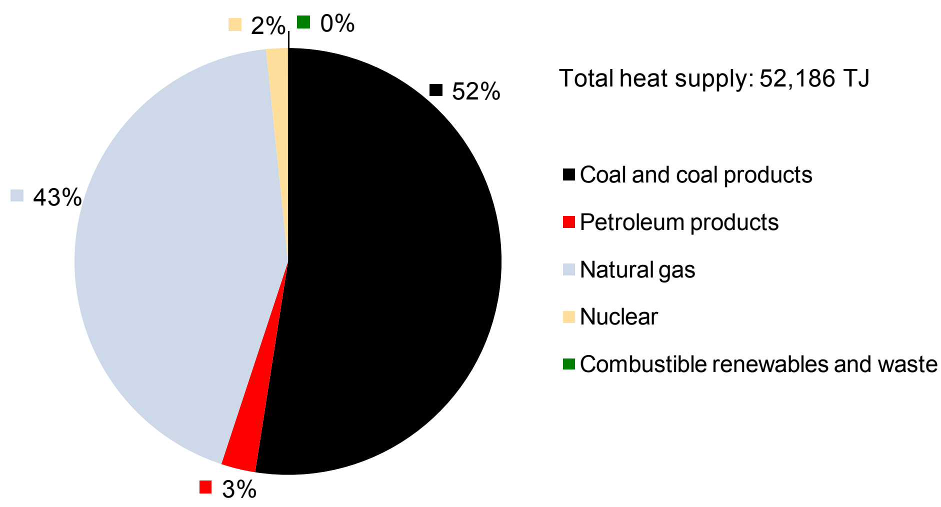
Source: IEA[5] (2009)

Figure 11.38: *Electricity generation by sources in 2007*



Source: IEA[5] (2009)

Figure 11.39: *Supply of heat by sources in 2007*

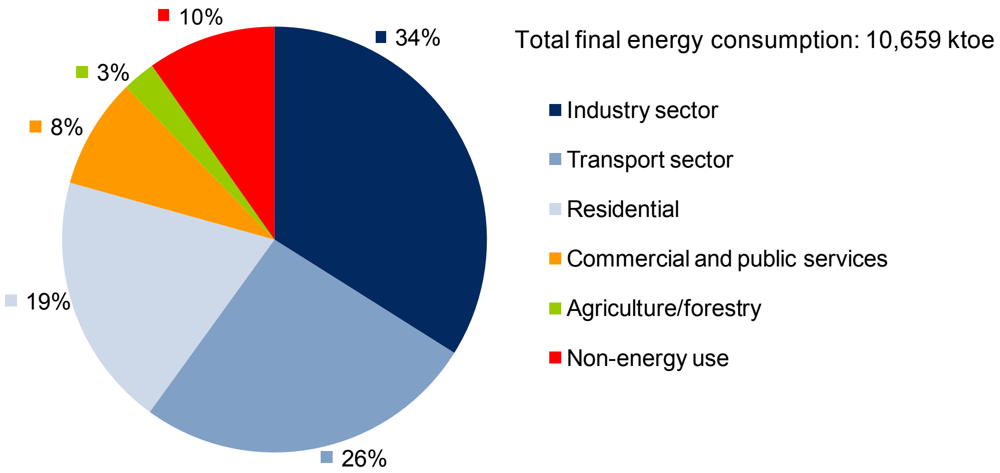


Source: IEA[5] (2009)

Energy demand

The industry sector is the largest energy consumer with 34 per cent, followed by the transport (26 per cent) and the residential (19 per cent) sectors. Commercial and public services consume only eight per cent, as shown in Figure 11.40. The high share of industry in the national energy consumption is mainly due to the energy intensive chemical and metallurgical sectors. The share of the service sector of final energy consumption is still low (eight per cent) as compared to other countries. The agriculture sector has a similar energy consumption (2.7 per cent) when compared with the EU-27 average (2.4 per cent)[103].

Figure 11.40: Total final energy consumption by sectors in 2007



Source: IEA[5] (2006)

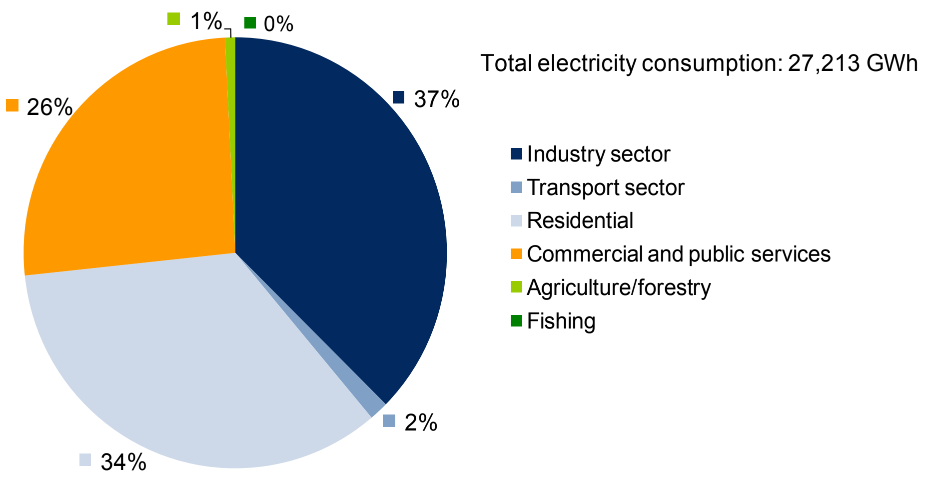
Industry (38 per cent), residential (34 per cent), and commercial and public services (26 per cent) are the three major consumers of electricity (see Figure 11.41).

Electricity consumption in the industrial sector is quite intense since the late 1990ies. At the same time there was a shift in the structure of the fuels consumed in the industrial sector: the use of district heat has decreased sharply since 1997 leaving a spot for electricity, natural gas and oil products. The residential sector is a big consumer of electricity. The share of electricity used for heating purposes remained roughly at 25 per cent over the past 15 years. This share may decrease with increased household equipment and electric appliances, and with rising gas penetration and improved district heating networks. Energy consumption in the services sector decreased from 1990 to 1997 but has increased again since 1997. Electricity has by far the largest share in this sector[99].

The industrial sector is the largest gas consumer (49 per cent), followed by the transport sector (17 per cent). The non-energy use of gas derives mainly from use of petrochemical feedstock (26 per cent), as shown in Figure 11.42. Within the industrial sector, the chemical industry is the foremost gas consumer with 49 per cent, followed by the metallurgy industry (18 per cent), the construction sector (eight per cent) and the glass manufacturing industry (three per cent)[104].

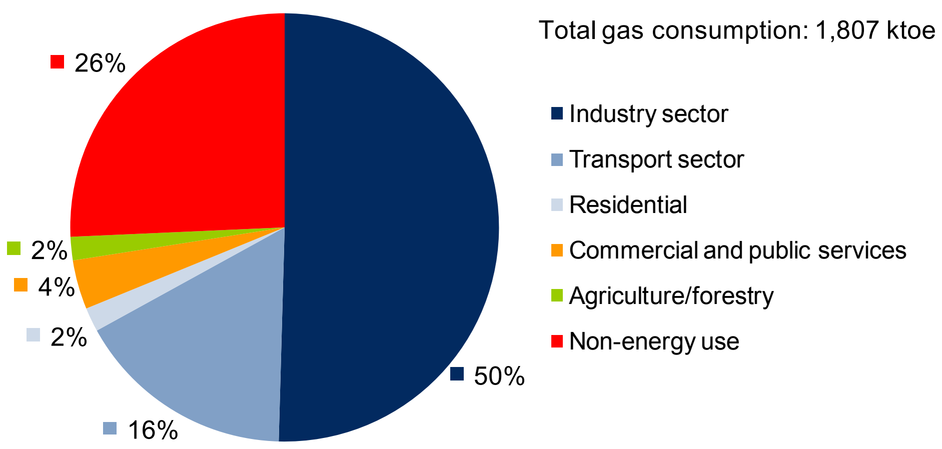
Heat demand is composed by the industrial (38 per cent) and residential (47 per cent) sectors, while the share of commercial and public services share amounts to 15 per cent (see Figure 11.43). The share of district heated dwellings is about 18 per cent[104].

Figure 11.41: Final consumption of electricity by sectors in 2007



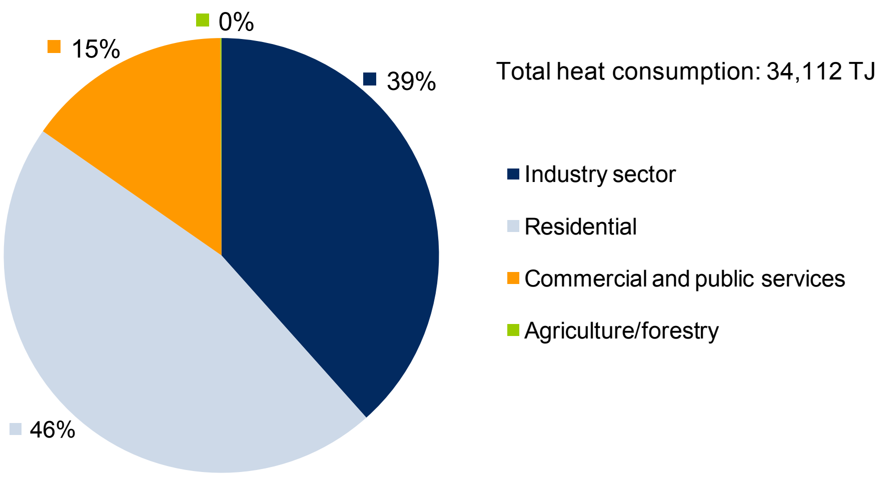
Source: IEA[5] (2009)

Figure 11.42: Final consumption of gas by sectors in 2007



Source: IEA[5] (2009)

Figure 11.43: Final consumption of heat by sectors in 2007



Source: IEA[5] (2009)

Energy markets

Electricity market

The restructuring of the former monopolist National Electricity Company (NEK) at the end of 2006 was carried out in connection with the country's commitments under Directive 2003/54/EC concerning common rules for the internal market in electricity and was the start of an extensive deregulation and privatization process of the Bulgarian electricity sector: following the adoption of the Energy Strategy of Bulgaria (State Gazette No. 71, 23 July 2002) and on the basis of the amended Energy Act (State Gazette No. 107 of 9 December 2003) and the relevant secondary legislation, the Privatization Agency of Bulgaria has undertaken the privatization of the electricity generation companies. However on 18 September 2008 the Bulgarian Energy Holding EAD (BEH EAD) was created by decision of the Ministry of Economy and Energy. BEH EAD is a shareholding company with 100 per cent state owned participation. The holding includes mini Maritca Iztok EAD, Maritsa East 2 thermal power plant (TPP) EAD, Kozloduy nuclear power plant (NPP) EAD, NEK EAD including the Electricity System Operator EAD, Bulgargaz EAD, Bulgartransgaz EAD, and Bulgartel EAD. All companies brought together in the holding structure preserve their operational independence and licences, as they are all owned and directly subordinated to the corporate center BEH EAD[105].

The rest of the produced electricity quantity is realized by local and foreign companies[104]. Independent producers, concentrated into nine municipal district heating companies and 17 industrial thermal power plants account for 11 per cent of generation in the country. Several hydropower plants are in the process of being sold. Seven regional distribution companies have been privatized and are now owned by foreign operators: Stolichno, Sofia Region, and Pleven are owned by CEZ A.S. (Czech Republic); Plovdiv and Stara Zagora by EVN AG (Austria); Varna and Gorna Oryahovitsa by E.ON Energie AG (Germany). The eighth distribution company Zlatni piasazi - Service AD is also in private ownership[99].

As of 1 July 2007 the electricity market in the country is fully liberalized. Each user of electricity was given the legal right to choose a supplier and was provided with free and equal access to the energy transmission and distribution grids. Currently the share of the free market among the total electricity volume is about 30 per cent[104].

Further achievements of the power sector deregulation in 2007 were: emission of generation licences to independent power producers; establishment of a transmission company with wholesale market functions; establishment of nine regional distribution/supply licensee companies; emission of 14 licences to traders of electricity; regulated markets for generation and wholesale trading, and end-user prices; regulated third-party access possibilities for eligible customers: bilateral contracts, balancing market; deregulated prices for ancillary services[99].

Electricity tariffs

The prices for liquid fuels and coal are set by the market, while the prices for electricity, heat, natural gas, and renewable energy are regulated by the State Energy and Water Regulatory Commission. The Commission applies the “cost-plus”, “price cap” and “revenue cap” basic methods of price regulation for electricity and heat, allowing for return on capital and stimulating efficiency improvement. The Council of Ministers sets binding rules for the formation and application of prices and tariffs for electric energy. The energy enterprises set prices and tariffs according to the binding rules and basic principles, and submit them for approval to the State Energy and Water Regulatory Commission (SEWRC) one month before publication along with the pricing documents[104].

Household electricity prices depend on the consumption profile (amount and day-timing). They have risen by 14 per cent over the last three years and are about 49 per cent below the European averages. At 65-70 EUR/MWh including VAT, Bulgaria is the country providing the second cheapest household electricity supply in the EU-27. Similarly, industrial user prices have risen by 12.5 per cent over the last three years but remain about 39 per cent lower than the European averages at 34-64 EUR/MWh including VAT. Prices for industrial users are lower in absolute terms than for households. The impact of electricity prices on industrial consumers is weaker than on households[99]. The electricity prices for enterprises and households are shown in Table A.3.1.4.

Gas market

In the gas sector, Bulgargaz is the dominant player, a vertically integrated state-owned company performing public supply, transmission, storage, and transit activities. In January 2007, Bulgargaz EAD was restructured into BULGARGAZ HOLDING EAD (which consolidates the newly established subsidiary gas trading companies), BULGARTRANSGAZ EAD, functioning as combined operator, involved in the storage, transit transmission, and transmission of natural gas, and BULGARGAZ EAD, acting as public supplier of natural gas and the related purchase and sale. 37 companies have licenses for gas distribution[99]. About 15 per cent of the domestic gas consumption is being supplied by Petreco-Sarl-Bulgaria and PDNG EAD, which extracts natural gas from Galata, situated in the Black Sea shelf.

The market model for natural gas in Bulgaria is based on bilateral contracts between producers (importers) and traders on one hand, and privileged consumers on the other hand. This market is realized through regulated access to the network and at regulated prices by the State Water and Energy Regulatory Commission. The conditions for admission to the gas market have been regulated in the Energy Act and secondary legislation. SEWRC has issued regional and municipality licences in order to develop the gas distribution network. Long-term business plans are a part of the issued licences approved by the SEWRC[104].

Gas tariffs

The prices for natural gas depend on international prices and have been rising in Bulgaria as elsewhere in Europe but for both domestic and industrial users they still are among the lowest in the European Union[99].

Heating market

Heat production and sales in Bulgaria are organized on the regional principle. District heating plants are owners of the heat energy services and of the heat transition networks. The State Energy and Water Regulatory Commission issues licenses to the district heating plants in the country. Licenses have been issued to 25 regional district heating plants. Another nine licenses have been issued to Industrial thermal power plants in the sectors of chemical industry, metallurgy, food-and-beverage, and textile industries. 20 of these companies possess installations for combined heat and electricity generation[104].

The District Heating sector is undergoing a process of privatization since 2004. The privatization projects of most of the district heating companies have been already finished successfully. The work on the sale of district heating company Shoumen EAD and Pernik EAD continues. The Sofia district heating network, which supplies more than 60 per cent of all district heating users in the country, managed by the Sofia District Heating Company Toplofikatsiya Sofia, jointly owned by the municipality and the state, has been nationalized in 2008 due to financial problems[104].

Heating tariffs

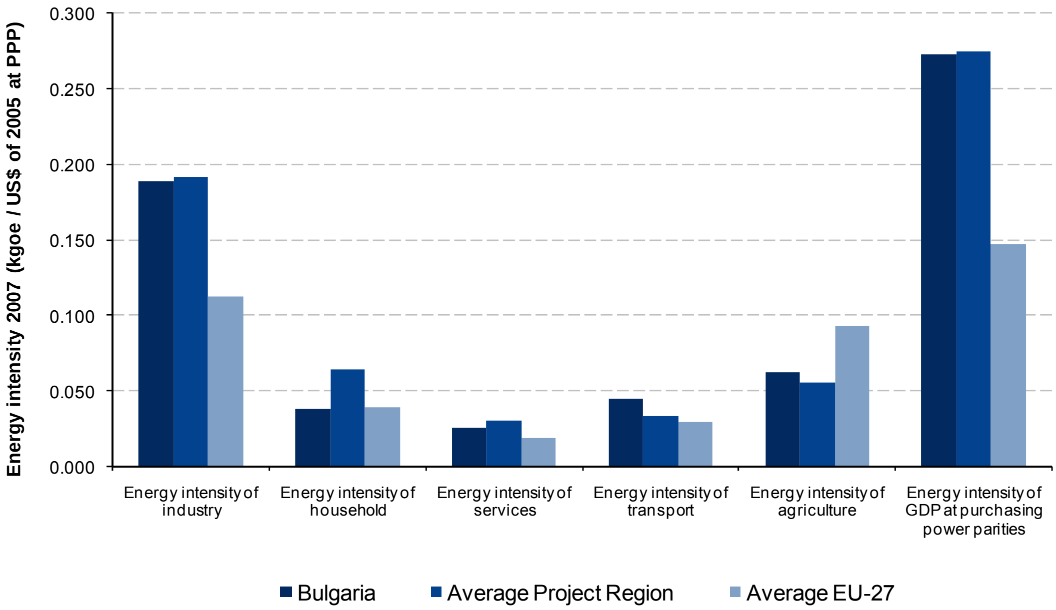
Tariff reforms in the district heating sector continued for almost a decade. In the beginning there was a unified tariff for all district heating companies, which was not sufficient to cover the real production and transmission costs. At a later stage separate prices for different district heating companies were introduced. Tariff increases were introduced periodically; however they did not lead to a lowering of the level of subsidies since the enterprises continued to make losses for a number of reasons, such as lack of investment in improvement of efficiency of the systems, poor accounting and collection practices, and disconnection of a growing number of subscribers because of the price increases. In 2002 pricing reforms started focusing on the phase-out of subsidies and in 2005 all prices were liberalized. Since removal of subsidies only low-income people still receive financial support for energy needs by the social safety net programme. Since 2002 the State Energy and Water Regulation Commission is responsible for district heating tariff setting and regulation[99].

11.4.3. Current situation with respect to energy efficiency and future potential for energy savings and increase in efficiency

Energy intensity

The energy intensity of the GDP at Purchasing Power Parity for Bulgaria in 2007 is almost double the EU-27 average and slightly lower than the project region average (see Figure 11.44)[6]. Bulgaria is the member state with the highest energy intensity in the EU. This high energy intensity is explained by the extensive use of electricity in metal processing industry; the low efficiency of electricity generation, supply and consumption; and the extended use of electricity for heating by residential and tertiary users[22].

Figure 11.44: Primary energy intensity at Purchasing Power Parity in 2007



Source: Enerdata[6] (2007)

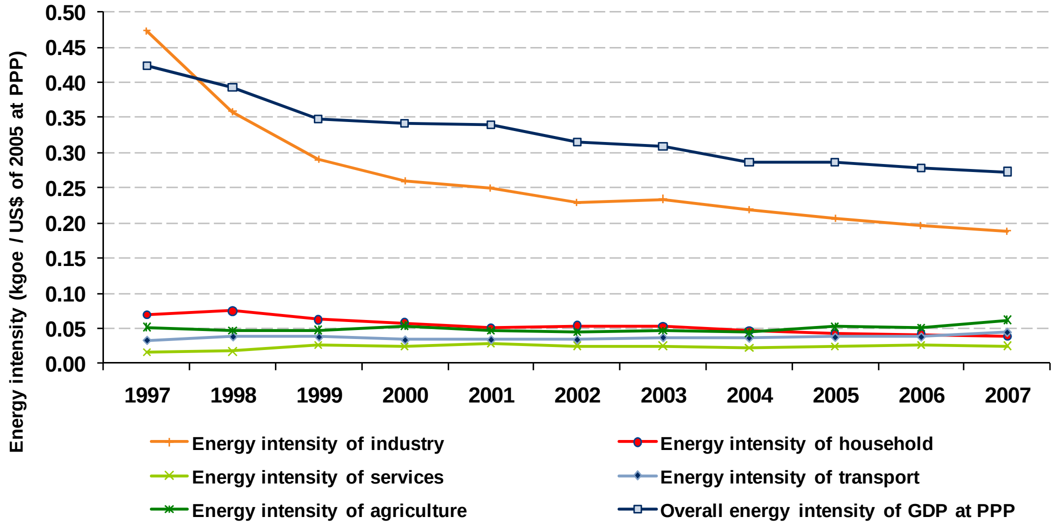
Although the overall energy intensity of the country is currently on a high level, it has decreased significantly since 1990. However, this reduction in energy consumption is not a sign of improved energy efficiency, but is due to many other factors inherent to the transitional period. Final energy consumption in 2005 was still 40 per cent lower than in 1990[99]. Since 1997 the overall energy intensity decreased by 35 per cent (see Figure 11.45).

Consumption of final energy by industry has reduced by 60 per cent since 1990, influenced by the re-structuring and modernization of the Bulgarian economy[99]. However, industry still has the highest share of final energy, mainly due to three energy intensive sub-sectors (chemicals and petrochemicals, non-metallic minerals, and iron/steel), although they have been largely modernized. The energy intensity of the industry sector follows the pattern of the overall energy intensity, i.e. for 2007 considerably higher than the EU-27 average and slightly lower than the project region average (see Figure 11.44)[6].

In line with the industry sector, the energy intensity of the household sector decreased in the last decade by almost 45 per cent (see Figure 11.45). For 2007 the household energy intensity is almost identical with the EU-27 average and significantly lower than the project region average (see Figure 11.44)[6].

Unlike the other sectors, the transport, agriculture, and services sectors witnessed an increase of their energy intensity levels from 1997 to 2007 (33 per cent, 20 per cent and 50 per cent respectively), as shown in Figure 11.45. Especially the transport sector energy intensity is compared to the EU-27 and the project region average relatively high. There has been a strong modal shift from passenger rail to road transport and similarly from goods transport by water and rail to transport on roads. A similar shift occurred from public urban transport to private cars implying a constant growth of urban traffic congestion[22].

Figure 11.45: *Primary energy intensity in Bulgaria by sector at Purchasing Power Parity*



Source: Enerdata[6] (2007)

Energy losses from electricity and gas grids

According to Enerdata, the electricity losses from the transport and distribution grids in Bulgaria are higher than in neighbouring Romania but still low comparatively to the project region, amounting to less than twelve per cent of the total production[6]. During the last years the electricity losses have been decreased as a result of the implemented reconstruction of the grids, the exchange of conventional meter devices, and the implementation of specific measures for preventing unauthorized access to the grid and consumption of electricity[104].

100 per cent of electricity as well as gas customers are equipped with a conventional meter. Both customer categories can be disconnected from the grid in case of non-payment[104].

District heating grid

District heating systems experienced a sharp decline since 1990. Between 1990 and 2005, the output declined by a factor of four. Not only do cogeneration plants only represent around half of the output, but the systems are 20 to 36 years old.

Currently heat losses in the transmission network vary between 17 per cent and 20 per cent. In the last years a large part of district heating transmission network and substations have been rehabilitated in order to reduce the heat losses in the energy distribution as well as to regulate the consumption in buildings more efficiently[104].

Metering of heat consumption is completed at the boundaries of the properties based on conventional and remotely-read meters[104]. The disconnection from the heat supply is only possible at the boundaries for the whole building, i.e. individual flats cannot be disconnected.

Chapter 10 of the Energy Law, adopted in November 2003, introduced individual billing of heat energy from district heating to multi-family buildings on the basis of a share distribution system if the consumers have installed devices for share distribution (individual allocators or heat meters). In case of absence of devices for share distribution the consumed heat energy is calculated on the base of installed capacity of the heating radiators multiplied by the maximum specific consumption for the building[99].

Other sources of inefficiency

One further source of energy inefficiency is that dwellings in Bulgaria are mostly privately owned (92 per cent) and there are no recognized organizations for home owners leading to sustainable renovation behavior[99]. In order to actively resolve this issue, the Bulgarian parliament adopted the Condominium-Project Building Act (1 May 2009)[104].

Estimated potential for energy savings by sector

In order to realize the main energy and climate change target of the EU of 20 per cent energy savings by 2020 and according to EU Directive 2006/32/EC on energy end-use efficiency and energy services, Bulgaria prepared the First National Energy Efficiency Action Plan 2008–2010. For the whole period of the Directive 2006/32/EC (2008-2016) the national energy savings target is 627 ktoe (7,291 GWh). Compared to the expected growth of energy consumption, based on an economic growth of 5.5 per cent annually, the impact of the planned savings is still limited. The distribution of energy saving targets by sector for the first three years up to 2010 is as follows: households 61 ktoe (29 per cent), services 29 ktoe (14 per cent), industry 48 ktoe (23 per cent), transport 63 ktoe (30 per cent), agriculture eight ktoe (four per cent) of the total 209 ktoe (100 per cent)[104].

ESCOs and other initiatives in energy efficiency

The business model for energy services companies in Bulgaria is set up on the principle of public-private partnership, whereas the ESCOs provide the necessary investment for implementation of the project for energy efficient service with own means and at their own risk. The investment is paid off from the achieved energy savings. For the purposes of that activity the ESCOs and the user of the service sign a contract with a guaranteed result. The ESCO business model has been regulated in the Energy Efficiency Act[104] in 2004 (State Gazette No. 18 from 5 March 2004). It is estimated that at present about 150 companies are in the possession of a license for carrying out energy audits in Bulgaria[107].

Currently, the most successful ESCO operating in Bulgaria is Enemona SA, a private Bulgarian engineering company, established in 1990. It is the largest Energy Services Company in Bulgaria. The company implements energy efficiency projects in the industrial sector, public buildings (municipal and state) and civil buildings, based on an energy performance ESCO contracting business model (guaranteed result contracts). The company implements also renewable energy sources projects (small hydro power plants, solar and biomass power stations). Based on the Energy Efficiency Act, which was introduced in 2004, Enemona, which before has worked exclusively as an engineering services company, decided to enter the field of services for energy audits and energy saving projects. According to Enemona the repayment period is usually in the range of seven years. Currently the company is in discussion with the European Bank for Reconstruction and Development for the provision of a credit line of EUR eight million for the extension of the current activities. To date, Enemona has established 30 energy performance contracts. Enemona may be suitable to serve as a financing vehicle to address small energy efficiency projects (below EUR ten million) in the industry and public sector[106].

Another active ESCO company is Energy Efficiency Systems Ltd, which is focused on energy audits for industrial enterprises, energy services and training of staff. The company has been established in the 1990ies with the support of the United States Agency for International Development (USAID). However, unlike the pure ESCO concept, Energy Efficiency Systems Ltd. does not take any financial risks. The main customers of the company derive mostly from the food and beverages industry. According to the director of the company, the average size of the projects ranges between EUR 50,000-100,000, while the payback period is two to three years[107].

11.4.4. Current situation with respect to renewable energy sources and future deployment potential

Deployment of renewable energy sources

The share of renewable energy sources of the total primary energy supply in Bulgaria is 5.1 per cent and seven per cent for electricity generation (see also section 11.4.2)[5]. In 2007, the electricity produced from renewable energy sources (including pumped storage hydropower plants) in Bulgaria amounted to 2,927 GWh.

The main renewable energy source used to generate electricity in the country is hydropower: in 2007, large hydropower plants had the highest share of electricity produced from renewable energy sources, generating 80.5 per cent of the total electricity produced from renewable energy sources in the country. Small hydropower plants of less than ten MW installed capacity had a share of 17.8 per cent.

In recent years, the development of plants utilizing the potential of wind and solar energy to generate electricity has started. Although wind power plants supplied only 1.7 per cent of the electricity produced from renewable energy sources in 2007, in comparison to 2005 wind power plant electricity generation had increased more than tenfold[104].

The share of biofuels in the Bulgarian transport sector accounts for less than 0.1 per cent[99]. So far only four to five biofuel projects have been developed in Bulgaria[108].

Estimated potential for renewable energy sources

According to the National Long-term Energy Efficiency Programme 2005-2015, the renewable energy sources potential in Bulgaria amounts to 6,000 ktoe[104].

The existing technical and economic potential for large hydro power is already exploited. There is potential to install around 2,200-3,400 MW wind energy in the country. The best wind potential is in the mountains (about 1,000 m above sea level) and along peninsulas of the Black Sea. It has to be noted however, that the highest wind potential located at the Via Pontica is an ecologically sensitive area since it is a bird migration route[109]. In the East and South of the country there is some solar potential. Bulgaria has a moderate potential for geothermal energy. Power generation potential from geothermal sources is about 200 MW[99].

According to the Center for Energy Efficiency EnEffect, the wood biomass potential in Bulgaria can be considered to be significant, since the surface area of Bulgaria consists of 33 per cent forest area. A significant increase in the usage of wood could be witnessed in the past decade. The biggest potential lies in waste wood that could be employed for heating and electricity production. The wood potential could be increased sixfold if sanitary cuts would be applied more frequently. In order to solve this problem, the State Forestry Agency (SFA) has been established in 2008[108].

Projects and initiatives in renewable energy sources

Currently some independent enterprises are operating in the generation of electricity from renewable energy sources, mainly hydro, wind, and solar[104].

11.4.5. Institutional, regulatory and policy framework for energy efficiency and renewable energy sources

Policymakers in the energy sector

Institutional policymakers

The Ministry of Economy and Energy is the main ministry in charge of energy policymaking in Bulgaria. It was incorporated by decision of the Bulgarian Parliament in August 2005 through the merger of the Ministries of Economy and Ministry of Energy and Energy Resources. Within its wide scope of responsibilities, the Directorate Energy Efficiency and Environmental Protection is the unit which specifically deals with energy efficiency and renewable energy. The Ministry has the legislative initiative in the energy efficiency area and it controls the implementation of legislative provisions. It also develops, and submits for adoption by the Council of Ministers, national indicative targets for energy savings, including an intermediate indicative target, and energy efficiency action plans. The Ministry interacts with other government authorities regarding the implementation of the state policy on energy efficiency and implements international cooperation of Bulgaria in the area of energy efficiency.

Further important governmental agencies are listed below.

- The State Energy and Water Regulatory Commission is an independent specialized state body established in 1999 to regulate activities and prices in electricity, gas and heat markets[99].
- The Energy Efficiency Agency (EEA) is an executive agency of the Ministry of Economy and Energy. The Agency was established in 2002 under the Energy Efficiency Act and is the successor of the National Energy Efficiency Agency at the Council of Ministers (1997) and the State Energy Efficiency Agency (1999). In 2007, EEA devoted the first year of Bulgaria's membership in the European Union to activities related to the harmonization with the Union's energy policy.

Non-institutional policy makers

The Center for Energy Efficiency EnEffect is an important non-governmental, non-for-profit organization and its mission is to support the efforts of the central, regional, and local authorities in the sustainable development of the country through more effective usage of the energy. In compliance with the Bulgarian Energy Efficiency Act requirements, a consulting subdivision has been established - EnEffect Consult LTD. Its main activities are in the field of energy audits, building certification, researching, and analyses[110].

Regulatory and administrative institutions at the regional and local level

Municipalities in Bulgaria have regulated functions which realize the democratic principles of self-governance. Organs of local administration serve the society, function on the base of normatively regulated rights, obligations and responsibilities. The municipalities can carry out their own economic activity, i.e. to collect local taxes and fees; to form its own municipal budget with means from the population and economic activity on its territory. This provides the municipality a certain economic independence which allows it to form and implement its own regional economic policy. At the same time, the economic policy of the municipality is limited because a big part of its money for functioning and development go to the republican budget which means that its target usage should be in compliance with the national and district programmes for development[111].

Based on the relative budgetary and policy freedom, Bulgarian municipalities have entered a number of public-private partnerships in the field of renewables and energy efficiency. The district heating biomass power plant in Bansko is an example of a public-private partnership. The municipality provided the grid and the public land, while a private company built the power plant and the logistic chain[108].

Energy policy and regulatory framework

The National Energy Strategy, adopted by the Parliament in 2002, lays down the basis for the introduction of market mechanisms and for transforming the energy sector, including improving the efficiency of energy use in Bulgaria. The Energy Strategy is currently in a process of revision.

The main provisions for the functioning of the energy sector are laid down in the Energy Law from 2003 (State Gazette No. 107, 9 December 2003; with major amendments in 2006 and March 2008). The Law provides for the legal, operational and accounting separation of energy sector companies into production, transmission, distribution, and supply, through liberalization, market competition, and privatization in connection with the country’s commitments under Directive 2003/54/EC concerning common rules for the internal market in electricity and Directive 2003/55/EC concerning common rules for the internal market in natural gas. The Law includes, among others, specifications for heating billing, renewable energy sources, and combined heat and power generation[104].

Policy and regulation on energy efficiency

Two Directives of the European Commission play a key role regarding energy efficiency. These are Directive 2006/32/EC concerning energy end-use efficiency and provision of energy services and Directive 2002/91/EC concerning energy performance of buildings. Under the EU Directive 2006/32/EC on energy end-use efficiency and energy services, Bulgaria is committed to reduce its energy consumption by nine per cent of the average final inland energy consumption for the period 2001 to 2005 before 2016. The first National Energy Efficiency Action Plan for 2008-2010 was adopted by the Government and the European Commission in 2007.

During the last years the process of harmonization of the energy efficiency framework of Bulgaria with European legislation was a priority. A new Energy Efficiency Act was adopted by the Bulgarian Parliament in November 2008, substituting the former Energy Efficiency Act that was set in force in 2004 (and amended in 2006 and 2007)[104]. The secondary legislation for the implementation of the Energy Efficiency Act has been developed. The latest ordinances that have been elaborated are mainly directed to the implementation of the legal provisions concerning the certification of buildings.

On the basis of the Energy Efficiency Act, all buildings with a total built-up area that exceeds 1,000 m^2 shall be subject to mandatory certification according to the established procedure after energy audits. The energy certification of buildings shall seek to certify the current state of energy consumption in the buildings, the energy performance, and the conformity thereof with the energy consumption class scale from A to G[112]. The industrial facilities with a yearly consumption above 3,000 MWh, need to carry out energy audits. These energy certification and audits can be carried out by licensed companies that employ certified employees.

The main policy documents concerning energy efficiency implementation in Bulgaria are:

- The National Long-term Energy Efficiency Programme 2005-2015 and the National Short-term Energy Efficiency Programme 2005-2007, instituted by the Energy Efficiency Act. A primary energy intensity reduction of 17 per cent and a primary energy intensity reduction of eight per cent by 2015 were targeted by the Long-term Programme.
- The First National Energy Efficiency Action Plan for 2008-2010, adopted by the Government in 2007. The energy saving target for the three years is 209 ktoe, distributed by sector: households 61 ktoe (29 per cent), services 29 ktoe (14 per cent), industry 48 ktoe (23 per cent), transport 63 ktoe (30 per cent), and agriculture eight ktoe (four per cent).
- The Energy Efficiency Act of 2008 and its secondary legislation.

For the period of 2008 to 2016, Bulgaria is expected to save up to 627 ktoe, as stipulated by the second National Energy Efficiency Action Plan that Bulgaria is currently developing in line with EU regulations[109].

The main general programme for energy efficiency in residential and tertiary sector buildings is the National Programme for Renovation of Panel Residential Buildings from 2005-2020 (Decision of the Council of Ministers from January 2005). A subsidy of up to 20 per cent from the state budget is envisaged for expenditure related to the implementation of energy efficiency measures in block of flats. Today the Programme has not started yet. Its implementation is expected to start after the enforcement of the Condominium-Project Building Act (1 May 2009) and the founding of associations of building owners under the provisions of that law. Furthermore the National Strategy for Financing of Buildings Insulation for Energy Efficiency Improvement for the period of 2005-2020 (adopted by the government in May 2004) is important regarding energy efficiency in residential and tertiary sector buildings. In addition, Bulgaria has introduced a number of important energy efficiency measures in buildings, such as measures linked to EU accession, measures in support of thermal performances of homes, subsidies, and fiscal measures[99].

Policy and regulation on renewable energy sources

The renewable energy sources target to be achieved in 2010 is about 11 per cent for electricity consumption and 16 per cent in 2020 and was set in the National Long-term Programme for the Promotion of Renewable Energy Sources (2005-2015), which is based on Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources in the internal electricity market and Directive 2006/108/EC on the promotion of electricity produced from renewable energy sources. The main potential for renewable energy production is from biomass, wind, geothermal, and solar sources. In January 2008 the Ministry of Economy and Energy elaborated a National Long-term Programme for Promotion of the Use of Biomass for the Period 2008-2020, which was approved by the Council of Ministers by virtue of Decision No. 388 of 20 June, 2008. The Programme defines the national long-term objectives for utilization of the local energy resources of biomass[104].

The main pieces of legislation relevant to renewable energy are: the Energy Act (2003), Energy Efficiency Act (2004), Ordinance on Setting and Applying Prices and Rates of Electricity (2002), and Regulation for Certification of the Origin of Electric Power Generated by Renewable and/or Combined Generation Sources, Issuance of Green Certificates and Trading (2005). The most recent legislation for renewable energy sources is the Renewable and Alternative Energy Sources and Biofuels Act (2007). It sets an ambitious framework for the support of renewable energy sources. One of the main measures prescribed by the Renewable and Alternative Energy Sources Law, was the introduction of the obligatory connection of renewable power plants to the high- and low voltage grid. Based on the Renewable and Alternative Energy Sources Law, the Bulgarian Government will develop a National Action Plan for 2020, as required by EU regulation[109].

A set of programmes for the implementation of the above mentioned legislation has been progressively developed:

- Long-term Programme for Promotion of Biofuel Consumption in Transport Sector 2008-2020;

- Long-term Programme for Utilization of Biomass in Bulgaria 2007-2015;
- National Long-term Programme for the Promotion of Renewable Energy Sources, 2005-2015.

The next forthcoming legislation on renewable energy sources will be the implementation of the new EU Directive 2009/28/EC on the promotion of the use of energy from renewable sources in June 2009. According to this new directive the allocated share of renewables for Bulgaria is 16 per cent of the Bulgarian gross final consumption. In 2005 the percentage of renewables was 9.4 per cent. In 2010 5.75 per cent of biofuels have to be blended or purified with conventional fuel. In 2008 this target was just two per cent[109].

International commitments and current status of implementation

EU Regulation

Bulgaria signed the Treaty of Accession to the EU in 2005 and officially accessed to the EU in 2007. The progress review of the Energy Charter in 2008, states that Bulgaria has made good use of the EU accession process in the past years to improve the energy efficiency policy framework. Bulgaria has achieved substantial progress in the introduction of a coherent set of medium- to long-term strategies, specific legislation for energy efficiency, and concrete action plans, supported by the general move in the country towards EU accession and the interaction with other EU member states. This is evidenced by the multitude of support programmes for the residential and industry sector[113].

In the frame of the Energy Efficiency Act and in particular with the introduction of the First National Energy Efficiency Action Plan required by the EU Directive on Energy Efficiency and Energy Services, Bulgaria has developed for all end-use sectors clear objectives, tasks, and targets. In this context, Bulgaria is also working to introduce suitable policy and progress monitoring provisions. The challenge for energy efficiency policy makers will be to ensure efficient implementation of the policy measures and coherence among the various sector instruments in the coming years[99].

Furthermore, Bulgaria is Participant of the Energy Community Treaty, which was signed on 25 October 2005 in Athens by the European Community and then nine Contracting Parties from South-East Europe. Following ratification, the Treaty entered into force on 1 July 2006. When the Treaty establishing the Energy Community was signed in 2005, Bulgaria endorsed it with the other Contracting Parties. Following its accession to the European Union, the legal status of Bulgaria changed from Contracting Party to Participant.

Kyoto Protocol

Bulgaria is a party to the United Nations Framework Convention on Climate Convention as an Annex I country and to the Kyoto Protocol as an Annex B country. Bulgaria ratified the UNFCCC in 1995 and signed the Kyoto Protocol in 1998 and ratified it in 2002. Under these agreements the country has committed itself to an eight per cent reduction of greenhouse gas emissions during the first period (2008-2012) in comparison with the base year 1990.

The responsible institution for issuing letters of support and approval of Joint Implementation projects is the Ministry of Environment and Water. By now the Ministry has approved 19 JI projects which are under implementation. Furthermore 21 letters of support have been issued, but these projects haven't been approved yet[22].

Other international commitments

Bulgaria signed the Energy Charter Treaty and Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects in December 1994. Both were ratified in July 1996 and entered into force in April 1998. The Energy Charter Treaty is a European initiative dating from 1990, which plays an important role as part of an international effort to build a legal foundation for energy security, based on the principles of open, competitive markets and sustainable development. It aims at mitigating risks associated with energy-related investment and trade[99].

11.4.6. Economic incentives and financing schemes for energy efficiency and renewable energy projects

General investment climate in the country

Bulgaria benefits from the presence of a Foreign Investment Agency, called the Invest Bulgaria Agency (IBA), which was established in 1995, and acts as a the main institution for foreign investors. The mission of IBA is to help potential and existing investors exploring investment opportunities in Bulgaria and carrying out greenfield investment projects in the country. It provides prospective investors with up-to-date information on the investment process in the country, legal advice, identification of suitable Bulgarian partners, and coordination of the investment policy with other institutions. The Agency has a staff of 35 professional employees. As main reasons for investment in Bulgaria, IBA praises Bulgaria's competitive wages, low corporate tax on income and personal income rates (both ten per cent), and a VAT exemption on equipment imports for investment projects larger than EUR five million[114].

According to the Heritage Foundation[115], The Investment Promotion Act, last amended in May 2007, stipulates equal treatment of foreign and domestic investors. However, government approval is required for majority foreign ownership in some sectors. Many sub-federal authorities also provide incentives, but bureaucracy, frequent changes in the legal framework, and corruption impede foreign investment. Residents may hold foreign exchange accounts subject to some restrictions; while non-residents may hold them without restriction. A few capital transactions require prior registration with the Central Bank. Foreign ownership of land is permitted if the owners are from EU countries or countries with an international agreement permitting such purchases. Expropriation is possible, provided that the owner is adequately compensated.

According to Transparency International, Bulgaria is still not able to tackle political corruption effectively, which is closely linked to a very high level of organized crime, despite its accession to the EU. During the past two years, corruption in public procurement and strategic concession deals, a judiciary system paralyzed by corrupt structures, and the misuse of EU funds dedicated to the country's development – for which it faced recent sanctions – have countered Bulgaria's success, heavily damaged its international image, and reduced trust in national institutions. Joining the European Union is not an automatic remedy for corruption, as the worsening of Bulgaria's Corruption Perceptions Index score clearly shows at 3.6 in 2008, ranking it third best within the project region, down from 4.1 in 2007[53].

Incentives for energy efficiency

The Law on Local Taxes and Charges, which has been revised based on the introduction of the Energy Efficiency Act in 2008, provides for tax exemptions for owners of buildings, which possess a specified category of Energy Performance Certificate, issued under the provisions of the Energy Efficiency Act. Exemption from property tax is determined and depends on the category of the issued certificate. Owners of buildings possessing Category A Certificate are exempted from the property tax for a period of seven years to ten years, while owners of buildings possessing Category B Certificate are exempted from the property tax for a period of three to five years[104].

Incentives for renewable energy sources

Bulgaria has a feed-in tariff for energy from renewable energy sources, which is regulated by the State Energy and Water Regulatory Commission.

SEWRC defines a preferential price for every type of production on the basis of general assessment of the costs. The preferential prices are set at 80 per cent of the average retail price during the previous year plus an allowance for the different technologies of energy generation from renewable energy sources. The allowance for the next year cannot be less than 95 per cent of the allowance for the preceding year[104].

Preferential prices are valid for 25 years for the electricity generated from geothermal and solar energy and 15 years for the electricity generated from hydroelectric power plants with installed capacity less than ten MW, as well as for the electricity generated from other renewable sources. The terms for the generation of the electricity and the mandatory purchase shall start not later than 31 December 2015[104]. The feed-in tariffs for electricity from renewable energy sources in Bulgaria are listed in Table 11.9[116].

Table 11.9: Feed-in tariffs in Bulgaria

Technology	Price excl. of VAT (EUR/MWh)
Small hydropower (<10 MW)	43.55
Wind power (< 2,250 full load hours)	89.51
Wind power (> 2,250 full load hours)	79.79
Photovoltaic (< 5 kW)	400
Photovoltaic (> 5 kW)	367.3
Cogeneration biomass (< 5 MW)	94.1
Cogeneration biomass (agricultural residues, loppings etc.) (< 5 MW)	110
Cogeneration biomass (energy crops, e.g. miscanthus, etc.) (< 5 MW)	82.9
Sales price of the national utility to public energy suppliers	31.29

Source: Austrian Energy Agency[116] (2009)

Financing mechanisms for energy efficiency and renewable energy projects

National financing mechanisms

There are two main funding mechanisms in Bulgaria for energy efficiency and renewable energy sources projects:

- Annually funds are envisaged for allocation from the Republican Budget in the form of targeted subsidies for support to the process of improving of the competitiveness of small and medium-sized enterprises in Bulgaria. Funds are also ensured for the implementation of energy efficiency audits for state-owned and municipal buildings in compliance with the provisions of the Energy Efficiency Act. These funds are placed at the disposal of the Energy Efficiency Agency, which in turn distributes them among the potential beneficiaries. In 2008 a total of EUR two million (BGN four million) from the Republican Budget were awarded to the Energy Efficiency Agency through the Ministry of Economy and Energy. The resources were allocated as follows[104]:
  - EUR 0.5 million (BGN one million) as subsidies for carrying out energy efficiency audits of small- and medium-sized enterprises, subject to mandatory auditing under the Energy Efficiency Act. The subsidy is to the amount of 50 per cent of the total value of the contract for energy efficiency audit, but not more than EUR 12,500 (BGN 25,000 incl. VAT);
  - EUR 1.5 million (BGN three million) for energy efficiency auditing of buildings state-owned or in municipal property, which are subject to mandatory auditing under the Energy Efficiency Act. The subsidy is up to the amount of 100 per cent of the audit contract.
- The Enterprise for Management of Environmental Protection Activities within the Ministry of Environment and Water was created under the provisions of the Environmental Protection Act. It lends funds in the form of zero-interest loans to companies for construction of small hydro power plants. The size of the loans is up to 70 per cent of the total value of the project[104].

International financing mechanisms

Significant support for the development of energy efficiency and renewable energy sources projects comes from international financial institutions[22]:

- The Bulgarian Energy Efficiency Fund (BgEEF) was established in 2004 under the Energy Efficiency Act of 2004, initially capitalized through grant financing, the main donors being the Global Environment Facility with USD ten million, the Government of Austria (USD 1.5 million) and the Bulgarian Government (USD 1.5 million). The underlying principle of BgEEF's operations is a public-private partnership. BgEEF supports the identification, development, and financing of viable energy efficiency projects implemented by Bulgarian private enterprises, municipalities, and households. BgEEF has the combined capacity of a lending institution, a credit guarantee facility, and a consulting company. It provides technical assistance to Bulgarian enterprises, municipalities, and private individuals in developing energy efficiency investment projects and then assists their financing, co-financing or plays the role of guarantor in front of other financing institutions. In order to be considered for eligibility, a project must apply a well proven energy saving technology and at least 50 per cent of project's benefits must come from energy savings. Types of projects includes refurbishment of buildings, replacement of fuel, thermal insulation, modernization of street lighting systems, small cogeneration systems as well as energy efficiency in industrial processes. To date, BgEEF has already financed 65 projects, with an average project size of EUR 300,000 (BGN 600,000). According to the BgEEF the paypack period of the projects is usually five to six years, while the current interest rates are 6-9 per cent for municipalities and seven to ten per cent for private enterprises. So far no loans have defaulted[117].

- The Bulgarian Energy Efficiency and Renewable Energy Credit Line (BEERECL) was set up in 2004 by the EBRD together with the Kozloduy International Decommissioning Support Fund (KIDSF) and the Ministry of Energy. The framework comprised EUR 50 million of EBRD financing on lent to six participating banks, and was extended in 2006 with the EBRD making available a further EUR 55 million. The financing is complemented by EUR 20 million in grant funding from the KIDSF, set up in 2000 and administered by the EBRD. Under this framework, technical assistance is included free of charge for the beneficiary of the project (conducted by Encon services who won the EBRD tender). By the end of 2008 a total of 126 projects have been financed under the BEERECL Programme, amounting to EUR 135 million[104].
- To date, the Bulgarian Residential Energy Efficiency Credit Line (REECL) from the EBRD has committed to 15,560 energy efficiency home improvement projects, financed through personal loans totaling EUR 22.5 million (BGN 45 million) and incentive grants amounting to around EUR four million (BGN 7.8 million), saved a total estimated electricity equivalent of 108 GWh per year.

Commercial financing mechanisms

Besides the national and international financing schemes, private initiatives including Bulgarian Energy Services Companies are active[22].

11.4.7. Barriers to the implementation of energy efficiency and renewable energy projects

Box 4: Summary of barriers to the implementation of energy efficiency and renewable energy projects in Bulgaria

Legal, institutional and administrative barriers

1. Corruption and diffused criminality remain a widespread problem in Bulgaria.
2. The lack of a legal structure or representative organization for home-owners is a administrative barrier to the rehabilitation of urban residential structures.
3. There is currently no dedicated agency for the development and the implementation of policy for renewable energy sources.
4. Frequent amendments of existing regulations and a strong regulatory proliferation may originate uncertainty and confusion among investors and project developers.
5. Currently no sanctions or penalties are enforced for companies that do not respect their obligation to conduct energy audits as well as implementing the necessary follow-up measures.
6. The degradation state of district heating infrastructure points out the absence of sufficient action and the need for further support to investments by the municipal entities.

Economic and financial barriers

7. Although Bulgarian electricity customers already pay among the highest tariffs in the entire project region, the currently low energy prices for final customers are possibly a barrier for investments in Bulgaria.
8. The feed-in tariff in Bulgaria is perceived as rather complicated in its definition and might lead to investment uncertainty for project developers since they lack clear long-term price guarantees and are exposed to yearly changes in the feed-in tariff.

Lack of awareness, human capacities and professional skills

9. Despite national programmes and the availability of sufficient financing mechanisms for energy efficiency, the current degradation state of the district heating infrastructures is an indicator for lack of awareness and/or lack of professional capacities at the municipal level.
10. The absence of activity of local commercial banks in financing energy efficiency and renewable energy projects points out a lack of awareness on potential financial benefits as well as possibly also the lack of technical understanding for project evaluation.

Legal, institutional and administrative barriers

Despite strong commitment by the Bulgarian government and significant progress in political reforms, mainly driven by the target of accession to the European Union and the full implementation of the *acquis communautaire* as a requirement for membership, some legal, institutional, and administrative barriers should be addressed in Bulgaria:

- Corruption and diffused criminality remain a widespread problem, which should be addressed quickly in order to establish framework conditions which are in line with those of other Eastern European EU member states. Furthermore, past cases of misuse of EU funds may have damaged the credibility and the image of Bulgaria among foreign investors;
- Frequent amendments of existing regulations and a strong regulatory proliferation may originate uncertainty and confusion among investors and project developers (at the same time no specific action for monitoring of implementation progress appears to be in place);
- The lack of sanctions or penalties for companies that do not respect their obligation to conduct energy audits as well as implementing the necessary follow-up measures also points out the lack of implementation of existing policy[22]. This barrier might be overcome by the Condominium-Project Building Act, which has been introduced in 1 May 2009;
- There is no dedicated agency for the development and the implementation of policy for renewable energy sources;

- At the local administrative and institutional level, the following obstacles to investments could be identified:
  - The lack of a legal structure or representative organization for home-owners is a barrier to the rehabilitation of urban residential structures, where the property is very often extremely fragmented;
  - The fragmentation of land ownership is also a barrier to the development of biomass and biofuel projects. Furthermore, the lack of a plan for optimal management of forest resources has so far restricted the availability of wood residues for utilization as biomass fuel for electricity and heat production;
  - The degradation state of the district heating infrastructure points out the absence of sufficient action and the need for further support to investments by the municipal entities (such as enhanced privatization of infrastructure, implementation of favorable tariff systems or provisions for establishment of dedicated budgets).

Economic and financial barriers

Besides the lack of commitment by Bulgarian commercial financing institutions in the sector of energy efficiency and renewable energy sources (which should be however addressed at the policy level), no significant economic and financial barriers could be found in Bulgaria, with exeption to the feed-in tariff mechanism.

The feed-in tariff in Bulgaria is perceived as rather complicated in its definition; furthermore, it should be made sure that the reference retail prices are published and available to potential investors in order to avoid intransparency and discrimination risks. Additionally, the feed-in tariff mechanism might lead to investment uncertainty for project developers since they lack clear long-term price guarantees and are exposed to yearly changes in the feed-in tariff.

Low energy prices for final customers are possibly a barrier for investments in Bulgaria; however, it must be pointed out that Bulgarian electricity customers already pay among the highest tariffs in the entire project region and that a further increase of final tariffs may have strong social impacts, given the economic situation of the country, as well as trigger unwanted inflation effects.

Lack of awareness, human capacities and professional skills

Awareness of governmental institutions appear to be widespread and mainly driven by the requirement of compliance to EU regulations and targets for energy efficiency and renewable energy sources; both the awareness and the availability of resources at the regulatory level are witnessed by the high level of regulatory activity in Bulgaria.

However, despite national programmes and the availability of sufficient financing mechanisms for energy efficiency, the current degradation state of the district heating infrastructures is an indicator for lack of awareness and/or lack of professional capacities at the municipal level.

Furthermore, the absence of activity of local commercial banks in financing energy efficiency and renewable energy projects points out a lack of awareness on potential financial benefits as well as possibly also the lack of technical understanding for project evaluation.

11.5. *Croatia*

11.5.1. Overview of economic situation

General demographic data

Croatia has a population of 4.437 million (2001) and a surface area of 56,538 km^2. The capital is Zagreb, with 779,000 inhabitants. Out of the total 4.437 million inhabitants, 47.6 per cent live in rural and 52.4 per cent in urban areas. The population density of Croatia of 79 inhabitants/km^2 is considerably lower than most other European countries, ranging between 34 inhabitants/km² in rural and up to 325 inhabitants/km² in urban areas. Out of 21 counties, including the City of Zagreb, eight (38 per cent) show immigration or population regeneration trends, whereas the rest of the counties (62 per cent) is characterized by an overall emigration and depopulation trend. Croatia is characterized by strong negative growth rates of rural population, which has various origins: a low share of women in reproductive age living in rural areas, inadequate living conditions for young families, change of living patterns (inclination to have fewer children) or a higher share of economically active, younger people searching for a professional career in urban centers. Although in some EU countries negative growth rates of population coincide with positive trends in economy both in urban and rural regions, in Croatia the situation is different and characterized by strong differences regarding opportunities for economic and social development among the regions[118].

Current political situation and outlook

After declaration of independence from Yugoslavia in June 1991, armed conflicts severely affected the economy, which later showed strong recovery. Croatia is a candidate for EU membership since June 2004. Croatian authorities currently lead negotiations on the accession to the European Union.

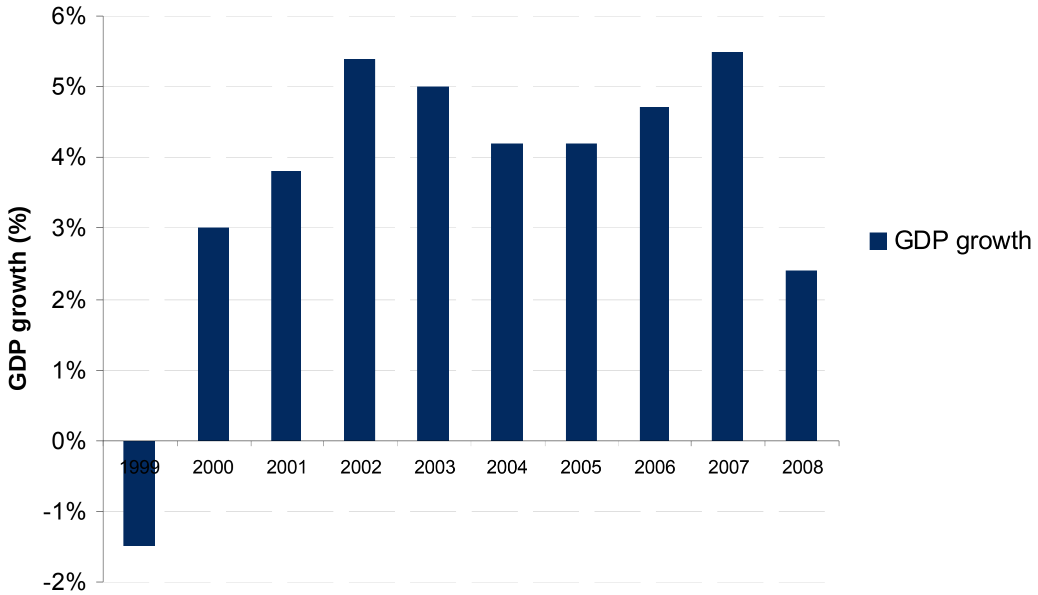
The current President of the Republic of Croatia is Ivo Posipovic, elected on 10 January 2010. On 1 July 2009, the Croatian Prime Minister Ivo Sanader resigned, and suggested Jadranka Kosor as the next Prime Minister. On 6 July 2009, she was confirmed as the first female Prime Minister of the Republic of Croatia by parliament. The next parliamentary elections are scheduled for 2011.

Croatia is administratively divided into 20 counties (županija) and the capital city of Zagreb. Each county has an assembly, which is composed of representatives elected by popular vote.

Gross Domestic Product

Croatia's economic situation has begun to improve slowly since 1999, when the GDP contracted by 1.5 per cent. Since 2000 the real gross domestic growth ranged between 2.4 per cent (2008) and 5.5 per cent (2007) led by a recovery in tourism and credit-driven consumer spending (see Figure 11.46). Inflation over the same period has remained moderate[119]. According to the Economist Intelligence Unit, the real GDP of Croatia is expected to contract by 5.4 per cent in 2009, due to falling domestic demand and an economic slow-down in the euro zone, which will undermine Croatian exports and tourism[120].

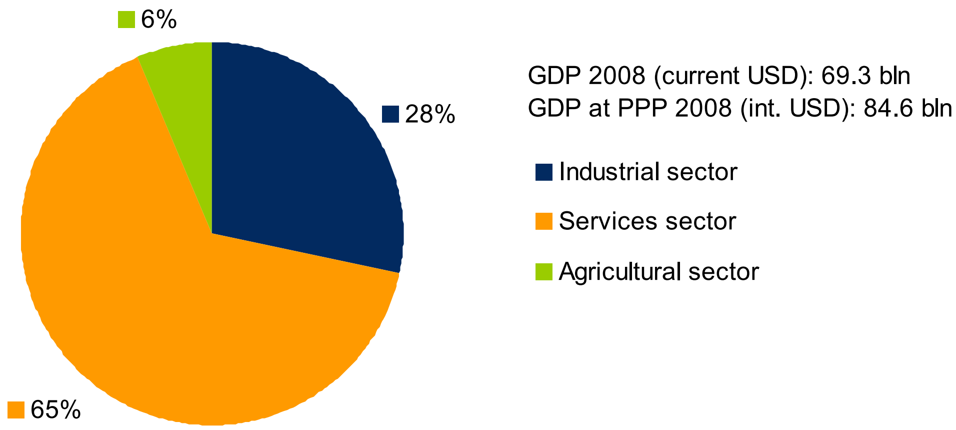
Figure 11.46: Real GDP growth of Croatia



Source: EUROSTAT[119] (2009)

The repartition of the GDP in 2008 can be seen in Figure 11.47 and was clearly dominated by the services sector with 65 per cent. The industrial sector, with a share of 28 per cent, is mostly focused on the following sub-sectors: chemicals and plastics, machine tools, fabricated metal, electronics, pig iron and rolled steel products, aluminum, paper, wood products, construction materials, textiles, shipbuilding, petroleum and petroleum refining, and food and beverages[121].

Figure 11.47: Repartition of the Gross Domestic Product in Croatia in 2008



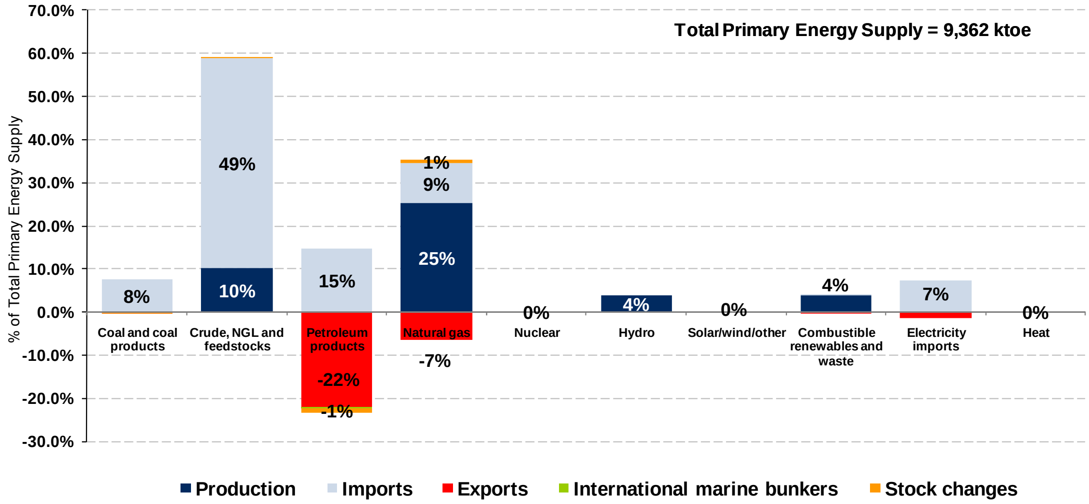
Source: World Bank[121] (2009)

11.5.2. Energy sector and development of energy markets

Energy supply

Although a producer of oil and natural gas and endowed with hydroelectric resources, Croatia is an importer of primary energy (oil, coal, and gas) and electricity. Its total primary energy supply in 2007 amounted to 9,362 ktoe. Croatia's import dependency on primary energy imports is 57 per cent, which is mainly based on the high import dependency on crude oil, which represents 49 per cent of the overall energy balance of Croatia[5] due to the imports from the nuclear power plant Krsko in Slovenia, which is jointly owned by Slovenia and Croatia, the net electricity balance is negative (see also Figure 11.48).

Figure 11.48: Energy balance of Croatia by primary energy sources in 2007



Source: IEA[5] (2009)

Croatia's primary energy production and imports amount to 12,242 ktoe. 89 per cent of the total supply comes from fossil fuels while hydro and renewable energy production account for six per cent of total supply (see Figure 11.49). In addition to onshore oil and gas production fields, Croatia has recently started offshore production of natural gas[122]: around 65 per cent of gas consumption (in 2006) was produced in Croatia from 20 onshore and five offshore gas fields[22].

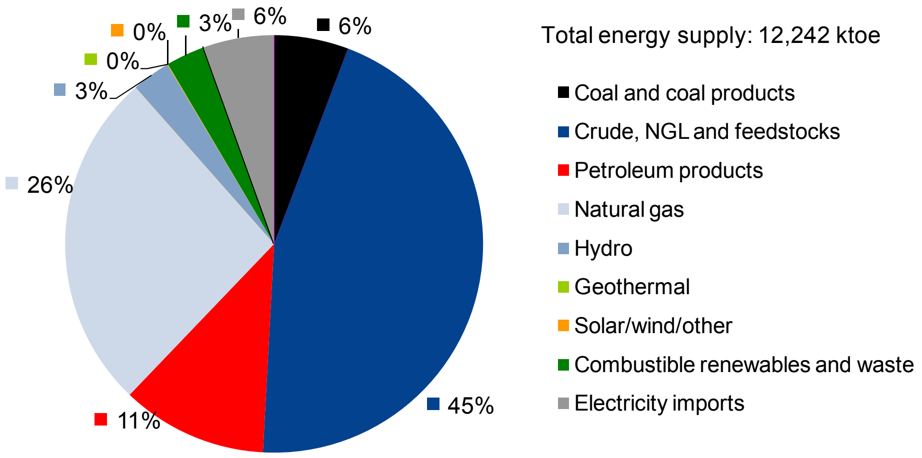
In 2007, electricity generation in Croatia amounted to 12,081 GWh, 36 per cent coming from hydro power plants (mainly large hydro power plants) and 64 per cent coming from fossil fuels while less than one per cent are produced from renewable energy sources (a third wind and a third biomass) as can be seen in Figure 11.50.

Although the Croatian wind sector has seen a large expansion in recent years, the installed capacity remains at 17 MW[22]. The hydro power plant park is quite old, with the youngest plants being already over 20 years old. Most of the thermal power plants were built between 1962 and 1984, while two plants were built in the past ten years (Plomin 2 with 210 MW in 1999 and one CHP unit in Zagreb with 208 MW in 2003). Currently, one hydro power plant in Lešće and two CCGT units in Zagreb and Sisak are in the construction phase[123].

According to the Energy Institute Hrvoje Požar (EIHP) the forecasted growing electricity demand of annually 3.5 per cent requires additional generation capacities. The new Croatian National Energy Strategy, which has been adopted in late October 2009 (Official Gazette 130/09)[124], forecasts that by 2020 new capacities will be needed. 300 MW should be covered by hydro power plants, 2,500 MW by thermal power plants, 1,450 MW by renewables and 300 MW by cogeneration power plants[125]. A decision about possible new nuclear power plants has been postponed for the next few years.

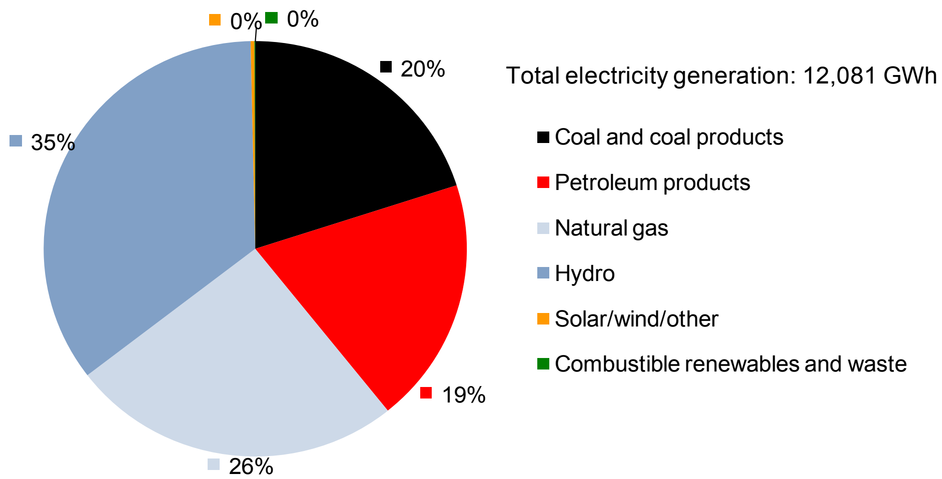
Heat is produced through combined heat and power plants (75 per cent) and heat boilers (25 per cent). Additionally to the heat produced by combined heat and power plants and conventional heat boilers, also biomass furnaces, electrical heat generation, as well as solar thermal collectors and heat pumps are in use[123].

Figure 11.49: Supply of primary energy by sources in 2007



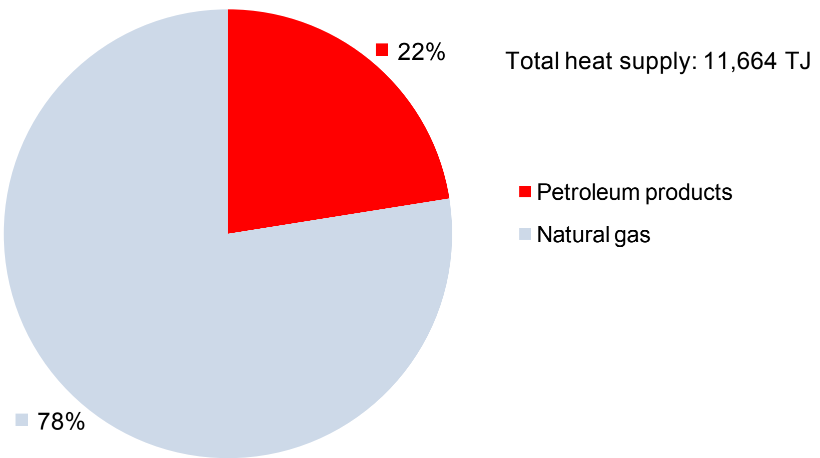
Source: IEA[5] (2009)

Figure 11.50: Electricity generation by sources in 2007



Source: IEA[5] (2009)

Figure 11.51: Supply of heat by sources in 2007

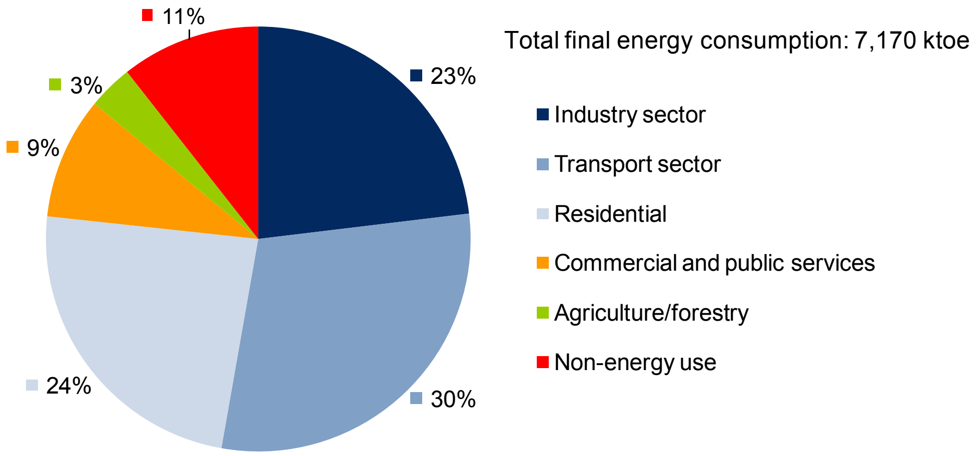


Source: IEA[5] (2009)

Energy demand

The transport, the residential, and the industry sectors represent each around a quarter of the final energy consumption in Croatia as can be seen in Figure 11.52. Although they account for more than 65 per cent of the GDP, services represent only nine per cent of the final energy consumption. The share of 11 per cent classified as non-energy use derives from the use of petroleum products, especially the use of chemical conversion processes, as well as from non-energy use of coal and gas.

Figure 11.52: Total final energy consumption by sectors in 2007



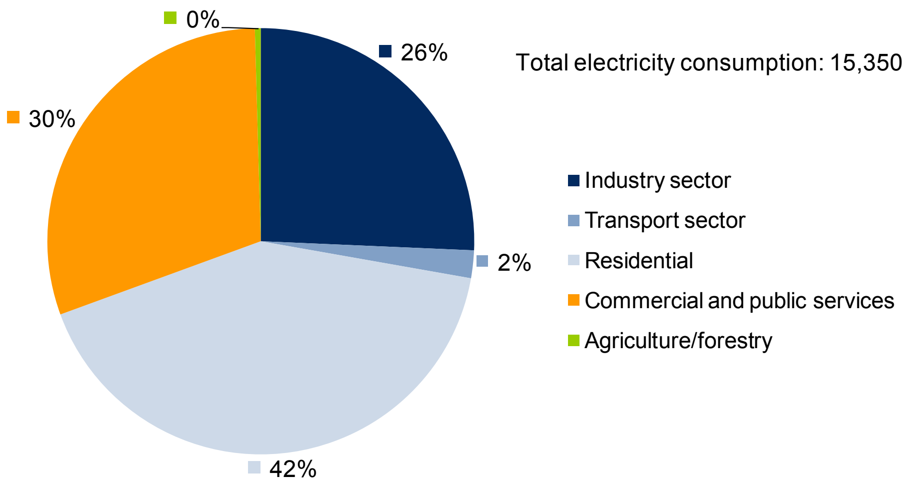
Source: IEA[5] (2007)

Electricity demand amounts to 15,350 GWh (19 per cent of the total final primary energy consumption). It is absorbed at 42 per cent by the residential sector. The industrial sector makes up to 26 per cent of the final consumption while services account for 30 per cent (see Figure 11.53). Overall the electricity demand grew annually by 3.9 per cent between 2002 and 2007[126].

Amongst the 1,618 ktoe (more than 20 per cent of the total final consumption) of gas consumption in Croatia, around 30 per cent are respectively used by the industry and the residential sector (see Figure 11.54).

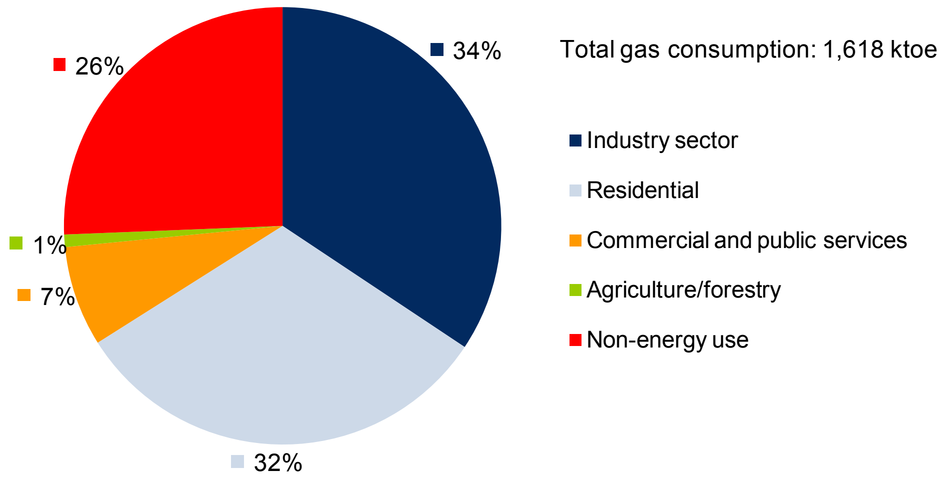
Heat represents only three per cent of the total final energy consumption in Croatia. The largest heat consumer is the residential sector, which represents 64 per cent of the final heat consumption. Industry comes next with 21 per cent of the consumption, followed by services with 15 per cent (see Figure 11.55).

Figure 11.53: Final consumption of electricity by sectors in 2007



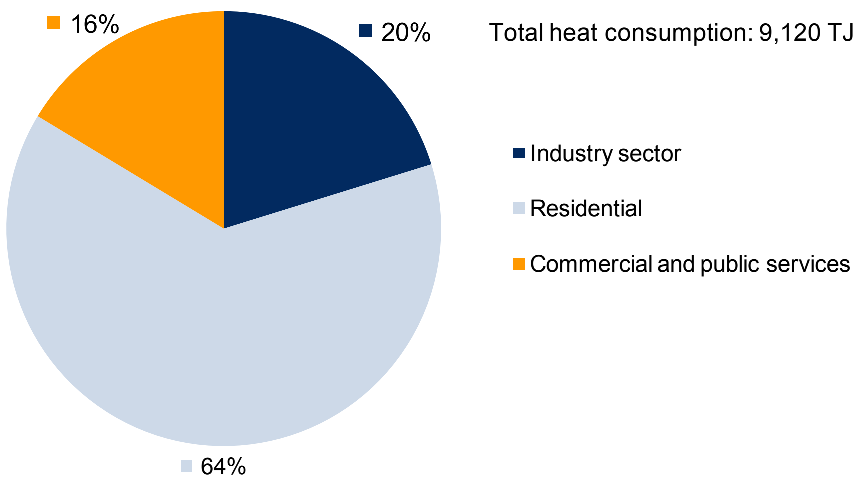
Source: IEA[5] (2009)

Figure 11.54: Final consumption of gas by sectors in 2007



Source: IEA[5] (2009)

Figure 11.55: Final consumption of heat by sectors in 2007



Source: IEA[5] (2009)

Energy markets

Electricity market

The Croatian electricity sector is characterized by a large public influence. The main operator is the state-owned power utility Hrvatska elektroprivreda (HEP). Since July 2002, HEP operates as a group of legally independent affiliated companies: HEP Proizvodnja (electricity production), HEP Operator prijenosnog sustava (HEP-TSO, transmission), HEP Operator distribucijskog sustava (HEP-DSO, distribution), HEP Opskrba (supply), HEP Toplinarstvo (heat supply), and HEP Plin (gas distribution). At a later stage other companies like HEP ESCO and HEP RES have been founded.

The privatization of HEP is supposed to be handled according to the HEP Privatization Law (2002), which foresees the sale of a minority share to domestic or foreign investors, while further shares are to be sold partly (up to seven per cent) under privileged conditions to employees and seven per cent shall be transferred without payment to war veterans[122]. Despite the amendments to the HEP Privatization Law, HEP has not been privatized so far. Due to the ongoing privatization of the Croatian Oil and Gas Company INA, the unsolved issues of how to guarantee added-value from the privatization, of how to secure employment and of how to satisfy regional demands, the government decided to postpone the privatization of HEP[127].

HROTE, the Croatian energy market operator, is responsible for the organization of the electricity market (including buying and selling renewable energy), while the transmission system operator HEP-TSO is responsible for the electricity transmission, maintenance, development, and construction of the transmission system and the power system control. Finally, the Croatian distribution system operator HEP-DSO is responsible for the electricity distribution, the maintenance, and the development and construction of distribution systems[123].

By the end of 2007 the following six companies disposed of a license for electricity generation in Croatia[126]: HEP Proizvodnja d.o.o., INA d.d., TE Plomin d.o.o., Adria Wind Power d.o.o., Valalta d.o.o. and EKO d.o.o.

Electricity tariffs

The electricity tariffs depend on voltage level, type of customer, and time of use. The electricity tariffs for the same group of consumers are equal for entire Croatia. In 2007, the average price of electricity was 73 EUR/MWh (for tariff customers)[126]. The exact figures along all customer categories can be seen in Table A.3.2.2. Electricity production facilities (with yearly CO_2 emission greater than 30 kt) are subject to a CO_2 charge since 2007[123]. Additionally, a tariff component for remuneration for electricity from renewable energy sources (currently 8.9 HRK/MWh or 1.2 EUR/MWh) and a charge from the market operator HROTE have to be paid by final consumers. The values of the feed-in tariff for each deployed technology can be found in Table 11.17.

Electricity and gas tariffs for the public service segment are regulated by the Croatian Energy Regulatory Agency (CERA) based on the principles defined in the legal framework and pertinent secondary regulation, according to the principle of “cost of service” or “cost-plus” regulation, allowing for a reasonable period of time for the return of investments. Regulated tariffs are applied to the whole supply chain, with the exception of production for and supply to the so-called privileged customers. According to the Law on Electricity Market, the CERA is in charge of setting electricity transmission and distribution fees upon the proposal by the grid owner. According to CERA, some fundamental aspects for definition of the fees (asset base, rate of return of investments) still need clarification[122].

Gas market

Regarding the gas sector, by the end of 2007 a total of 39 companies held a gas distribution license, while only the company INA Industrija Nafte held a license for shipping and storage of natural gas[126]. Of the 39 distribution companies only four own a market share above five per cent: Gradska plinara Zagreb d.o.o. in Zagreb (34.8 per cent), HEP Plin d.o.o. in Osijek (13.2 per cent), Termoplin d.d. in Varaždin (8.2 per cent) and Medimurje plin d.o.o. in Čakovec (5.1 per cent).

At the moment, transport and storage of gas is done by state-owned PLINACRO. Responsibility for the long-term planning and development of the gas transmission system is within the Ministry of Economy, Labour and Entrepreneurship. PLINACRO has been granted under the Law on the Gas Market (Official Gazette 40/07, 152/08) the status of sole transport system operator for 30 years[123].

As of August 2008, all gas customers obtained the status of eligible natural gas customers (Gas Market Act, Official Gazette 177/04)[123].

Gas tariffs

As for electricity, gas tariffs for the public service segment are regulated by the Croatian Energy Regulatory Agency based on the principles defined in the legal framework and pertinent secondary regulation: “cost of service” or “cost-plus”, allowing for a reasonable period of time for the return on investments.

Regulated tariffs are applied to the whole supply chain, with the exception of production for and supply to the so-called privileged customers. Privileged producers are also entitled to buy gas from the wholesaler INA at the price for eligible gas consumers[122]. Prices of gas supplied to distributors and directly supplied industrial consumers are based on a weighted value of imported and domestic gas, including the supplier’s margin.

Prices can be changed quarterly upon INA’s request and approval by CERA. According to the last act dating from December 2008, the wholesale gas price is currently 0.18 EUR/m^3 (1.32 HRK/m^3). The exact figures per customer category are shown in Table A 3.2.2.

Heating market

In Croatia, ten per cent of households are connected to one of the district heating systems (14 towns), from which 80 per cent are supplied by HEP District Heating, which is part of the HEP Group[122]. Beside heat producers, heat distributors, and suppliers also participate in the Croatian heat market. At present 20 companies have obtained a license for the production of heat, while 15 companies obtained one for distribution and 21 companies for heat supply.

The three large district heating systems in Croatia are based in the cities of Zagreb, Osijek, and Sisak. The owner of these systems is HEP District Heating (HEP Toplinarstvo d.o.o. and HEP Toplinarstvo Sisak d.o.o.). The district heating system of Zagreb operates two central combined heat and power plants (including a new plant). In 2003, it supplied 1,578 GWh of hot water, 751 GWh of steam to customers and produced 1,735 GWh of electricity. District heating competes with natural gas as heating fuel. At the moment, market shares in Zagreb are about 35 per cent district heating, 35 per cent natural gas and 30 per cent other fuels[122].

In the rest of the country, district heating systems are run by separate enterprises (either owned by a municipality or under concession from the municipality), which ensure the supply and distribution of heat only, and any demand for steam is met independently by steam produced within industrial premises. Several towns in Croatia have individual block boilers, i.e. public heating plants but on a much smaller scale. In all district heating systems, district heat is delivered at the building level and building owners are responsible for the heat installations inside the buildings[122].

Due to the imminent structure of the district heating systems, no real competition exists between the 15 distribution companies. Customers can only choose between different heating sources but not between different district heating companies[125].

Heating tariffs

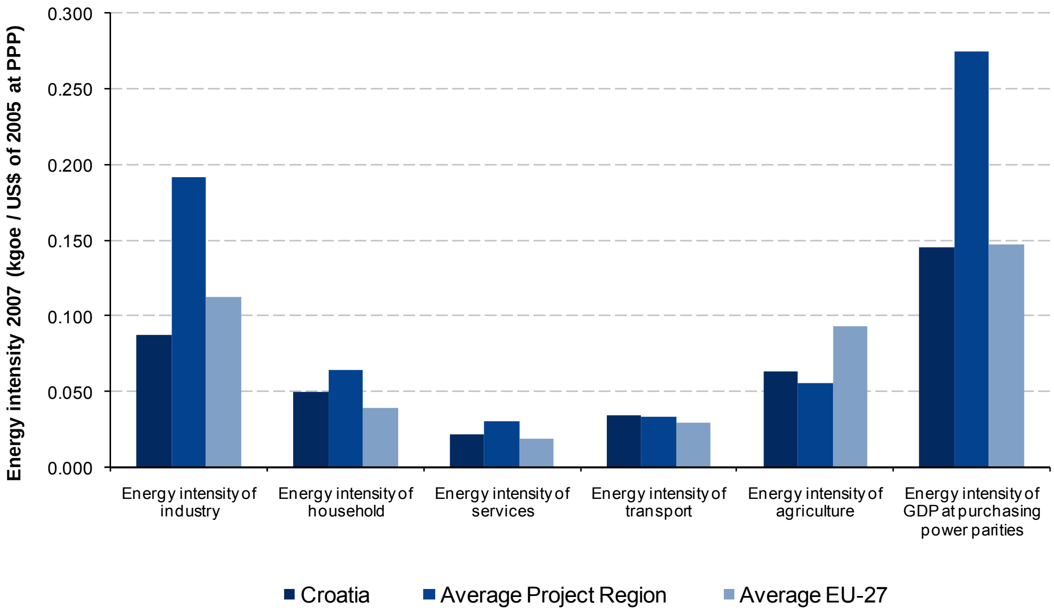
Prices for district heating include energy and demand charges. District heating prices are regulated in accordance with the Bill of Production, Distribution and Supply of Thermal Energy. Additionally the amount of tariff items of the different heating companies is determined within the Decision on the Amount of Tariff Items (OG 115/07)[123]. The heating tariffs are different for different customers (households and commercial) and cities (14 cities have district heating systems). In 2006, the average price of space heating in Zagreb was much cheaper than electricity at around 20 EUR/MWh. In 2005, district heating was still subject to cross-subsidies[122]. The exact figures per customer category can be seen in Table A 3.1.5

11.5.3. Current situation with respect to energy efficiency and future potential for energy savings and increase in efficiency

Energy intensity by consumption sector

The energy intensity of GDP at purchasing power parities for Croatia in 2007 is in line with the EU-27 average and significantly lower than the project region average (see Figure 11.56). The transport sector displays higher energy intensity than the EU-27 or project region average for 2007, whereas the one for the agricultural sector is slightly above the project region average but below the EU-27 average. The services and household sectors are both below the project region average but slightly higher than the EU-27 average for 2007[6].

Figure 11.56: Primary energy intensity at Purchasing Power Parity in 2007



Source: Enerdata[6] (2007)

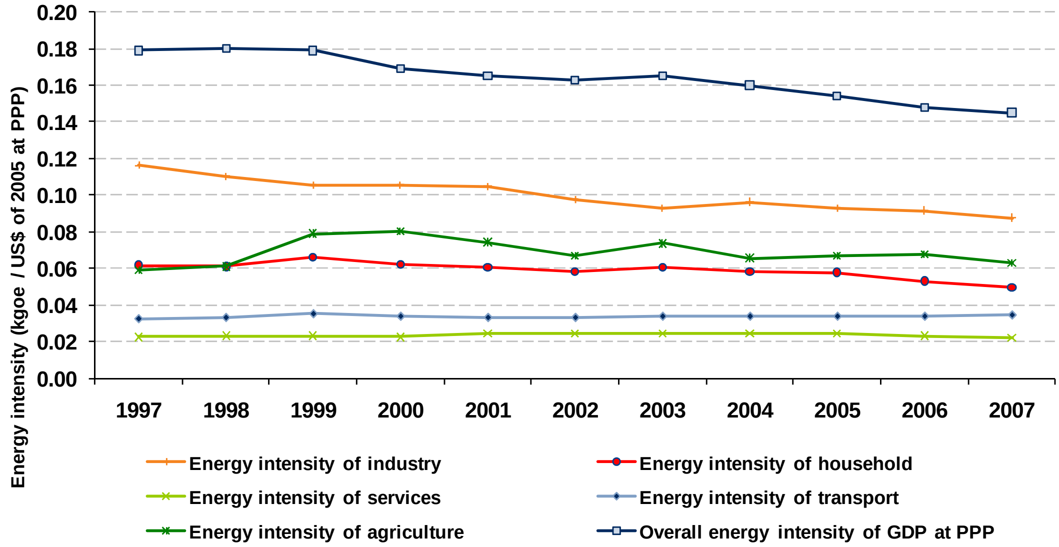
From 1997 to 2007 the energy intensity of GDP decreased by 20 per cent (see Figure 11.57). This decline can be partly attributed to an increased energy efficiency based on the creation of an energy efficiency fund and subsidies. Part of the decline can be attributed to the decrease in industrial output, as well as to climate effects such as warmer winters[125].

Despite a substantial decrease from the 1990 consumption levels, the industry is still a major energy-consuming sector in Croatia. Important energy consumers are the chemical and petrochemical industry, cement and lime production, non-metallic minerals and the food industry. Other important branches are shipbuilding, metal industry, electrical manufacturing, and textiles industries. Nevertheless, the energy intensity of the industrial sector decreased by 25 per cent in the past decade and is considerably lower than the EU-27 and project region averages for 2007[128]. In line with the overall decline in the industrial sector, almost all industrial sub-sectors experienced a decline in energy intensity levels, with exception of the transport equipment and construction sub-sectors[123].

The services and household sectors are both below the project region average but slightly higher than the EU-27 average for 2007. Both sectors enjoyed a decrease of energy intensity in the last decade (see Figure 11.57).

On the contrary, the energy intensity levels of the transport and agriculture sectors increased by around six per cent since 1997. The transport sector displays a higher energy intensity than the EU-27 or project region average for 2007, whereas the one for the agricultural sector is slightly above the project region average but below the EU-27 average[128].

Figure 11.57: Primary energy intensity in Croatia by sector at Purchasing Power Parity



Source: Enerdata[6] (2007)

Energy losses from electricity and gas grids

According to Enerdata, in 2006 losses on the Croatian transmission and distribution systems were estimated at around 16.5 per cent of total electricity production. However, according to the Energy Institute Hrvoje Požar, the electricity transmission losses amounted to 3.2 per cent and the distribution losses to 9.8 per cent for 2007[123]. The differences of the values provided by Enerdata and EIHP may be a consequence of different approaches, i.e. whether the losses are based on the final or the gross electricity consumption.

The main reason for the electricity losses derive from technical losses and losses due to unauthorized consumption on low voltage level. The situation improved considerably in the past years. This can be partially attributed to a special programme which was set up in 2007. The problem of customers not paying their bills was transferred from HEP to the Social Department of the Government, thereby partially reducing the unauthorized consumption.

The transmission losses in the gas sector account for 0.5 per cent and the distribution losses for 3.5 per cent. The losses can be attributed mostly to technical causes, i.e. gas leakage or to differences in measured and delivered amounts[123]

All final electricity and gas customers are provided with installed meters. The technologies in use are mainly conventional meters and remotely read meters. Additionally prepaid meters are being used sporadically[123]. Electricity, as well as gas customers can be disconnected from the grid in case of not paying their bills.

District heating

The existing district heating network of HEP District Heating in the three cities of Zagreb, Osijek and Sisak, is obsolete and poorly insulated, and major network sections are degraded or damaged. In addition, detection of leakages is difficult with current network design. This is causing major heat and hot water losses, which translate into higher bills to the customers. Losses on the steam network are also high due to declining industrial activity and the consequent uneconomic utilization of the steam supply capacity. The total heat losses on HEP network in 2004 accounted for 15.6 per cent of the production[129].

However, heat losses have been gradually reduced[122]. These improvements can mostly be attributed to the continuous improvement of the Zagreb heating network (e.g. pre-insulated pipes)[123]. According to EIHP the Government could propose that a certain amount of renewables as primary energy should be included in the supply of heat in order to improve the overall fuel efficiency.

Currently, the meters in use are metering the building as a whole. However, individual customer meters are being introduced gradually. Billing for district heating is based on metering at each heating station. The system includes approximately 2,000 heating stations. Depending on the type of connection to the grid, it is very difficult or almost impossible to disconnect individual customers from the district heating grid.

Other sources of inefficiency

According to the Energy Institute Hrvoje Požar the main sources for energy inefficiency in the industrial sectors are boilers, electromotors, pumps, and compressors. In the power generation sector the low efficiency of some thermal power plants can be identified as cause of inefficiency. The main causes for the low energy efficiency in the transport sector can be attributed to missing intelligent traffic control systems, low efficiency vehicles, and generally a low average number of passengers in cars. Regarding the housing sector, the following sources of inefficiency have been identified by EIHP: thermal insulation in buildings, heating systems (e.g. boilers), hot water production, ventilation and air conditioning, lighting, household appliances, and control and management[130].

Estimated potential for energy savings by sector

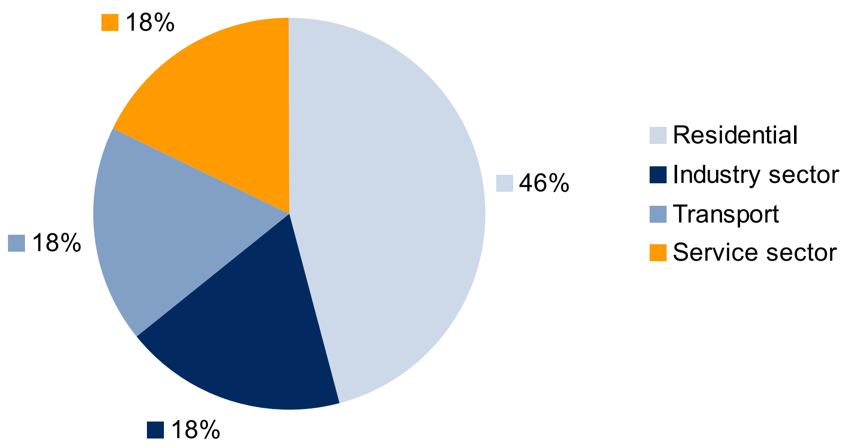
According to the results of the Industrial Energy Efficiency Network (MIEE) Programme, economically justified integral energy efficiency measures, with appropriate support, could achieve savings in thermal energy of about 6,000 to 8,000 TJ/year and about 500 GWh/year of electricity[122]. According to the First National Communication to the United Nations Framework Convention on Climate Change, the industry sector could save up to 7.5 per cent of electricity by improving electric motors[122].

EIHP estimates the energy saving potential for old buildings constructed before 1987 at more than 50 per cent of the final energy consumption by improving the thermal insulation and the heating system[123].

The energy saving potential for the transport sector is estimated to be 1.5 per cent per year for the period of 2010 to 2020 (based on the yearly energy efficiency index ODEX for the transport sector [kgoe/1000 EUR]). The main drivers for this improvement are according to EIHP the steady trend in energy efficiency achievements, the general dynamics of fleet replacement, changes in driving behavior, and the increasing public awareness in favor of promoting energy efficient transport modes[123].

According to the Energy Efficiency Masterplan for Croatia[130] the potential energy savings amount to 15,300 GWh. The repartition of these energy savings by sector are shown in Figure 11.58.

Figure 11.58: Potential savings by sector in per cent



Source: Ministry of Economy, Labour and Entrepreneurship[126] (2007)

ESCOs and other initiatives in energy efficiency

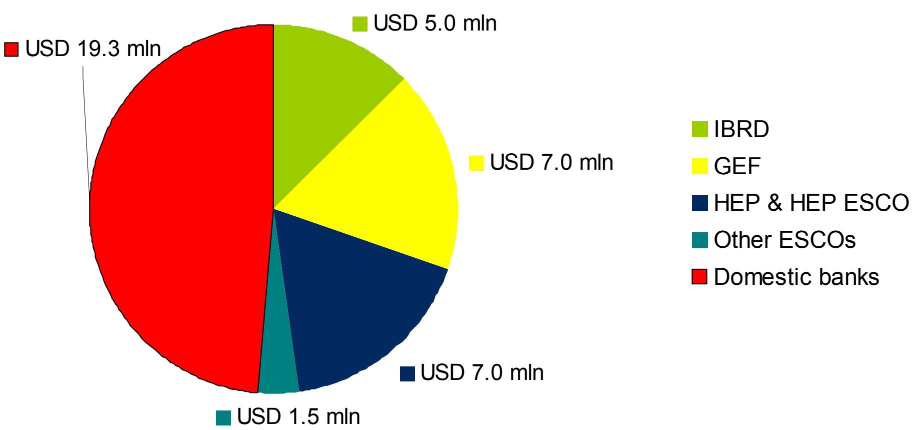
One of the opportunities for ESCOs in Croatia is the existence of a feed-in tariff for electricity from cogeneration. Depending on the size of the plant and the daily tariff category, electricity from cogeneration is purchased at a rate ranging from 20 to 80 EUR/MWh[131].

There are currently two Energy Service Companies (ESCOs) in Croatia:

- EETEK Holding Plc. is a private direct equity investment company active in the energy services business. The company is based in Budapest, with operations in Hungary, Slovakia, Bulgaria, and Romania. So far it has implemented one project in renewable energy sources (biomass) and one in energy efficiency (with ceramics manufacturer, initial investment of USD 0.7 million). Lack of energy efficiency regulation and administrative barriers are cited as main obstacles to investment projects. In Croatia, EETEK is looking for a project portfolio of up to USD 20 million per year where it would provide about 30 per cent of the investment[22].
- HEP ESCO d.o.o., a subsidiary company of HEP Hrvatska Elektroprivreda (HEP Group) is an Energy Service Company whose core business consists of preparation, financing, and implementation of energy efficiency projects on a commercial basis[132].

  The company was founded in April 2002 with the aim of becoming the key creator of the market for energy efficiency projects in Croatia and began operations on 1 September 2003. In a wider context, HEP ESCO is the implementing agency for the Energy Efficiency Project Croatia, which was initiated by the World Bank and the Global Environment Facility in cooperation with HEP and the Croatian Bank for Reconstruction and Development (HBOR). For this purpose HEP ESCO received a loan from the World Bank in the amount of EUR 4.4 million and a grant from the GEF in the amount of USD seven million, which is being used over a period of six years for the technical assistance, preparation of feasibility studies and for procurement of some equipment and works needed for the implementation of energy efficiency projects on end user sites. The total value of the project, with participation of domestic banks, is estimated to be USD 40 million over a six-year period, i.e. from 2004 to 2010[133]. The total amount – divided by its origin – foreseen for the Energy Efficiency Project Croatia, is listed in Figure 11.59. In 2008 HEP d.d. received a loan from the German Development Bank KfW in the amount of EUR 50 million, of which EUR ten million were allocated to HEP ESCO[134].

Figure 11.59: Financial resources provided for the Energy Efficiency Project in Croatia



Source: Lučić, G. & Fanjek, J. (2004)[135]

The European Energy Service Initiative – European Energy Service Awards declared HEP ESCO the best European energy service provider for energy efficiency projects for the year 2007.

HEP ESCO's number of employees has steadily grown from seven employees in 2003 to 18 in 2007.

Customers of HEP ESCO services are end users of electricity and heat energy, in both private and public sectors. Project partners are consulting, design, and engineering firms, small and medium enterprises, equipment manufacturers and contractors, and domestic commercial banks.

Energy efficiency projects (ESCO projects) are implemented on the basis of an Energy Efficiency Implementation Contract concluded between HEP ESCO and each client. The contract specifies the investments of the ESCO, mainly modernization or reconstruction of existing plants or buildings, with the aim of improving the efficiency of the energy use. Usually the investment is being paid back through cost savings resulting from energy savings. HEP ESCO finances the project completely or partly, depending on the investment amount and savings to be achieved. Depending on the project type, HEP ESCO assumes the risk of the investment and guarantees the savings to be achieved over the investment payback period. Savings are measured through a pre-set procedure for verification of savings. The average project values are in the range of EUR 100,000 to two million, while the total amount invested in energy efficiency projects from 2003 to 2008 was HRK 83 million[134]. An extract of HEP ESCO's energy efficiency projects, which amounted to 195 as of 2008, is shown in Table 11.10.

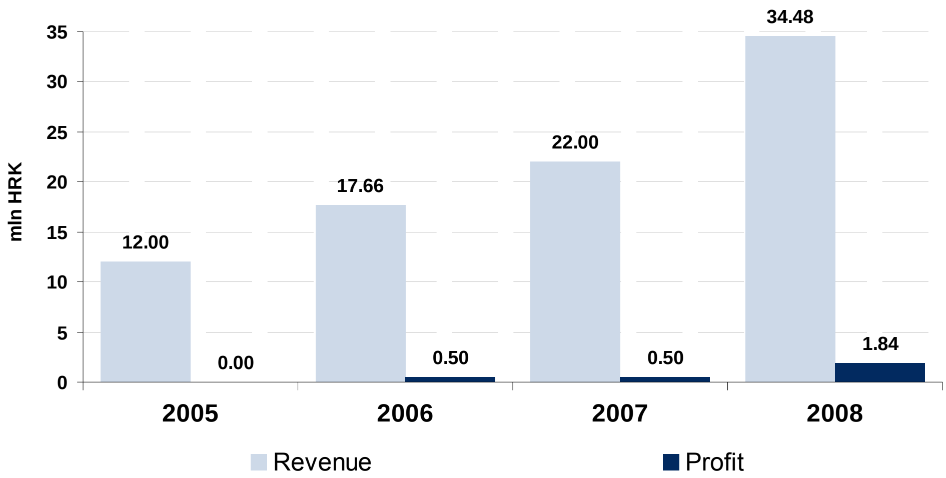
Table 11.10: Extract of energy efficiency projects of HEP ESCO

Project / Client	Project description	Year	Volume
Zagreb's public lighting Pilot Project (Zagreb)	Modernization of some streets in Zagreb with total energy savings of 47.3 per cent of electricity consumption	2006	HRK 5 million
Heating in schools (Sisak)	Modernization covered three schools. Scope of work covered installation of energy saving light bulbs, installation of boiler automation, and replacement of fuel oil with gas and hot water central system, and installation of valves with thermostatic heads	2007	HRK 5.1 million
General Hospital Dr. Ivo Pedisic Sisak	Modernization included changeover of the hospital's heating system from extra light fuel oil to the district heating system of the city of Sisak	2007	HRK 7.5 million
Sladorana Zupanja (Sugar Factory Zupanja)	Modernization included the reconstruction of the Factory's power supply, reconstruction of generators, installation of new presses and controls of electrical motor and the utilization of condensates	2007	HRK 5.1 million

Source: KfW[132] (2009)

HEP ESCO's revenues have been growing steadily over the years and reached USD seven million in 2008 (HRK 34.475 million), while since 2006 HEP ESCO has managed to achieve a profit every year (see Figure 11.60).

Figure 11.60: Revenue and profit of HEP ESCO

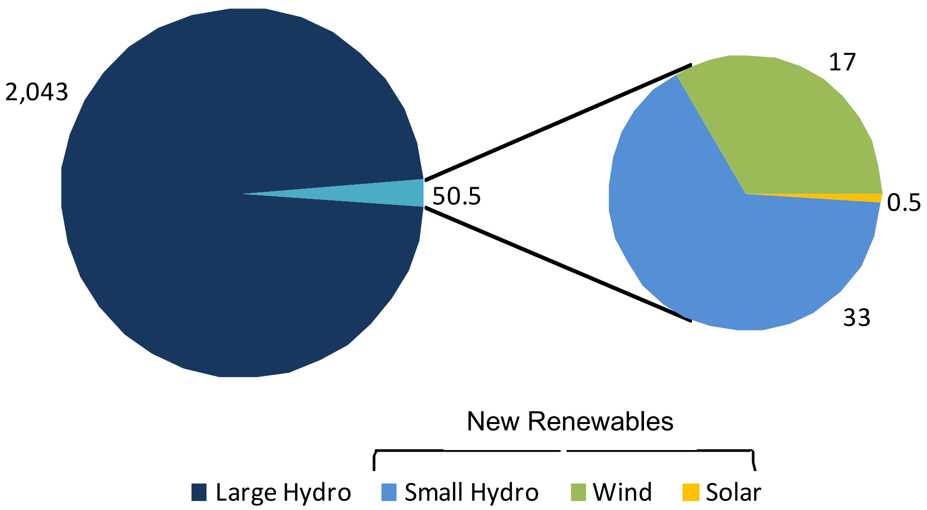


11.5.4. Current situation with respect to renewable energy sources and future deployment potential

Deployment of renewable energy sources

In Croatia the share of renewable energy sources of the domestic electricity generation reached about 36 per cent in 2007 (4,279 GWh). This is achieved mainly by a significant number of hydroelectric power plants in the country. Total hydropower installed capacity was 2,075 MW in 2006, dominated by large hydro power plants, with hydropower generation accounting for 4,236 GWh in 2007. The Croatian wind sector has seen a large expansion in recent years, reaching 17.2 MW of total installed capacity in 2006, coupled with a generation level of 35 GWh. As of July 2009 two additional wind power plants have been connected to the power grid: WPP Vrataruša (Senj) – 42 MW and WPP Orlice (Šibenik) – 9.6 MW. WPP Vrataruša was connected at the end of 2008, while WPP Orlice in spring 2009. Both are still in probe operation. Other renewable energy sources have a low significance in the country's power generation; however, as a secondary legislation package has been approved for the support of renewables, the chances of increases in these areas are high[22]. The future share of wind in the overall generation of renewables is stipulated to be 70 per cent. More than 122 projects have been announced to the Ministry of Economy, Labor and Entrepreneurship in this regard[136].

Figure 11.61: Installed renewable capacity (in MW) from renewable energy sources in Croatia (2007)



Source: Ministry of Economy, Labour and Entrepreneurship[126] (2007)

The total heat production classified by energy sources is listed in Table 11.11. It should be noted, however, that no reliable data exists, which would enable the determination of the installed heat capacities of solar collectors. Therefore the stated figure for solar heat production is just an estimation[126].

Table 11.11: Heat generation from renewable energy sources in 2007

Type of renewable energy source	Heat production (TJ)
Solar	26
Biomass	13,380
Geothermal (space heating)	140
Geothermal (hot water preparation)	563

Source: Ministry of Economy, Labour and Entrepreneurship[126] (2007)

The total amount of the solid and liquid biofuel production for 2007 can be seen in Table 11.12. It has to be noted, however, that due to the construction of new biodiesel plants the total Croatian biofuel production capacity increased to 29,000 tonnes per year by the end of 2007[126].

Table 11.12: Solid and liquid biofuel production in 2007

Solid biofuels	Production	Unit
Wood pellets	41,000	t
Wood briquettes	27,475	t
Charcoal	5,985-6,235	t/year
Firewood	1,450,600	m^3

Liquid biofuels	Production	Unit
Biodiesel (total)	4,334	t
Domestic rapeseed	1,300	t
Collected waste cooking oil	320	t
Imports	2,714	t

Source: Ministry of Economy, Labour and Entrepreneurship[126] (2007)

Estimated potential for renewable energy sources

There is a high potential for wind power development in Croatia. Currently, research is being carried out on the potential construction of wind farms of a total installed capacity of about 1,500 MW; however, in order to maintain the secure operation of the electricity system it is very likely that only some of these projects will be realized[22]. According to EIHP, the wind energy potential is estimated at 23,000 GWh per year. Due to the high profitability of the wind power plants, mostly based on the feed-in tariffs, at present more than 5,000 MW of new wind capacity are being considered for development. It has to be noted, however, that the transmission grid can accommodate at present a maximum capacity of around 360 MW. Additionally, the wind sector is facing a legal barrier, since wind mills cannot be constructed on islands or within a radius of one km around the coast line. Due to this barrier, most of the planned wind parks are located onshore[125].

Croatia has significant potential for biomass and geothermal energy, with 50 PJ of total energy biomass potential and 48 MW potential capacities in the case of geothermal energy. The most important source of biomass for energy is wood from forestry and wood processing industry. Additionally, agricultural residues have a significant energy potential in the eastern part of Croatia, as well as in the coastal region. HEP Renewable Energy Sources is currently conducting two pre-feasibility studies for two biomass power plants. It is planned to generate 50 MW by using 400,000 t of wood biomass, which will be sourced locally from the Croatian forest company Hrvatske šume[137].

The potential for additional hydropower utilization is of 177 MW for small hydropower plants leading to an annual output of 568 GWh[22]. In total 699 potential small hydro sites have been identified[123]. The overall technical potential from hydropower is estimated to be ten TWh. 60 per cent of this potential have already been tapped at present. However the remaining four TWh of annual output, are firstly thought to be less economically attractive and secondly face restrictions due to environmental concerns.

Although the solar potential in Croatia is relatively high, due to favorable conditions in the coastal region, the potential has not been employed thoroughly so far. The main reasons for the very limited use of solar energy are the lack of public awareness and lack of financing support.

Use of solar thermal systems in tourist facilities was noticeable before 1990. However, many systems were poorly maintained and replaced after 1995. Without governmental support, use of solar thermal power was focused on small private projects. With financing programmes issued by some counties in 2008 and 2009, the situation has been improving[123].

Due to its high cost, use of photovoltaic energy is mainly focused on autonomous systems. Its use in grid-connected systems increased slightly with the introduction of the renewable energy sources legislation in 2007, but is still low[137].

Croatia intends to expand domestic biofuel production and provides continuous education and expert support to farmers[138].

Projects and initiatives in renewable energy sources

The market for renewables is experiencing a high activity and is generally fragmented. One recent local start-up is HEP Renewable Energy Sources, a subsidiary of HEP, which has been set up in 2006. Many small local developers are conducting the required pre-feasibility studies and undergoing the subsequent approval process, but are planning to sell their final projects to foreign investors such as Verbund, BEWAG or Acciona[137].

11.5.5. Institutional, regulatory and policy framework for energy efficiency and renewable energy sources

Policymakers in the energy sector

Institutional policymakers

The main ministries in charge of energy policy in Croatia are listed below.

- The Ministry of Economy, Labor and Entrepreneurship (MoELE) is responsible for energy issues and has a dedicated division for renewable energy and energy efficiency issues. MoELE monitors energy management, initiates, supports, and monitors energy efficiency programmes, and covers the development of the legislative framework encompassing energy efficiency and eco-design;
- The Ministry of Environmental Protection, Physical Planning and Construction (MoEPPPC) is the responsible entity in the field of energy performance of buildings, except for the part relating to inspection of boilers and air conditioning systems in buildings, for which the competence lies with MoELE.

Other policy involved institutions are the following.

- The Croatian Energy Regulatory Agency (HERA) prepares methodology and tariff systems; licences for carrying out energy activities (energy permit); rulings on granting the status of eligible producers (eligible producer decision);
- The Croatian Energy Market Operator (HROTE) performs activities of organizing the electricity market as a public service under the supervision of HERA;
- The Energy Institute Hrvoje Pozar (EIHP) prepares energy sector development studies, forecasting and planning; advice to the Government on energy market restructuring and legislation; tariff studies; studies in the district-heating sector; electric transmission and distribution system analysis and planning, and various activities in the framework of energy efficiency and renewable energy sources;
- The Environmental Protection and Energy Efficiency Fund plays a key role in financing the preparation, development and implementation of projects in the field of energy efficiency, renewable energy, and environmental protection.

Regulatory and administrative institutions at the regional and local level

Direct renewable energy or energy efficiency project financing by the 20 Croatian counties is possible, since they dispose of budget autonomy. In 2008 for instance, the county of Sisacko-Moslavacka supported the installation of solar thermal collectors. Financial incentives amounted to 20 per cent of the investment and installation costs (max. EUR 1,370)[123].

While most procedures related to energy efficiency and renewable energy sources are centralized and implemented on a national level, some projects can be started and realized at lower levels. Such kind of projects are mostly regulated and implemented by the regional agencies on the county level. There are several agencies supported by some of the 20 Croatian counties: North-West Croatia Regional Energy Agency (REGEA), Medimurska County Energy Agency (MENEA), Regional Energy Agency Kvarner (REA Kvarner), Regional Energy Agency North (REA North), Regional Energy Agency of Istarska County, and the Development Agency of Varazdinska County (AZRA). These agencies are mainly engaged in projects in the public sector.

Energy policy and regulatory framework

The Energy Law approved in 2001 defines measures to ensure a secure and reliable energy supply, efficient power generation, and its use. It addressed equally the enforcement of regulations in the energy sector, regulates carrying out energy activities based on market principles or pursuant to public service obligation, and other key issues relevant for the energy sector[22].

The principal objectives of Croatia's energy policy are stated in the Energy Sector Development Strategy adopted by the Parliament in 2002 for the period of ten years. On the basis of the Strategy, a National Energy Programme (PROHES: Programme of Development and Organization of Croatian Energy Sector) has been developed. It was launched to develop an energy management framework that will promote clean technologies, shift to fuels with lower carbon contents (natural gas), diversification of energy resources, higher energy efficiency and renewable energy sources utilization, demand-side management, energy savings development of energy markets, and environmental protection.

By 21 April 2009 the Ministry of Economy, Labour and Entrepreneurship published the Croatian National Energy Strategy in form of a white book. This white book is based on subsequent discussions of the earlier publication of the green book. Evaluations of energy intensities of three different potential energy sources have been conducted. At present, it is still not clear which energy sources should be focused on. Additionally, very concrete targets and methodologies regarding renewables and energy efficiency have been set. The share of renewables of the overall consumption has been set to 20.1 per cent for 2020[127]. The relevant Energy Sector Laws are listed in Table 11.13.

Table 11.13: Relevant energy sector laws in Croatia

Publication	Name of the legislation
Official Gazette 68/01, 177/04 and 76/07 and 152/08	The Energy Act
Official Gazette 177/04 and 76/07	The Act on the Regulation of Energy Activities
Official Gazette 40/07, 152/08 and 83/09	The Gas Market Act
Official Gazette 56/06	The Oil and Oil Derivates Market Act
Official Gazette 42/05	The Act on the Production, Distribution and Supply of Thermal Energy
Official Gazette 177/04, 76/07 and 152/08	The Electricity Market Act
Official Gazette 152/08	The Act on Efficient Utilization of Energy in Final Consumption
Official Gazette 76/07	The Physical Planning and Building Act

Source: UNECE[22] (2009)

In accordance with the Law on Electricity Market, all customers with an annual consumption above 20 GWh and all customers directly connected to the transmission system are eligible consumers who have a free choice of a supplier. The market has been progressively opened: Since 1 July 2006, for the consumers with consumption above nine GWh/year, since 1 July 2007 all industrial and commercial consumers are eligible, and since 1 July 2009 all consumers including households are eligible. Production of electricity and supply to eligible customers shall be carried out as market activities, while the electricity supply to tariff customers, transmission and distribution of electricity,

electricity supply, management of the electricity supply system, and the organization of the electricity market shall be performed as public services. There is regulated third-party access to the transmission and distribution networks being under the responsibility of the Transmission System Operator and Distribution System Operator (TSO/DSO) for contracting on transmission/distribution network use.

Policy and regulation on energy efficiency

In Croatia, the implementation of the regulation regarding energy efficiency is the responsibility of two ministries: Ministry of Environmental Protection, Physical Planning and Construction and Ministry of Economy, Labour and Entrepreneurship[123].

The Croatian Energy Efficiency Legislation is primarily based on the Energy Act (Official Gazette 68/01, 177/04 and 76/07 and 152/08), which is the key legal act regarding energy efficiency, since it treats energy efficiency as a national interest and sets the basis for the establishment of the Environmental Protection and Energy Efficiency Fund (established in 2004)[130]. It is later followed by the Act on Efficient Utilization of Energy in Final Consumption (Official Gazette 152/08). The relevant secondary legislation acts are listed in Table 11.14.

Table 11.14: Relevant secondary legislation regarding energy efficiency in Croatia

Publication	Name of the legislation
Official Gazette 113/08, 89/09	Ordinance on the requirements and criteria to be met by energy auditors and energy certifiers of buildings
Official Gazette 113/08, 91/09	Ordinance on energy certification of buildings
Official Gazette 110/08	Technical regulation on heating and cooling systems of buildings
Official Gazette 110/08, 89/09	Technical regulation concerning energy economy use and thermal production in buildings
Official Gazette 76/07	Construction and Physical Planning Act
Official Gazette 129/06	General Conditions of Thermal Energy Supply
Official Gazette 36/06	Grid Code for Power System
Official Gazette 14/06	General Conditions of Electricity Supply
Official Gazette 135/05	Ordinance on Efficiency Requirements for New Hot-water Boilers Fired by Liquid and Gaseous Fuels
Official Gazette 135/05	Ordinance on Energy Efficiency Requirements for Electric Refrigerators, Freezers and Combinations thereof
Official Gazette 133/05	Regulation on Energy Efficiency Labeling of Households Appliances
Official Gazette 79/05, 155/05 and 74/06	Technical Regulation Concerning Energy Economy and Heat Retention in Buildings
Official Gazette 79/05	Technical Regulation Concerning Heat Energy Savings and Thermal Protection in Buildings
Official Gazette 158/03	Act on Technical Requirements for Products and Conformity Assessment

Source: UNECE[22] (2009) and EIHP[123] (2009)

According to EIHP, the newly drafted Energy Strategy stipulates an energy efficiency improvement of nine per cent of the annual final inland energy consumption (based on the average of the five years prior to 2008) in the period of 2008 to 2016[123].

In 2004, the Ministry of the Economy Labour and Entrepreneurship and the Ministry of Environmental Protection and Physical Planning of the Republic of Croatia established the Environmental Protection and Energy Efficiency Fund, which is a structured extrabudgetary fund which finances projects and activities in the areas of environmental protection, energy efficiency, and renewable energy sources.

The Act on Efficient Utilization of Energy in Final Consumption (Official Gazette 152/08) has been adopted in 2008. Additional policy documents regarding energy efficiency are still at a draft stage:

- Master Plan for Energy Efficiency (drafted in 2007);
- National Energy Efficiency Action Plan.

The Energy Efficiency Master Plan for Croatia (for 2008-2016 period) and the two other strategic documents, which are based on the former one, i.e. the Energy Efficiency Programme for Croatia (2008-2016) and the First National Action Plan for Energy Efficiency (2008-2010) are expected to be adopted by Government in the beginning of 2010[123].

The Physical Planning and Building Act (Official Gazette No. 76/2007) laid the legal bases for the adoption of the regulations of the EU Directive 2002/91/EC on energy performance of buildings[123].

The Physical Planning and Building Act states the significance of energy efficiency and introduces mandatory energy certification of buildings (from April 2010). The energy certificate will be issued on the basis of calculation data (EN 13790) and on the basis of energy audits. The certificates will be made available to a buyer or a leaseholder and will be issued by persons authorized for this purpose by the responsible ministry. Energy certification of buildings, i.e., their classification by energy consumption, is a huge novelty which will very likely facilitate the improvement of quality of construction and upgrading of the existing buildings[123].

Policy and regulation on renewable energy sources

The Government has started to reform the energy sector through secondary legislation, in order to push the share of total electricity consumption from renewable energy sources (other than large hydropower plants) presently from 1 to 5.8 per cent until 2010. The Energy Law, which was supplemented by five regulations (see Table 11.15), came into force in July 2007[22].

Table 11.15: Relevant regulations of the Energy Law of Croatia

Publication	Name of the legislation
Official Gazette 67/07	Ordinance on Acquiring the Status of Eligible Electricity Producer
Official Gazette 67/07	Ordinance on the Use of Renewable Energy Sources and Cogeneration
Official Gazette 33/07	Tariff System for the Production of Electricity from Renewable Energy Sources and Cogeneration
Official Gazette 33/07	Regulation on Incentive Fees for Promoting Electricity Production from Renewable Energy Sources and Cogeneration
Official Gazette 33/07	Regulation on the Minimum Share of Electricity Produced from Renewable Energy Sources and Cogeneration Whose Production is Incentivized

Source: UNECE[22] (2009)

At present the sub-laws regarding the production of heating and cooling from renewables are in the preparation phase. They should be drafted in the second quarter of 2010. So far, no national targets for the production of heating and cooling have been defined.

Regarding biofuels, the legislation is based on the Regulation on the Quality of Biofuels (Official Gazette, 141/05). The Act on Biofuels for Transport has been adopted in 2009 (Official Gazette, 65/09)[123].

The national indicative target of minimum share of electricity produced from renewable energy sources in the total electricity supply amounts to 5.8 per cent of the total electricity consumption by 2010 (excluding large hydro). A regulation on biofuel quality defines biofuels and sets a national indicative target of a 5.75 per cent share of biofuels in the total annual consumption of petrol and diesel by the end of 2010. This share of biofuels will gradually increase to ten per cent by 2020, according to the new Energy Strategy adopted by the Croatian Parliament on 30 October 2009.[139]

International commitments and current status of implementation

EU Regulation

Croatia ratified the Energy Community Treaty as a participating country in 2006. The treaty should ensure that Croatia adopts EU single market regulations regarding energy (the EU *acquis communautaire* in the relevant fields of Energy, Environment, Competition, and others). Building upon the South-East Europe Regional Energy Market for electricity and natural gas formed in the framework of the Stability Pact for South-Eastern Europe through the Athens Memorandum of November 2002, the Treaty foresees a full liberalization of the energy markets by 2015. The Treaty creates an institutional framework allowing for free transmission and trade of energy products, which should attract investors, improve security of investments, enhance energy supply and environmental protection, and encourage efficient use of energy and development of renewable energy sources. Croatia has for instance ratified the EU Directive 2002/91/EC on energy performance of buildings by adopting the Physical Planning and Building Act (Official Gazette, 76/2007)[123].

Kyoto Protocol

Croatia is a party to the UNFCCC as an Annex I country and to the Kyoto Protocol as an Annex B country. Croatia has ratified the Kyoto Protocol in April 2007. One of the commitments is the reduction of national greenhouse gas (GHG) emissions by five per cent over the commitment period 2008 to 2012 in comparison to the base year 1990, increased by a correction factor of 3,5 Mton of CO_2 equivalent[130]. The Ministry of Environmental Protection, Physical Planning and Construction is responsible for issuing letters of endorsement and approval of Joint Implementation projects. So far there are no Joint Implementation projects, because expected greenhouse gas emissions will be very close to the Croatian Kyoto limit (-5 per cent of GHG emissions compared to the baseline year). However, it will be necessary to implement significant measures regarding energy efficiency and renewable energy source in order for Croatia to satisfy current Kyoto obligations.

Larger emitters (with emissions above 30 tonnes of CO_2 per year) are only subject to a CO_2 levy. In June 2009 the government has adopted a National Allocation Plan and all listed facilities (81) will be obliged to participate in the system of monitoring, reporting and verification on emissions, which is going to start from 2010. The emission trading and interconnection with the EU ETS is planned as soon as Croatia will join the European Union[125].

The Regulation on implementation of the Kyoto Protocol flexible mechanisms (Official Gazette, 142/2008), i.e. the Joint Implementation projects, as well as the Regulation on greenhouse gas emission quotas and the method of emission allowance trading (Official Gazette, 142/08) were adopted in May 2008[125].

Other international commitments

Croatia has ratified the Energy Charter Treaty and its related Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects. Both entered into force in 1998 requiring Croatia to formulate energy efficiency strategies and policy aims, to establish appropriate regulatory frameworks, and to develop specific programmes for the promotion of efficient energy usage and the reduction of harmful environmental practices in the energy sector.

11.5.6. Economic incentives and financing schemes for energy efficiency and renewable energy projects

General investment climate in the country

Croatia benefits from the presence of a Trade and Investment Promotion Agency whose main task is to provide full service to investors during and after the implementation of their investment projects, to propose measures to enhance the business environment and to present Croatia internationally as a desirable investment location. The Trade and Investment Promotion Agency has four main divisions: Strategic Planning Division, Investors' Support Division, Export Support Division, and Public Private Partnership Division[140].

The Trade and Investment Promotion Agency aims to become a regional leader in attracting export orientated foreign direct investments which generate high added value and open new workplaces. This goals are tried to be achieved by the creation of a positive investment climate, the promotion of the Republic of Croatia as an excellent location for investments, the creation and maintenance of labor, real estate and entrepreneurship zones database, the organization of site visits, the support during implementation of investment projects and aftercare, and by providing support to Croatian exporters.

According to the Heritage Foundation[141], foreign and domestic investors are accorded national treatment. However, despite economic and administrative reforms, bureaucracy can inhibit economic activity and corruption remains a problem. There is steady pressure to increase transparency and fulfill commitments to adopt EU laws, norms, and practices. Croatia's constitution guarantees the free transfer and repatriation of profits and invested capital for foreign investments. Some capital transactions, such as inward portfolio investment, are subject to government conditions. To acquire property by means other than inheritance, reciprocity, or as an incorporated Croatian legal entity, foreign investors need approval from the Ministry of Justice.

Despite extensive reforms and external incentives in the framework of the European Union pre-accession process, Croatia is not perceived as having significantly improved its anti-corruption stance and was therefore awarded with a score of 4.4 by Transparency International's Corruption Perceptions Index for 2008, nevertheless ranking first from top within the project region[53].

Incentives for energy efficiency

Financial incentive schemes partly exist in Croatia at a national level, through annual tenders for supporting usage of energy efficiency and renewable energy sources, organized by the Environmental Protection and Energy Efficiency Fund. This is an extrabudgetary fund for financing projects, programmes, and measures for the purpose of environmental protection, energy efficiency, and the use of renewable energy sources in Croatia[22]. In 2008, it was planned to allocate EUR 13.7 million for projects and programmes of energy efficiency, renewable energy sources, sustainable building, cleaner transport, and education, research and development. The scheme for financing of physical persons is being developed and should start in 2010[123]. The fund can support up to 40 per cent of the total investment under the conditions shown in Table 11.16[22].

Table 11.16: Investment conditions of the Environmental Protection and Energy Efficiency Fund

Financing type	Conditions
Soft Loan	• <40 per cent of eligible costs and <EUR 230,000 • 0 per cent interest rate • Grace period of two years and payback period of 5 years
Interest subsidy	• 2 per cent below official interest rate
Grant	• For local or regional units grants of 40-80 per cent depending on the geographical location
Donation	• <EUR 27,000 for research and development, <40 per cent of total costs

Source: UNECE[22] (2009)

There are currently no tax incentives in place for energy efficiency projects.

Combined heat and power plants also benefit from a feed-in tariff varying from 20 to 80 EUR/MWh depending on the size of the plant and the time of the day[142].

Incentives for renewable energy sources

There is a feed-in tariff in place since 2007 for the generation of electricity from renewable energy sources. Feed-in tariffs are set according to the energy source generated from. Green electricity producers that have received a decision on acquiring eligible producer status from the market regulator are eligible for these tariffs[22].

Table 11.17: Feed-in tariff for electricity from renewable energy sources (in EUR/MWh)

Type of plant	< 1 MW	>1 MW
Solar power plant up to 10 kW	464	-
Solar power plant from 10 to 30 kW	409	-
Solar power plant above 30 kW	287	
Hydro power plant	94	57 - 94
Wind power plant	87	89
Solid biomass from forestry and agriculture	164	142
Solid biomass from wood-processing industry	130	113
Geothermal power plant	172	172
Biogas power plant	164	142
Liquid biofuel power plant	49	49
Water gas power plants and power plants using gas from water treatment plants	49	49
Power plants using other renewable energy sources (ebb and tide, waves)	82	68

Source: The Croatian Energy Market Operator (HROTE)[131] (2007)

Additionally the Croatian Bank for Reconstruction and Development (HBOR) offers support of up to 50 per cent of the total eligible costs for the preparation of documents and studies for renewable energy sources projects[22].

Financing mechanisms for energy efficiency and renewables

National financing mechanisms

On national level three financial instruments are available:

- The Croatian Bank for Reconstruction and Development (HBOR) offers credit lines for environmental protection, energy efficiency, and renewable energy sources projects. HBOR offers interest rates in the range of four to six per cent depending on the borrower[22];
- HEP-ESCO offers financing for energy efficiency at less than five per cent interest rate, with a maximum payback period of ten years for the governmental sector and five years for the private sector[22];
- The Croatian Energy Regulatory Agency (HERA) introduced a voluntary auditing programme for small- and medium-sized enterprises and small- and medium-sized industrial customers in 2008. The budget for the establishment of the scheme was EUR 30,000[126].

International financing mechanisms

On international level, there are two financing mechanisms[22]:

- The Global Environment Facility grant for energy efficiency projects development (executive institution: HEP ESCO);
- The European Bank for Reconstruction and Development activities in Croatia are diversified and investments are mainly made in infrastructure projects. The Bank sets an objective of promoting energy efficiency and focuses on infrastructure needed for security and diversity of supply, including renewable energy projects. In 2007 the EBRD signed a commitment to finance up to EUR 25 million of the Private Equity Fund dedicated to investments in energy efficiency and renewable energy sources projects in Central and South-Eastern Europe.

Commercial financing mechanisms

The Croatian Bank for Reconstruction and Development issues bank guarantees for energy efficiency projects. The bank guarantees for the energy efficiency projects are issued for the coverage of up to 50 per cent of total investments with a maximum of USD 300,000, while the estimated payback period has to be less or equal to ten years. Units of local and regional self-government, communal societies, commercial societies, craftsmen, and other physical and legal persons can apply for this type of guarantee[123].

The bank guarantee can be issued to following investments:

- The project must be a new investment aiming at improvement of energy efficiency in buildings, i.e. in heat sources, local heating systems, and heating networks where at least 50 per cent of the energy is used for space and water heating in buildings. Acceptable are also investments in infrastructure of units of local and regional self-governments as well as improvements in industrial processes;
- Greenfield projects, especially those that use the integrated concept of construction with reduced energy consumption and energy efficiency technologies provided that it is possible to determine the basis for savings calculations. One example for a loan application for such a greenfield project is the investor Strizivojna Hrast d.o.o, which requested a guarantee of HRK 46.9 million for the purchase of machinery and equipment for a cogeneration plant and the partial payment of contractors for the costs of building the cogeneration plant. The resulting energy efficiency improvements are expected to be 27 per cent.

Three commercial banks are included in the programme, i.e. Raiffeisen Bank Austria d.d., Zagreb, and OTP Banka Hrvatska d.d., Zadar and Privredna Banka Zagreb d.d.

Equity and mezzanine financing is used by investment groups and private equity funds that are active in the region but only on a relatively small scale[22].

Croatia has been making progress in the implementation of structural reforms: more than 90 percent of Croatian banks' assets are held by the private sector and the public regained confidence in the banking system after the 1998 banking crisis[121].

Other support mechanisms

The following support mechanisms are available in Croatia:

- The United Nations Development Programme energy efficiency project Removing Barriers for Improving Energy Efficiency of the Residential and Service Sectors, with two sub projects („Put Your House in Order“ and “A Systematic Energy Management in Towns and Counties”) aimed on increasing energy efficiency. The objective of the Systematic Energy Management sub-project is continual energy efficiency improvement and sustainable management of resources on a local and regional level[123].
- The World Bank jointly with the Croatian Development Bank, financed in 2005 the Renewable Energy Sources Project for Croatia aiming at reducing greenhouse gas emissions on a continuous basis by overcoming barriers to implementation of renewable energy. The project will achieve the objectives by: (i) overcoming the barriers to market development, including: (a) legal (e.g. lack of enabling policy and legal framework, inadequate planning capacity, unclear permitting, and licensing procedures, unclear land ownership); (b) financial (e.g. lack of understanding of renewable energy in banking and business community, lack of risk capital); and (c) technical (e.g. potential strain on transmission system). (ii) Providing assistance to confirm market potential, build knowledge and implementation capacity, streamline procedures, monitor compliance with minimum share targets, and inform the public. The overall investment loan amounted to USD 8.5 million.

11.5.7. Barriers to the implementation of energy efficiency and renewable energy projects

Box 5: Summary of barriers to the implementation of energy efficiency and renewable energy projects in Croatia

Legal, institutional and administrative barriers

1. Complex authorization procedures with no simplified procedures for the development of energy efficiency or renewable energy projects are reported to be cumbersome for local project developers.
2. The regulatory development has been conducted at a very high pace, which should be regarded as a positive factor to support project development, but at the same time this rapid legislative development creates problems for project developers to follow and comply with regulatory changes.
3. At the same time some existing legislation still needs a stronger degree of implementation, such as the building code, and the regulation on biofuels.
4. The absence of a centralized database for energy consumption in buildings as well as the absence of an adequate regulatory and legal framework for Energy Service Companies and public-private partnerships is a barrier for successful realization of energy efficiency projects.
5. Without massive investments in the expansion and the management of the electricity transport grid, the remarkable wind potential of Croatia is very unlikely to be exploited to the fullest.

Economic and financial barriers

6. One main barrier to the development of energy efficiency projects are capital constraints, i.e. high upfront costs and long payback periods.
7. The de-facto market monopoly of HEP in the power sector constitutes a barrier for new market entrants in the energy sector.

Lack of awareness, human capacities and professional skills

8. The abandonment of the project for the establishment of an Agency for Energy Efficiency and Renewable Energy Sources appears to be an indicator for lack of awareness on the relevance of reaching the targets for energy efficiency and renewable energy sources.
9. Commercial banks appear to have a rather low level of awareness of and expertise in energy efficiency and renewable energy projects, as these are – despite the availability of credit lines from the government and from international financing institutions – still considered to be “no business as usual”.

Legal, institutional and administrative barriers

During the analysis phase and based on the barriers identified during the previous UNECE assessment missions in the project regions, the following legal, institutional and administrative barriers could be identified for Croatia:

- Complex authorization procedures with no simplified procedures for the development of energy efficiency or renewable energy projects: the authorization procedures are reported to be cumbersome for local project developers. For the development of a renewable energy project for electricity generation, about 20 different permits are required (without consideration of various additional sub-permits); this implies also the requirement to provide duplicates of documentation to different ministries or institutional agencies and is aggravated by the lack of communication and coordination between the different ministries and between national and local institutions. Furthermore, in the case of renewable energy projects, the permit for use of project locations requires that all detailed information regarding equipment be already available at the permit request stage (which is most often not the case) and subsequent modifications of equipment are not allowed;
- Lack of coordination between governmental agencies involved in energy efficiency and renewable energy sources, with subsequent over-sophistication of procedures for policy definition, policy implementation, and project development;

- Legislative inefficiencies: in Croatia, regulatory development has been conducted at a very high pace, which should be regarded as a positive factor to support project development, but at the same time this rapid legislative development creates problems for project developers to follow and comply with regulatory changes, and subsequent uncertainties to invest. At the same time some existing legislation still needs a stronger degree of implementation, such as the building code, and the regulation on biofuels: a stronger focus on implementation of existing regulation rather than on development of new policies (as well as the definition of entities responsible for monitoring of implementation progress) would be necessary;
- Market inefficiencies: the de-facto market monopoly of HEP in the power sector constitutes a barrier for new market entrants in the energy sector; this situation might be worsened with the recent entry of HEP in the market for renewable energy project development: without adequate measures to stimulate market competition and support new market entrants, a quick consolidation of this dynamic market could take place;
- Another barrier specifically relating to the development of wind projects (but which could have significant effects on the implementation of the overall renewable energy policy of the country) is the current limited capacity of the transport grid to accommodate new wind power generation capacity: currently the grid capacity for new wind plants is estimated at a maximum of 360 MW, in front of an expressed interest of 5,000 MW. Without massive investments in the expansion and the management of the electricity transport grid, the remarkable wind potential of Croatia is very unlikely to be exploited to the fullest. Currently, EIHP is involved in a study exploring technical and economical preconditions on the power grid to accept greater capacity of wind power plants;
- Finally, for energy efficiency projects, a barrier for successful realization is the absence of a centralized database for energy consumption in buildings as well as the absence of an adequate regulatory and legal framework for Energy Service Companies and public-private partnerships.

Economic and financial barriers

- **Energy efficiency projects:** according to the recently developed Energy Efficiency Master Plan for Croatia, one main barrier to the development of energy efficiency projects are capital constraints, i.e. high upfront costs and long payback periods[130]. At the same time, however, several credit lines for energy efficiency are available in Croatia and many financial resources remain unused, pointing out the necessity of a further economic stimulation of the demand for energy services and energy efficiency projects;
- **Renewable energy projects:** a major economic barrier is certainly posed by the high upfront investment sums required, which are difficult to access for small independent project developers (especially under the current financial environment) and at the same time the fact that some institutional credit lines, such as the Croatian Environmental Protection and Energy Efficiency Fund, do not support projects for electricity production from renewable energy sources, since the refinancing mechanism through the feed-in tariff is considered to be a sufficient incentive;
- **Heat production and supply:** finally, in the case of heat generation and supply projects, a major barrier is constituted by the absence of a feed-in tariff or other equivalent economic incentive for heat production from renewable energy sources and/or the increase of efficiency in existing heat production and distribution assets. In particular, the presence of a feed-in tariff for electricity produced in cogeneration plants, while being beneficial to the development of this highly efficient technology, leads to the waste of the produced heat amounts, in absence of adequate economic incentives for heat utilization.

Lack of awareness, human capacities and professional skills

Besides legal, administrative and institutional barriers and, to a lesser extent, economic and financial barriers, lack of awareness and of human capacities for the preparation and the evaluation of bankable project proposals among the various stakeholders certainly represent barriers to the successful development of bankable projects:

- Government institutions: government institutions and policymakers do not seem to be entirely immune to lack of awareness on the relevance of reaching the targets for energy efficiency and renewable energy sources: the abandonment of the project for the establishment of an Agency for Energy Efficiency and Renewable Energy Sources (only a division within the existing Croatian Environmental Protection and Energy Efficiency Fund will be formed with the assignments previously intended for the new agency) appears to be an indicator of this tendency. Furthermore, while considering the need for new investments to cover the growing demand for energy, the Croatian Energy Strategy appears not to consider increase of energy efficiency as a valid measure to avoid investments in new generation capacity. Finally, an apparent low commitment of the Government to reach the Kyoto Protocol targets leads to weak commitment in the implementation of the related mechanisms, such as JI projects (within the country or with other Annex B countries), CDM projects (in neighbouring non-Annex B countries) or the implementation of a national emission trading scheme, which is still under development;

- Commercial banks and financing institutions: commercial banks appear to have a rather low level of awareness of and expertise in energy efficiency and renewable energy projects, as these are – despite the availability of credit lines from the government and from international financing institutions – still considered to be “no business as usual”. Additionally, the promotion of available funds specifically intended for such kind of projects among bank clients is virtually non-existent, leading to the case of available financing mechanisms remaining unused;
- Final customers: the lack of awareness among final energy consumers is (not only in Croatia) probably the highest hurdle to the realization of energy efficiency projects: the absence of an obligation to perform energy audits and the lack of information regarding ESCO business models for performance contracting have so far prevented private companies from developing energy efficiency projects. The planned obligation to perform energy audits and energy certification will be gradually introduced from April 2010 onwards and will hopefully bring an improvement of the situation. At the same time, Croatian energy customers seem in general to have a very low awareness regarding energy issues (e.g. the possibility to change supplier), which appears to be linked with the low level of competition in the Croatian energy market.

Besides lack of awareness, lack of human capacities to develop bankable energy efficiency project proposals also appears to be a major barrier for investments: while a training programme for energy auditors has been put in place recently by the Croatian Government, the need for energy auditors in buildings has been estimated in the Master Plan for Energy Efficiency at approximately 500 professionals and is therefore likely to be covered in the short-term. The education programme for energy auditors and energy certifiers for building sector has started in October 2009. EIHP is one of five education centers and approximately 70 experts were educated by EIHP. Around 500 certified experts will be educated by the end of March 2010.[130]

The absence of guidelines requiring the availability of adequate project development and project financing skills in public institutions involved in energy efficiency policies (such as ministries, Environmental Protection and Energy Efficiency Fund, large industrial associations, chambers of commerce, regional energy agencies, and municipal administrations) is another barrier to successful realization of bankable projects. The absence of such guidelines leads to a negative spiral in which aspirant professionals are not encouraged to start a carrier path in the sector of energy efficiency projects since they to not see sound employment perspectives in this sector.

11.6. *Kazakhstan*

11.6.1. Overview of economic situation

General demographic data

Ranked as the ninth largest country in the world as well as the world's largest landlocked country, Kazakhstan has a territory of 2,727,300 km² and a population of 15.396 million, of which 53 per cent is urban. The population density is 5.6 inhabitants per km². The population growth rebounded after being negative in the late 1990ies and was 1.14 per cent in 2007[143]. The capital was moved from Almaty (1,247,896) to Astana (550,438) on December 1997[144]. Further major cities include Shimkent (526,140), Karaganda (446,139), Taraz (336,057) and Pavlodar (304,809)[144].

Current political situation and outlook

Kazakhstan is a presidential republic. It has a bicameral parliament, made up of the lower house (the Majilis) and upper house (the Senate).

Kazakhstan has been ruled by Nursultan Nazarbayev, the current president and formerly the first secretary of the Communist Party of the Kazakh Soviet Socialist Republic, since its independence from the Soviet Union in 1991. Since 1995, Nazarbayev has been re-elected several times, the most recent presidential election being in December 2005[22].

The current Prime Minister is Karim Massimov, who has been nominated by President Nazarbayev to succeed Daniyal Akhmetov as Prime Minister on 9 January 2007. The ruling Nur-Otan party, which won the elections to the lower house of parliament on 17 August 2007 by 88 per cent, endorsed Massimov's candidacy and the Parliament confirmed the nomination on 10 January 2007[145].

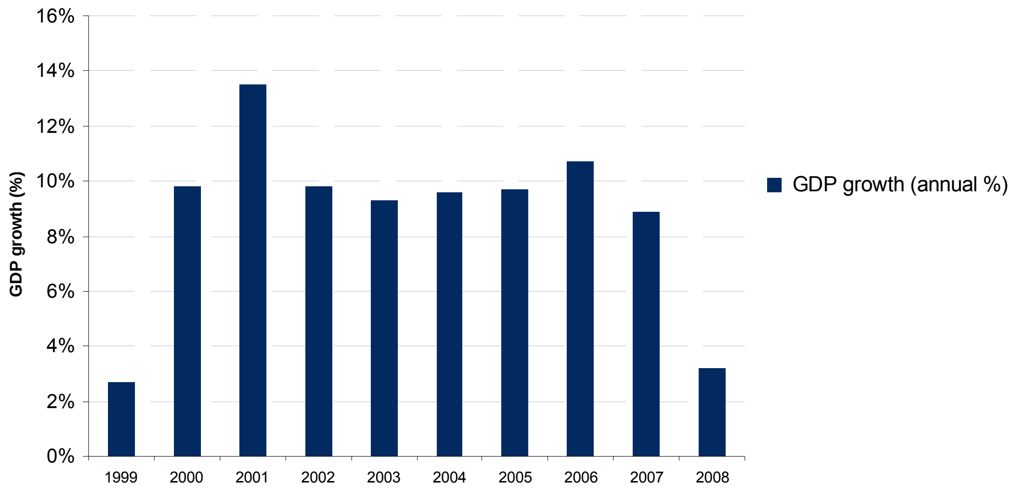
The next parliamentary elections will be held in 2011 (upper house) and 2012 (lower house), while the next presidential elections will take place in 2012.

Kazakhstan is administratively divided into 14 provinces, with two cities (Almaty and Astana) holding special status due to their republican significance, and the territory of Baykonur, which contains the space launch centre that is leased by the Russian Federation.

Gross Domestic Product

The economy of Kazakhstan is heavily concentrated on a few commodities, such as oil and gas, and faces the challenge of diversification. Oil extraction and oil-related construction, transport, and processing accounted for more than 16 per cent of GDP in 2004, and fuel and oil products made up 63 per cent of exports. Ferrous and non-ferrous metals and grains are the only other significant export products[146]. Nevertheless, Kazakhstan enjoyed a high gross domestic growth since 2000, averaging over nine per cent from 1999 to 2007 (see Figure 11.62)[143].

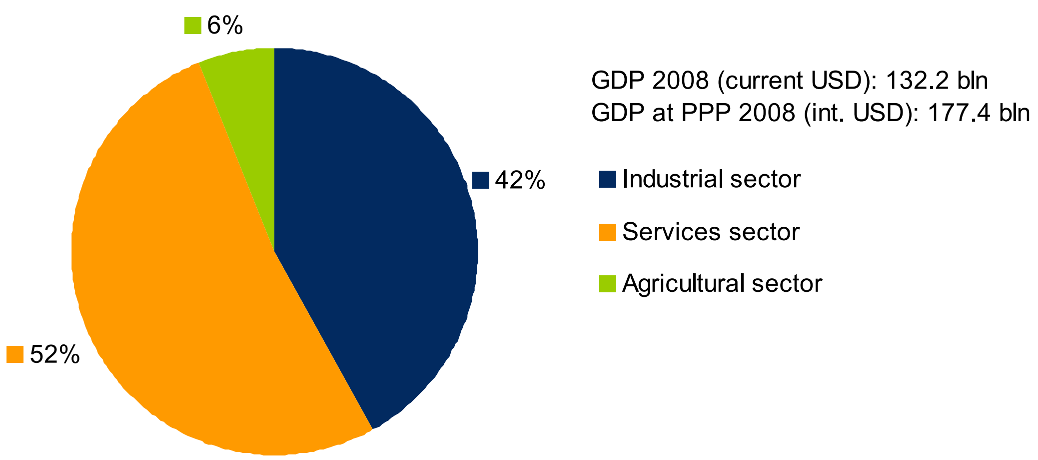
Figure 11.62: Real GDP growth of Kazakhstan



Source: World Bank[143] (2009)

The repartition of the GDP in 2008 can be seen in Figure 11.63. The Kazakh economy is strongly dominated by the industrial sector, which has a share of the GDP of 42 per cent, and is mostly focused on the following sub-sectors: tractors and other agricultural machinery, electric motors, and construction materials[143].

Figure 11.63: Repartition of the Gross Domestic Product in Kazakhstan in 2008



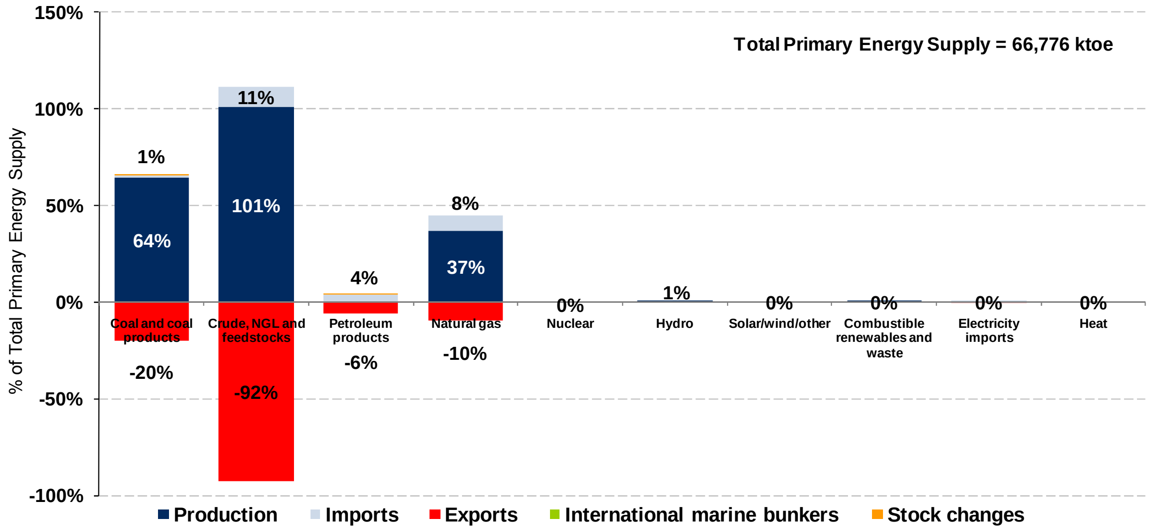
Source: World Bank[143] (2009)

11.6.2. Energy sector and development of energy markets

Energy supply

About 0.5 per cent of the world's mineral resources are located in Kazakhstan; this is equal to 90 billion tonnes of oil equivalent (toe). This amount includes 70 per cent of coal, 22 per cent of oil and oil condensate and eight per cent of gas. Kazakhstan is the second largest producer of oil and coal among the Commonwealth of Independent States countries after the Russian Federation. Kazakhstan has considerable reserves of oil and gas concentrated in its western part, which makes it one of the largest oil producing countries in the world[146]. Due to its vast fossil fuel resources (oil and gas), Kazakhstan is a net energy exporter with an overall energy export surplus of 12,496 ktoe of coal (29 per cent of national production), 54,633 ktoe of crude oil (81 per cent of national production), 1,167 ktoe of gas (5 per cent of national production), as well as petroleum products (1,414 ktoe), as shown in Figure 11.64[5].

Figure 11.64: Energy balance of Kazakhstan by primary energy sources in 2007



Source: IEA[5] (2009)

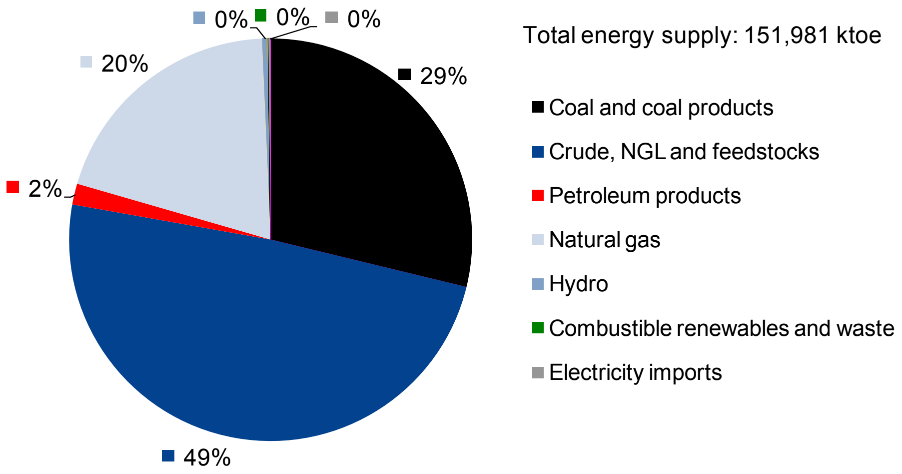
Kazakhstan's primary energy supply (the sum of national production and imports) and total primary energy supply in 2007 amounted to 151,981 ktoe and 66,776 ktoe respectively.

Fossil fuels cover almost 100 per cent of the country's energy mix. Coal, peat, and crude oil are the largest energy sources in Kazakhstan (78 per cent), while gas has a share of 20 per cent, as shown in Figure 11.65.

76,596 GWh of electricity were generated in Kazakhstan in 2007. Electricity generation is based on coal (70 per cent), gas (11 per cent), hydropower (11 per cent) and oil (eight per cent) as shown in Figure 11.65. Kazakhstan has the third largest electric power industry in the Former Soviet Union after the Russian Federation and Ukraine: 54 power generation plants with installed capacity of 18,981 MW, 88 per cent are thermal power plants (16,280 MW) and the rest are hydroelectric plants (2,220 MW). Close to 60 per cent (9,390 MW) of the total installed capacity is fired by coal from the Kazakh Ekibastuz coal mine, while another 20 per cent is fired by coal from three other coal deposits, i.e. Karaganda (8.1 per cent), Borly (9.5 per cent) and Semipalatingsk (1.6 per cent). Due to old and inefficient equipment (over 80 per cent of the installed conventional power plants are older than 20 years); only 14,617 MW of the total capacity can be utilized[147]. Presently the power plants of Kazakhstan have an installed capacity that can entirely meet the domestic demand, but due to the existing structure of electricity transmission and the state of the market, the South and West Kazakhstan regions import electricity and capacity from neighbouring states (2-3 per cent of the total electricity consumption)[146]. The electricity generation in Kazakhstan is characterized by a high concentration of production capacity (7,400 MW of thermal capacity at just three sites: Ekibastuz-1 (8 x 500 MW), Ekibastuz-2 (2 x 500 MW) and Aksu (8 x 300 MW) and a high share of cogeneration of electricity and heat for industrial and community use: 38 combined heat and power plants, 32 of which are in urban or suburban locations (38 per cent of the total capacity). The only nuclear reactor in Kazakhstan has been closed in 1999. However, the construction of a new plant in Aktau is expected to start in 2011. Currently the Kazakh energy company SAMRUK-Energy is planning to build jointly with South-Korean investors a 1,000 MW coal power plant in the Balkash region[148]. Furthermore, it is expected that by 2015 new gas power plants with a total capacity of 2,000 MW will be commissioned in the gas-rich region of Western Kazakhstan. Nevertheless, it is expected that by 2015 the overall decrease of the current power plant capacity will amount to 2,912 MW due to decommissioning of old power plants[147].

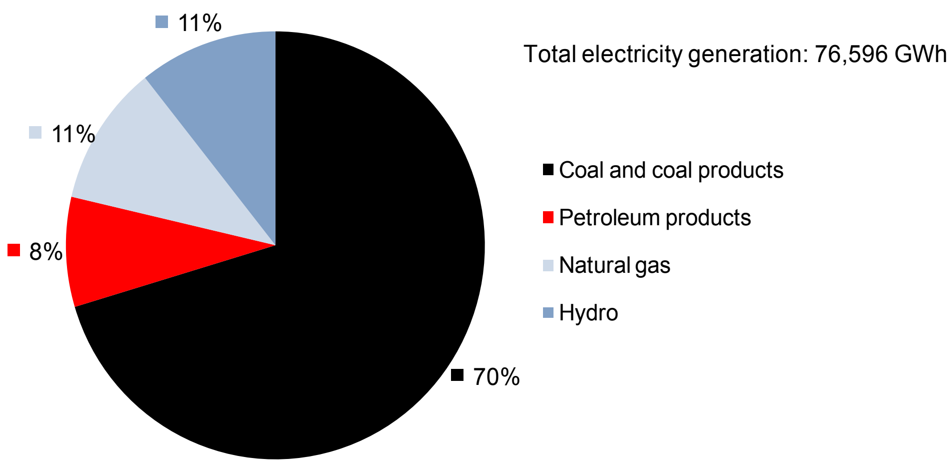
Coal represents the only source of commercial heat supply. As stated in the Energy Sector Development Programme until 2030, Kazakhstan is trying to base its heat supply on cogeneration where ever it is economically feasible and to rely on autonomous heating systems only where no cogeneration plants are available[146].

Figure 11.65: Supply of primary energy by sources in 2007



Source: IEA[5] (2009)

Figure 11.66: Electricity generation by sources in 2007

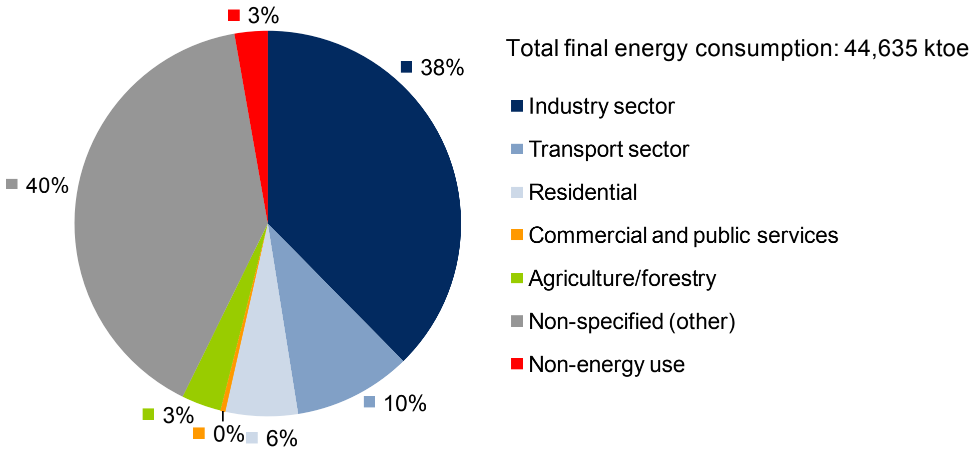


Source: IEA[5] (2009)

Energy demand

The industry sector is the largest consumer of primary energy with a share of 38 per cent of the total final consumption. The 40 per cent share of "non-specified" energy use, as shown in Figure 11.67 is partly due to the substantial fuel extraction activity of the country[6].

Figure 11.67: Total final energy consumption by sectors in 2007



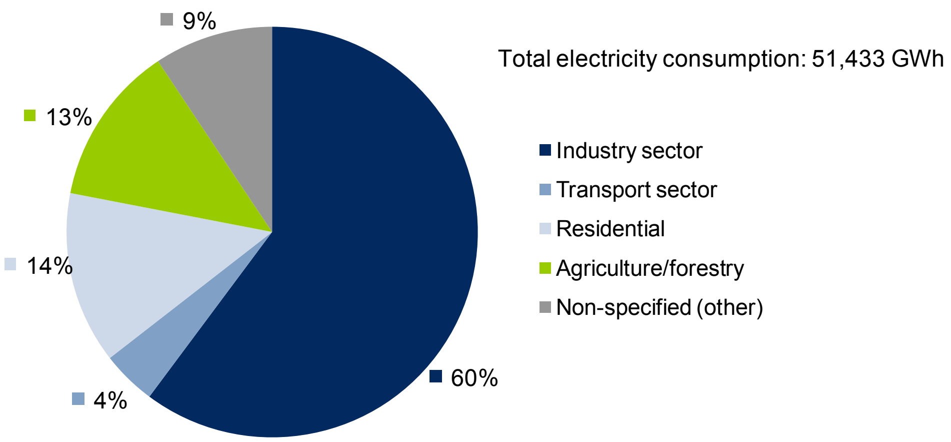
Source: IEA[5] (2009)

60 per cent of the electricity generation is consumed by the industry sector, 14 per cent by the residential sector, and 13 per cent by the agriculture sector, as shown in Figure 11.68 Despite a fall in industrial production rates, the share of industrial sector in the total electricity consumption remains high, with major shares of the fuel industry (owing to increased oil and gas production) and metallurgy (45 per cent of the total electricity consumption)[146].

The industry sector accounts for five per cent of the overall gas consumption in Kazakhstan, while the largest part is declared as non-specified (95 per cent), as shown in Figure 11.69. This non-specified consumption is based on the fact that natural gas in Kazakhstan is almost entirely associated gas, i.e. several oil fields re-inject significant quantities of gas into the ground to maintain crude wellhead pressure for liquids extraction. In the long term, when the liquids are exhausted, this gas can be recovered[149].

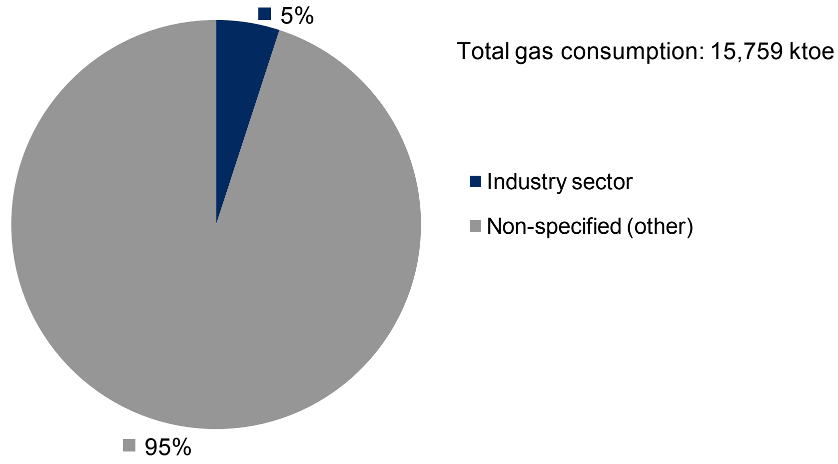
Heat demand is covered by the industrial (49 per cent) and residential (24 per cent) sectors. 26 per cent is non-specified (see Figure 11.70). Cogeneration power plants in Kazakhstan cover about 40 per cent of the domestic heat demand. The share of rural heat consumers (all sectors included) is around 30 per cent of the overall heat demand of Kazakhstan. This demand is being covered through burning of various fuels in heating boilers and small independent heating systems. Of the overall demand of urban consumers, 43 per cent are provided by cogeneration power plants, around 14 per cent by district heat boilers, and 43 per cent by independent heating systems and heating boilers[146].

Figure 11.68: Final consumption of electricity by sectors in 2007



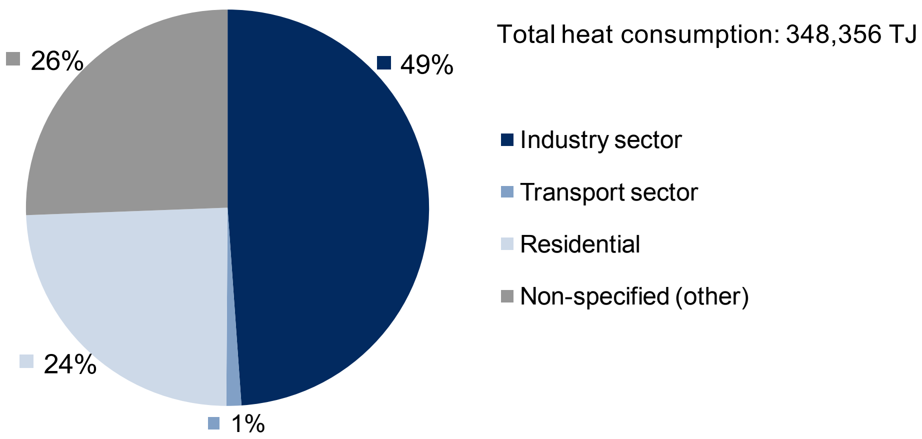
Source: IEA[5] (2009)

Figure 11.69: Final consumption of gas by sectors in 2007



Source: IEA[5] (2009)

Figure 11.70: Final consumption of heat by sectors in 2007



Source: IEA[5] (2009)

Energy markets

Electricity market

The Kazakh electricity sector underwent a reform of the ownership structure that started in 1996 with the adoption of the Programme for Privatization in the Electricity Sector (Government Resolution no. 663 of 30 May 1996). Based on this reform the former state-run company Kazakhstanenergo was reformed, i.e. the generation units mostly privatized, the distribution functions assigned to regional distribution system operators (REU), and the transmission functions consigned to the national transmission system operator Joint Stock Company Kazakhstan Electricity Grid Operating Company (KEGOC)[147].

The transmission grid provides electricity to large consumers directly connected to the high-voltage grid. Currently the region of Atyrau in the Western part of Kazakhstan is not connected to the national transmission grid[150].

The 21 regional distribution system operators (REU) maintain the distribution networks (< 110 kV) and perform transmission functions at the regional level[147]. Within one administrative, i.e. territorial region, only one REU may operate, i.e. the transmission and distribution functions within the regions are subject to monopoly.

Producers of electricity are independent power producers, or power plants owned by major industrial power consumers. 86.5 per cent of electricity generation has been privatized. Foreign investors active in Kazakhstan, include Inter-RAO from the Russian Federation, AES and Access Industries from USA[147].

The wholesale market for electricity trade has been established with around 15 licensed electricity traders active in Kazakhstan in 2008[147]. In the wholesale market, which is administrated by the market operator JCS KOREM, large industrial consumers and the regional distribution companies purchase electricity from power producers, industrial entities, or trading intermediaries[146].

Electricity tariffs

The government does not regulate prices for electricity, and consumers have free choice among providers of electric power. Wholesale electricity prices are determined by the market, which is administrated by the market operator JSC KOREM, transit prices by the Agency for the Regulation of Natural Monopolies, and end-use prices and distribution tariffs by local government committees, in particular Natural Monopolies Committee. The tariffs of the distribution system operators (REU) vary from region to region. In the Karaganda region (operated by Karaganda Power) the tariff (excluding VAT) is 13.2 EUR/MWh, while the tariff (excluding VAT) in the Aktyubinsk region (operated by Aktyubenergo) is considerable higher with 27.9 USD/MWh[147].

In general it can be noted that the electricity prices of Kazakhstan are among the lowest of the European and Asian members of the Energy Charter[147].

Currently, the Kazakh Government is discussing a new methodology for tariff calculation. The Kazakh Government has recently introduced a ceiling price methodology for a period of seven to ten years. Power plants will be classified into 13 groups of producers based on the plant type, installed capacity, type of fuel used, and the distance from the source of fuel supply. With the introduction of the ceiling tariff methodology a form of investment guarantee will be introduced[151]. Support programmes for low income households that would be most impacted by increased tariffs are also under discussion[22].

Gas market

There are three gas processing plants in Kazakhstan. The gas market in Kazakhstan is based on the model of the Fuel-and-Energy-Complex of the former Soviet Union into which it was meant to be integrated and as a consequence, the country, although being a net exporter, still imports significant amounts of its gas. International companies like Gazprom, ENI, and GP have participations in Kazakh gas companies, while the state has kept the control over the gas transmission network[146].

The gas industry in Kazakhstan has started its development only recently. As shown in Figure 11.64 Kazakhstan still has to import significant amounts of gas mainly from Uzbekistan, due to the fact that at present the gas from Western Kazakhstan cannot be transported to the Southern and Northern region of Kazakhstan due to a lack of pipelines. This situation is especially acute in the Southern region of Kazakhstan, i.e. around the former capital of Almaty, where the gas is being purchased from Uzbekistan at twice or thrice as expensive tariffs as the gas produced in the Western region of Kazakhstan.

The main gas transport routes are “Central Asia-Center”, “Orenburg-Novopskov”, “Soyuz”, “Bukhara-Ural”, and “Bukhara-Tashkent-Bishkek-Almaty” (BGR-TBA)[147]. Currently the Central Asia-Center gas pipeline, which connects the Western region of Kazakhstan with the Russian Federation, is being modernized in order to increase the throughput capacity from 54.8 billion m^3 to 100 billion m^3 annually.

Furthermore, Kazakhstan is actively involved a major regional construction project, i.e. the realization of the interstate gas pipeline project between Kazakhstan and China. Via a connection to the existing Beineu-Shymkent gas pipeline, Kazakhstan will supply gas from its Caspian deposits to Xinjiang in China. In April 2007, respectively July 2007, it was announced that Uzbekistan and Turkmenistan will join the original Kazakhstan-China gas pipeline. Construction works of the Kazakh section started on 9 July 2008 jointly by KazMunayGas and China National Petroleum Corporation (CNPC) and the first stage was finished in July 2009. The overall length of the pipeline is 1,818 km, of which 188 km are situated in Turkmenistan and 530 km in Uzbekistan. The project is expected to be finished by 2011 and will cost approximately USD 7.3 billion[147]. Furthermore it might be possible that a Transcaspian pipeline will be built, which will connect Kazakhstan and Turkmenistan to the planned Nabucco pipeline via Baku-Tbilisi-Erzerum[152].

Gas tariffs

Domestic gas prices in Kazakhstan are regulated by the State Agency for Regulation of Natural Monopolies. The prices cannot be changed more than once per calendar quarter (three months). Gas retail companies which seek a price change must apply to the agency for an official approval, which is not always granted. The agency also regulates gas storage and transport tariffs within Kazakhstan.

Kazakhstan's key distribution company, Kaztransgas Aimak, charges consumers in resource-rich Western Kazakhstan a distribution fee of 2.37 EUR/1000 m^3 whereas import dependent customers in Southern Kazakhstan pay as much as 14.01 EUR/1000 m^3. These tariffs are the same for individual and commercial consumers[22].

Heating market

Approximately 20 entities operate in the heat sector. In 2007, 45 per cent of the country's cogeneration plants connected to district heating systems were private, another 35 per cent were joint-stock companies with combined private and municipal ownership, and the remaining 20 per cent were fully owned by municipalities[153].

Heating tariffs

Heat and hot water tariffs are approved by the Agency for Natural Monopolies. Nevertheless, since there are social tariffs in place, the current heat tariffs are not always cost-covering, i.e. the full costs of production, transport, and distribution of heat and hot water are not fully covered[154]. Furthermore some district heating operators were forced to switch the fuel input, used for the cogeneration power plants, from coal to more expensive gas, due to restricted ecological requirement imposed by the Kazakh government. Nevertheless, these ecological requirements have not been priced into the heat and hot water tariffs at present, resulting in operating losses of the district heating facilities[147].

Sale tariffs for heat vary by regions with an average sale tariff for heat that ranged 6.3-23 USD/Gcal in 2004. There is, however, no variation in cost to different consumers[153].

Almaty City is supplied by three district heating companies. In 2008, the district heating tariff in Almaty was approximately 13 EUR/Gcal (2350 KZT/Gcal) incl. VAT. The tariff for domestic hot water was 1.1 EUR/m^3 (200 KZT/m^3)[22].

For buildings non-equipped with heat meters, billing is done on a square meter basis using a tariff methodology taking into account the type of building considered[153]. Currently, only 35 per cent of heating bills are actually based on consumption measurements.

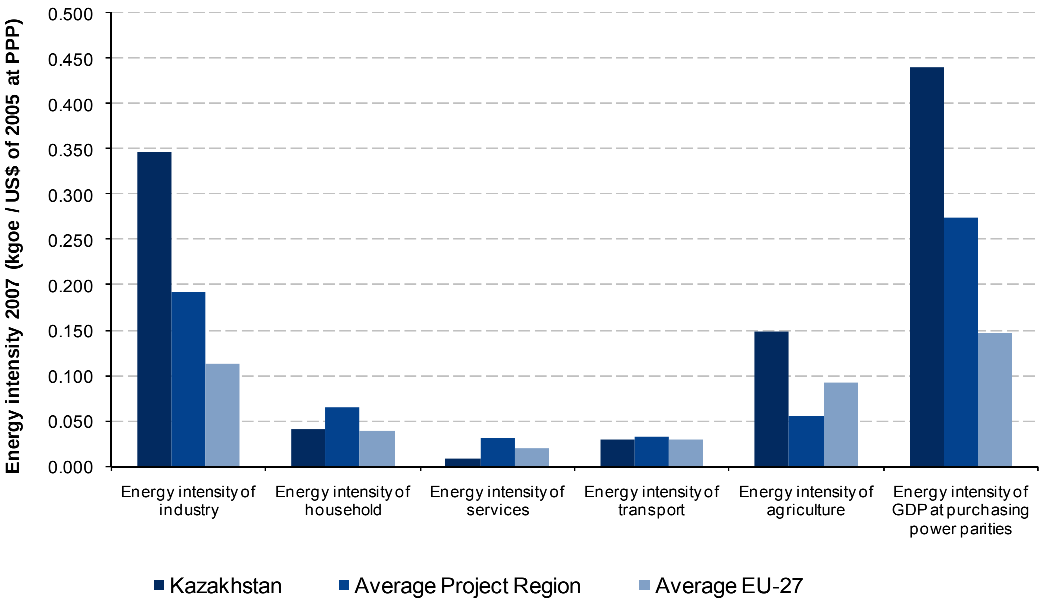
Around 75 per cent of the billed warm water is actually based on measurement[22]. Almaty city installs free water meters in low-income households[146].

11.6.3. Current situation with respect to energy efficiency and future potential for energy savings and increase in efficiency

Energy intensity

The energy intensity of the GDP at Purchasing Power Parity for Kazakhstan in 2007 is almost a triple of the EU-27 average and considerably higher than the project region average (see Figure 11.71)[6].

Figure 11.71: Primary energy intensity at Purchasing Power Parity in 2007



Source: Enerdata[6] (2007)

Kazakhstan has a very energy intensive industrial sector accounting for more than 60 per cent of the national electricity's consumption and around 40 per cent of the total energy consumption. In particular, the fuel and the metallurgy industries are large consumers[146]. Not surprisingly the energy intensity level for 2007 of the industrial sector is a triple of the EU-27 average and twice as much as project region average (see Figure 11.71). Notwithstanding the energy intensity level decreased by 50 per cent since 1997 (see Figure 11.72)[6].

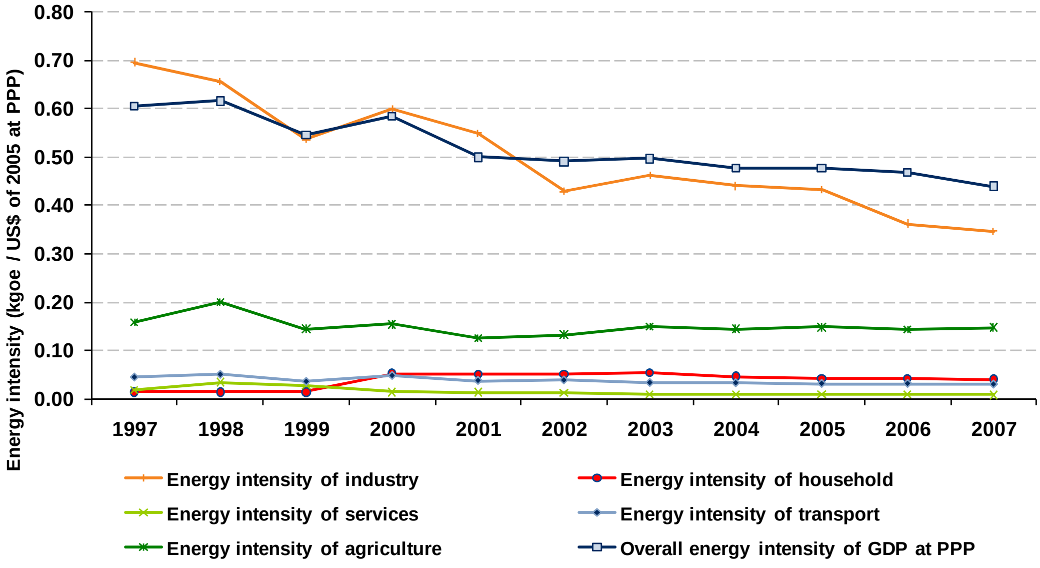
Although the energy intensity of the household sector increased by 190 per cent since 1997 (see Figure 11.72) it is on par with EU-27 average and lower than the project region average (see Figure 11.71). Heat losses in buildings in Kazakhstan are 50-60 per cent higher than heat losses in developed countries[146].

The services sector in Kazakhstan enjoyed a significant drop in its energy intensity in the past decade (see Figure 11.72) and is considerably lower than the two reference values (see Figure 11.71)[6].

The energy intensity of the transport sector decreased by 33 per cent since 1997 (see Figure 11.72) and is by now on par with the EU-27 and project region averages (see Figure 11.71).

Finally, although the agricultural sector decreased its energy intensity levels slightly by six per cent since 1997 (see Figure 11.72), it has been rising again in recent years and is articulately higher in 2007 than the two reference values (see Figure 11.71)[6].

Figure 11.72: Primary energy intensity in Kazakhstan by sector at Purchasing Power Parity



Source: Enerdata[6] (2007)

Energy losses from electricity and gas grids

The electricity losses from transmission and distribution in Kazakhstan vary from source to source: according to the PEREEA report, technical losses in the transmission and distribution grid are in the range of 15 per cent in Kazakhstan[146]. Seven per cent of the total losses can be attributed to transmission losses of the Transmission System Operator KEGOC, while the regional transmission and distribution losses vary from region to region. The smallest regional losses are attributed to Akmolinsk (4.5 per cent), while in the South of Kazakhstan the losses amount to 22 per cent[147].

The use of day-night electricity meters for households is low in Astana and Almaty and absent in some provinces[22]. For the purpose of energy efficiency it is planned to implement in all Kazakh regions sliding-scale daily electricity tariffs for enterprises. Furthermore, such sliding-scale tariffs for household consumers have been introduced in five regions. In total, about ten per cent of all individual consumers have been equipped with a multi-rate metering device[147].

District heating grid

In the towns with no combined heat and power plants, in villages and towns with low density of housing (usually one-, two and three-storey buildings) heat is supplied by furnaces, house or local heat boilers with a capacity up to 20 Gcal/hour or by district heat boilers of higher capacity. Most of these heating sources are of low efficiency (50 to 60 per cent); they have no treatment facilities and are often more than 20 years old. This share of heat consumption amounts to nearly 60 per cent[146].

Very limited funds have been spent on maintenance and renovation of the district heating system, and the investment needs are huge. The total heat losses in the distribution systems are about 40 per cent. Heat supply networks installed underground in non-accessible service ducts operate under varying conditions of temperature and humidity that contribute to corrosion processes. The service life of corrosion preventing and heat insulation coatings is two or three times less than designed. Above-ground installation is often impossible because of town-planning requirements[146]. Nevertheless, the mentioned situation varies from region to region. The heat losses in Astana for instance, amount to 16 per cent. This level has been achieved by installing new pre-insulated pipes, as well as introducing new frequency converters and control panels[155].

However, few residential consumers were disconnected from district heating, because of the lack of other heating alternatives. There is no natural gas supply infrastructure in the population centers in Kazakhstan; and consequently the district heating companies have no competitive pressure from natural gas suppliers[153].

Incidence of heat metering at building level varies widely from province to province. Heat metering and control at the household level is absent in Kazakhstan and only about ten per cent of multi-apartment residential buildings are equipped with heat meters[22]. Household warm water meters are very popular in Kazakhstan (77 per cent), as consumers discovered that installation of this relatively low-cost technology could substantially lower the water bill.

Other sources of inefficiency

Despite an overall 30 per cent reduction of the residential sector energy consumption between 1993 and 2003, the Kazakh residential sector still registers considerable heat losses (around 50 to 60 per cent higher than in developed countries)[146].

Estimated potential for energy savings by sector

The energy saving potential in the industry sector is high; the PEEREA report from 2006 estimated it at ten per cent of the consumption. This is related to the use of obsolete technologies and equipment. Currently, all industrial enterprises in Kazakhstan are property of private owners (both residents and non-residents of the Republic of Kazakhstan). Industrial companies are therefore interested in reducing their energy consumption and costs through better management and the implementing of more modern and efficient production lines[146].

ESCOs and other initiatives in energy efficiency

There is no Energy Service Company in operation in Kazakhstan, besides the Almaty City Energy Service Company to be established within the United Nations Development Programme/Global Environment Facility project Removing barriers to energy efficiency in the municipal heat and hot water supply. The municipal administration of Astana is considering the establishment of an Energy Service Company in Astana, analogous to Almaty, jointly with the UNDP[155].

11.6.4. Current situation with respect to renewable energy sources and future deployment potential

Deployment of renewable energy sources

Hydro is the only renewable energy source significantly utilized in Kazakhstan, contributing to 11 per cent of the total electricity generation and around 0.5 per cent of the total primary energy supply. Combustible renewable and waste account for around 0.05 per cent of the total primary energy supply of the country[5]. The share of renewable energy sources, excluding large hydro, is at present 0.3 per cent of the total electricity generation, out of which 90 per cent are provided by small hydro power plants[147].

Kazakhstan has well-developed machinery building industry, used mainly for military purposes in the Former Soviet Union. The Government of Kazakhstan tries to convert this industry to civil goods production. It has been estimated that in co-operation with western producers at least some of the former machinery plants could be converted to produce some components of wind turbines.

Estimated potential for renewable energy sources

Kazakhstan's hydro potential is estimated roughly at 170 TWh a year; while only 27 TWh are economically feasible and eight TWh of these are currently in place (7.8 TWh in 2007). The Electricity Development Programme until 2030 foresees the creation of 564 new and the rehabilitation of 14 hydro power stations: 38 large hydro power stations (larger than 30 MW) and 540 small hydro power stations. The total potential capacity of the 38 large hydro power stations is 3,296 MW, the output should be approximately 12 TWh. The total potential capacity of small hydro power plants is 2,412 MW, with an output of 11 TWh[146].

Kazakhstan has attractive opportunities to use wind energy, particularly in the Djungar Gate regions and in the Chilik corridor, where average annual wind speed is 7-9 m/sec and 5-9 m/sec respectively. Preliminary research envisages possibilities for installation of wind energy power stations with total capacity of 1,000 MW in the Djungar Gate region, and a slightly less in the Chilik corridor. The proximity of existing power lines, sound correlation between the windy season and growth in electricity demand creates the right conditions for effective use of these resources. Based on existing meteorological data, first platforms for construction of wind parks were specified in the Electricity Development Programme until 2030, as shown in Table 11.18.

Table 11.18: Expected capacity of potential wind power plants in Kazakhstan

Location	Potential capacity
Djungar	40 MW
Chilik	140 MW
Alakol	140 MW
Karoy	140 MW
Shengeldin	20 MW
Kurday	20 MW

Source: Energy Charter[146] (2006)

Total installed wind capacity could reach 520 MW, while the output is estimated at 1.8-2 TWh a year.

Kazakhstan is characterized by its significant solar energy resources. Annually, it receives 2,200-3,000 hours of sun, generating 1,300-1,800 kW/m² a year. This enables the use of solar water heaters and solar batteries, particularly portable photoelectrical systems on farms in agricultural regions.

According to the Electricity Development Programme, analysis of existing geothermal and biological resources shows little potential for energy generation until 2030. More appropriate is the utilization of geothermal energy for heat distribution and of biological resources for production of biogas with subsequent use for heating.

Projects and initiatives in renewable energy sources

The hydro power plants are being owned by private power generators, while the market for new renewable energy sources is still at an early stage. One project developer is for instance the Almaty Institute of Power Engineering and Telecommunication, which jointly with Russian partners, is active in the field of wind power generation[156].

11.6.5. Institutional, regulatory and policy framework for energy efficiency and renewable energy sources

Policymakers in the energy sector

Institutional policymakers

The ministries responsible for energy policymaking in Kazakhstan are listed below.

- The Ministry of Energy and Mineral Resources of the Republic of Kazakhstan is the main executive and coordinating body of the country's fuel and energy complex and ensures the implementation of the state energy policy. Among the functions of the Ministry is the elaboration of programmes for strategic development of the energy sector.
- The Ministry of Environmental Protection plays an important role in the state management of the energy sector and is responsible for climate change issues[157].

- Within the Ministry of Energy and Mineral Resources, the Committee of Governmental Energetic Surveillance is responsible for the technical supervision of the energy generation, transmission, distribution, and consumption. Furthermore the draft law on energy efficiency envisages that the committee will be the responsible government agency related to energy efficiency[158].

In addition to the ministries, the Agency of the Republic of Kazakhstan on Regulation of Natural Monopolies executes government regulation on tariffs, but is only responsible for the regulation of transmission and distribution tariffs (since only the regional distribution system operators and the transmission system operator are considered as monopolists), while the Ministry of Energy is responsible for the regulation of electricity production tariffs[159].

Non-institutional policy makers

The Kazakh Research Institute of Power Engineering is an institute which conducts research in the fields of power engineering in general and hydro power and heat-power engineering specifically. Furthermore, the institute has been contracted by the Government to develop a Governmental Energy Saving Programme. In June 2008 the institute established the Republican Energy Saving Centre to develop a part of this Programme[160].

Regulatory and administrative institutions at the regional and local level

Each of the fourteen Kazakh regions and the two equal cities, i.e. Almaty and Astana, have a separate budget. The raions, i.e. provinces, have no budget authority. Currently local authorities do not have the authority to grant privileges, such as tax privileges or exemptions, to enterprises or individuals, who implement energy efficiency technologies[147].

As of autumn 2009, regional and local departments have to develop their own energy saving plans for the upcoming five years[158].

Energy policy and regulatory framework

Restructuring of the electric power sector has been completed: the large majority of national power generating capacities has been privatized or placed under management of private companies. The National Electricity Grid has been formed and the open competitive market of electricity has been created. The transmission company remains state owned[146].

The governmental policy regarding heat supply is directed to privatization. As stated in the Energy Sector Development Programme until 2030, the development of centralized heating systems on the basis of cogeneration plants where it is economically feasible is one of the main directions of heating systems development.

The goal and the basic priorities of the development of the electricity sector are presented in the Programme for the Development of the Electricity Sector up to 2030 (adopted as a special Resolution of the Government of the Republic of Kazakhstan, April 1999). The principal strategic directions of the development of the sector are the creation of an integral power system of Kazakhstan; simultaneous operation with the integral power system (IPS) of the Russian Federation and the power systems of the Central Asian republics, further development of an open competitive power market, the improvement of the power generation structure by developing technologies using renewable energy resources, the reconstruction and modernization of the existing heating systems with combined generation of heat and electricity, as well as the implementation of modern autonomous high-quality sources of heat[22].

According to the Energy Sector Development Programme until 2030 it is envisaged to reduce the electricity production from coal to 60 per cent, compared to 70 per cent in 2006[160].

Furthermore the Law on Electricity was adopted in July 2004. Another basic act regulating electricity market is the Law on Natural Monopolies, which was last amended in December 2004.

Policy and regulation on energy efficiency

The current Law on Energy Savings in Kazakhstan came into force in 1997 but was never effectively implemented[22]. The State Energy Supervision Agency within the Ministry of Energy and Mineral Resources has the operational responsibility for the development of the new Law on Energy Savings. They have also been asked to evaluate and propose establishment of an Energy (Efficiency) Agency, within or outside the Ministry[22].

According to the Ministry of Energy and Mineral Resources, a new Law on Energy Savings is expected to be approved by the Parliament during the autumn of 2009[161]. As already mentioned, to support the development of the Law on Energy Savings, the Kazakh Research Institute of Power Engineering (KazNII Energetiki) has been contracted to develop a Governmental Energy Saving Programme[22].

Policy and regulation on renewable energy sources

Kazakhstan's Electricity Development Programme until 2030, adopted by the Government in 1999, names the utilization of renewable energy resources among the priority directions for the electricity sector development and environmental problems solving in the Republic of Kazakhstan. According to the Programme, total generation of electricity based on renewable energy sources (including hydro energy) in Kazakhstan has been 8.3 TWh in 1995, and it is projected to reach up to 9.8 TWh by 2015[146].

The Law "On support of the renewable energy sources use" has been adopted by the Kazakh Parliament by 4 June 2009. Based on this newly introduced law the regional distribution system operators are obliged to purchase renewable energy sources by qualified energy producers of renewable energy sources for the standard losses of electricity in their grids to the amount of maximum 50 per cent of their total losses. If this quota has been exceeded, the remaining electricity from renewable energy sources has to be purchased by the transmission system operator KEGOC for the compensation of the transmission losses[147].

International commitments and current status of implementation

EU Regulation

On 4 December 2006, the European Union and Kazakhstan signed a Memorandum of Understanding (MoU) on energy. The MoU outlines two road maps for cooperation on enhancing energy security and industrial cooperation. This will include regular exchange on information concerning their respective energy policies, cooperation on transport infrastructure of mutual interest, and the development of environmentally friendly clean technologies[162]. The last dialogue on energy between Kazakhstan and the European Union was held on 16 May 2009 in Brussels, without resulting in further commitments, besides discussing prospects of extension and deepening of their strategic partnership.

Kyoto Protocol

Kazakhstan signed the Kyoto Protocol in March 1999 as a non-Party to Annex I of the UNFCCC and a non-Party to Annex B of the Kyoto Protocol [7]. In April 1999, Kazakhstan stated its intent to accede Annex I to the United Nations Framework Convention on Climate Change. On 26 February 2009, Kazakhstan ratified the Kyoto Protocol and still aims at becoming an Annex I country. However, the reduction target foreseen by Annex B has not been determined yet. As a result of this ambiguous status, neither Clean Development Mechanism nor Joint Implementation projects currently represent good opportunities for investors in the country.

Other international commitments

Kazakhstan signed the Energy Charter Treaty and its related Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects. Both entered into force in 1998 requiring Kazakhstan to formulate energy efficiency strategies and policy aims, to establish appropriate regulatory frameworks, and to develop specific programmes for the promotion of efficient energy usage and the reduction of harmful environmental practices in the energy sector[14].

11.6.6. Economic incentives and financing schemes for energy efficiency and renewable energy projects

General investment climate in the country

Kazakhstan has an Investment Promotion Center, called KAZINVEST, which was established as a closed joint-stock company in 2000, fully-owned by the state and managed by the Ministry of Foreign Affairs on behalf of the Government of the Republic of Kazakhstan. The main aim of

KAZINVEST is to create an attractive investment image and a favorable environment for investors. Some of the services offered by KAZINVEST include the maintenance of information databases on projects which require financing, assistance to prospective investors and to domestic companies in the search of investors, provision of legal services on the whole range of issues in the area of investment activities, as well as providing support in the preparation of feasibility studies[163].

According to the Heritage Foundation[164], the Kazakh Government plays a large role in overseeing foreign investment. Screening of foreign investment proposals is often non-transparent, arbitrary, and slow. With the exception of investments in oil production or mining, rules on local content and local sources of financing vary from contract to contract. Furthermore, prospective investors may be obligated to train local specialists and contribute to the social development of the region. An unclear legal code, legislative favoritism toward Kazakh companies, and government interference in commercial operations further deter investment. Subject to restrictions, foreign exchange accounts may be held by residents and non-residents. Most capital transactions, payments, and transfers are subject to government approval, quantitative limits, and strict documentary requirements. The Investment Law of 2003 weakened protections related to expropriation and compensation and provides no clear guidance for either process. Finally, land ownership is restricted.

Contrary to other Eastern European or Central Asian countries, Transparency International's Corruption Perceptions Index score of Kazakhstan in 2008 continued to decrease and currently stands at a low 2.2, ranking it tenth from bottom within the project region[53].

Incentives for energy efficiency

Currently, there are no incentives for energy efficiency measures in Kazakhstan. Nevertheless, according to the draft law on energy efficiency, legal entities and individuals may be entitled to subsidies from the budget in case they[147]:

- Develop projects aimed at the reduction of the use of natural gas, heat and electricity;
- Develop alternative fuel sources;
- Develop and implement devices that are more energy efficient than standard devices.

Apart from these incentives the draft law also envisages penalties: enterprises, which have an energy consumption above 1,500 toe are subject to penalties. According to the draft law licensed energy auditors will be responsible for supervising the energy consumption of the enterprises[158].

Incentives for renewable energy sources

The Law "On support of the renewable energy sources use", which has been adopted by the Kazakh Parliament on 4 June 2009, envisages several incentives for the use of electricity from renewable energy sources.

Individuals and legal entities engaged in developing, constructing and operating facilities that use renewable energy sources may enjoy investment preferences under the legislation of the Republic of Kazakhstan on investment.

Furthermore, the law foresees that local executive authorities provide and allocate land plots for the construction of facilities using renewable energy sources. The law states that renewable energy sources facilities have to be connected to the nearest point of electric and/or heat networks of the energy transmission grid.

In addition, electricity from renewable energy sources shall enjoy priority in dispatching of electric power generation facilities. Finally, as already stated in section 4.2.6.5 "Policy and regulation on renewable energy sources" the regional distribution system operators are obliged to buy in full the volume of electricity produced by renewable energy sources in order to compensate up to 50 per cent of their transmission or distribution losses. In case this amount has been exceeded, the national transmission system operator will have to purchase the electricity from renewable energy sources for covering its transmission losses[147]. The above mentioned incentives apply only to renewable energy sources power plants with a capacity below 35 MW[161].

The law does, however, not foresee the establishment of a feed-in tariff for electricity from renewable energy sources. The tariffs for electricity from renewable energy sources are established bilaterally between the respective project developers and the Ministry of Energy and Mineral Resources. Consequently, the tariffs will vary from project to project[165].

Financing mechanisms for energy efficiency and renewable energy projects

National financing mechanisms

There are no specific energy efficiency or renewable energy sources funds available at the national level. Nevertheless, in 2003 the government of Kazakhstan introduced the Programme of Industrial and Innovation Development in order to promote long-term sustainable economic growth in Kazakhstan. This Programme sets priorities for the development of the manufacturing industry, new science-intensive and high technology production, up-to-date infrastructure and information technology, innovative small businesses, science, and education.

As part of the Programme, a State Investment Fund has been established for government financing of the highest priority projects, particularly those related to infrastructure development. Furthermore, a State Innovation Fund has been established, that will mainly participate in financing promising scientific research in the field of engineering, including applying it to production. The mentioned funds apply to all economic sectors, i.e. also to the energy sector. Nevertheless, no concrete projects in the field of energy efficiency or renewable energy sources have been undertaken so far[160].

International financing mechanisms

In July 2003 Kazakhstan launched its first solar energy project in Almaty, funded by United Nations Development Programme and the Canadian International Development Agency (CIDA). As part of the initial scheme, 1,500 residents are to benefit from the Programme.

The European Bank for Reconstruction and Development launched the KAZSEFF Sustainable Energy Financing Facility in Kazakhstan[22]. During the period of 2008 to 2011, KAZSEFF will provide long-term loans to enhance the modernization process of the industrial sector and to support the development of renewable energies in Kazakhstan. The Facility consists of two components: a USD 75 million financing facility for on-lending to industrial enterprises through local partner banks; and a technical assistance grant to support companies in the identification of energy loss areas, propose technical solutions for lowering energy consumption, and prepare bankable projects. KAZSEFF is designed for privately owned industrial companies, both medium sized and larger scale enterprises in Kazakhstan. Under this facility typical energy efficiency investments range from USD 250,000; the maximum loan amount for any one company (for one or several energy projects) should not exceed USD seven million. Prospective clients are mostly contacted via the database provided by two local partner banks as well as by contracts provided by governmental, as well as non-governmental associations. The first step of each project is the eligibility and creditworthiness check, while in a second stage the technical and financial appraisals are being conducted. At a final stage the final credit assessment, the credit decision and the loan disbursement follow. Currently over 50 projects are in the pipeline, while six projects have already been chosen for project implementation. The projects include the set-up of biogas facilities, which will use the manure from chicken, as well as the replacement of thermal generation equipment[166].

Furthermore the Clean Technology Fund (CTF) is active in Kazakhstan. CTF is a multi-donor Trust Fund within the World Bank 's Climate Investment Fund (CIF) and has been established in July 2008. It aims to support the rapid deployment of low-carbon technologies on a significant scale, with the objective of cost-effective reductions in the growth of greenhouse gas emissions. As of 15 April 2009, the total amount pleged to the CTF is USD 4.7 billion. As of today no funds have been disbursed yet, but investment plans have been prepared for Egypt, Mexico, and Turkey. Besides the World Bank, also the EBRD and the International Finance Corporation (IFC) act as trustees of the CTF. Together with the EBRD and the IFC, the World Bank has recently conducted a fact finding mission in Kazakhstan. The World Bank envisages having an investment plan for Kazakhstan by September 2009. Nevertheless, prospective projects can only be conducted with the support of the Kazakh government[167].

Commercial financing mechanisms

On a commercial basis, no specific funds for energy efficiency or renewable energy sources projects are currently available. Kazakh commercial banks may lend loans to enterprises, which for instance replace their out-dated equipment by energy efficient equipment, but do not operate specific credit lines dedicated to energy efficiency or renewable energy sources.

Furthermore, Kazakh banks are currently reluctant to finance long-term projects (> 5 years) due to a lack of funding. Before the international financial crisis, Kazakh commercial banks used to secure funding via issuing international bonds abroad. At present, the only funds available are the deposits of customers[168].

Other support mechanisms

The technical and financial experts of the KASZEFF Financing Facility provide free-of-charge consulting services for investing companies to substantiate the investment proposals to partner banks. If applicable the consulting team conducts energy audits and feasibility studies, gives recommendations on the planned measures and supports the companies in preparing bankable energy efficiency and renewable energy projects. KAZSEFF is being implemented by a consortium of international and national companies comprising MVV-Decon and GFA Consulting Group from Germany, as well as the Novosibirsk Energy Center from Russia.

The EBRD is currently supporting the Kazakh government with the development of the energy efficiency legislation. Furthermore the EBRD is supporting the government with the development of the secondary legislation related to the Law "On support of the renewable energy sources use"[169].

The EBRD also supports small- and medium-sized enterprises with management and technical consulting services through its Business Advisory Service (BAS) Project, while the Turn-Around-Management Programme (TAM) offers the services of senior advisors for management teams.

The United Nations Development Programme launched a programme, called Removing barriers to energy efficiency in municipal heat and hot water supply (2007-2011), including three main components: (1) Strengthening the legal, regulatory, and institutional framework to promote energy efficiency of the heat and hot water supply services in Kazakhstan; (2) Enhancing the awareness and building the local capacity to implement and adopt new institutional and financing mechanisms for organizing energy efficient heat and hot water supply services, and leveraging financing for them; (3) Compiling, analyzing and disseminating the project experiences and lessons learnt and initiating their effective replication in Kazakhstan and in other countries. An Energy Services Company is being established within Almaty City as a part of this project[22].

Besides the above mentioned programme, the UNDP has been monitoring a Wind Power Market Development Initiative (2004 to 2008) with the objective to promote the development of the wind energy market in Kazakhstan by: (1) assisting the Government to formulate a National Programme on Wind Energy Development; (2) providing information for and building the local capacity to develop wind energy products in Kazakhstan, and to organize financing them (including site "mapping" and expansion of the wind speed measurement programme); (3) facilitating construction of the first five MW wind farm to prepare ground for and reduce the risks of further investments; and (4) monitoring, analyzing and disseminating the experiences and lessons learnt during the implementation of the project[170].

11.6.7. Barriers to the implementation of energy efficiency and renewable energy projects

Box 6: Summary of barriers to the implementation of energy efficiency and renewable energy projects in Kazakhstan

Legal, institutional and administrative barriers

1. Despite the efforts made by the Government to support a positive environment for foreign investments, international observers point out administrative restrictions for foreign investments.
2. There is currently neither a national nor a municipal energy efficiency agency in place.
3. The Law on Energy Savings of 1997 has never been set into force and there are neither targets nor any action plan for energy efficiency.
4. Energy efficiency and the deployment of renewable energy sources have a moderate role in the National Energy Programme of Kazakhstan.
5. There is no national authority in charge for the technical policy of the district heating systems, which are in dire need of rehabilitation.

Economic and financial barriers

6. There are no provisions for the establishment of national or municipal funds or budgets.
7. Energy efficiency incentives are envisaged by the draft law on energy efficiency, however several sources expressed their concern that effective energy efficiency incentives might not be introduced due to the current financial crisis.
8. Incentives for renewable energy sources have been introduced recently by the adoption of the new Law on Renewables, however the introduction of project based tariffs for electricity from renewable energy sources might open the door to discrimination and corruption.

Lack of awareness, human capacities and professional skills

9. The huge availability of natural resources has so far prevented the public administration and the final customers in Kazakhstan to develop an awareness on the relevance of energy efficiency and renewable energy projects.
10. On a commercial basis, no specific funds for energy efficiency or renewable energy sources projects are currently available. Furthermore, Kazakh banks are currently reluctant to finance long-term projects (> five years) due to a lack of funding.

Legal, institutional and administrative barriers

Several legal, institutional, and administrative barriers could be identified in Kazakhstan.

- Despite the efforts made by the Government to support a positive environment for foreign investments, international observers point out administrative restrictions for foreign investments as well as a diffused corruption, which appears to have an increasing trend;
- A non-rational use of energy infrastructure, still linked to the structure of the former Soviet Fuel-and-Energy Complex, which implies that huge energy amounts are exported and then reimported from neighbouring countries; furthermore, the electric system operates in an non-integrated way and is not synchronized with the Russian electric system, thus preventing the exploitation of economic and infrastructural synergies between the countries;
- Increase in energy efficiency and in the deployment of renewable energy sources appear to have a moderate role in the National Energy Programme of Kazakhstan;
- The Law on Energy Savings of 1997 has never been set into force and there are neither targets nor any action plan for energy efficiency. Furthermore, there is neither a national nor a municipal energy efficiency agency;
- There is currently neither a national strategy on the development of district heating in place, nor a national authority in charge for the technical policy of the district heating systems;
- The uncertain state of Kazakhstan regarding the Kyoto Protocol (which has been ratified only at the end of February 2009) has so far prevented the development of CDM and JI projects.

Economic and financial barriers

Incentives for renewable energy sources have been introduced recently by the adoption of the new Law on Renewables. Furthermore energy efficiency incentives are envisaged by the draft law on energy efficiency. Nevertheless the situation is unclear at present. The introduction of project based tariffs for electricity from renewable energy sources might open the door to discrimination and corruption. Additionally, the right of connection to the grid and the subsequent connection fees have not been clarified. Furthermore, several sources expressed their concern that effective energy efficiency incentives might not be introduced due to the current financial crisis. There are no provisions for the establishment of national of municipal funds or budgets. Kazakh commercial banks, despite being active in the energy sector, have currently no ongoing activities in the sectors of energy efficiency and renewable energy sources.

Lack of awareness, human capacities and professional skills

The huge availability of natural resources, in particular fossil fuel, has so far prevented the public administration, the financial sector, and the final customers in Kazakhstan to develop an awareness on the relevance and also on the potential benefits from energy efficiency and renewable energy projects.

11.7. *Republic of Moldova*

11.7.1. Overview of economic situation

General demographic data

The Republic of Moldova has a surface extension of 33,846 km^2 and a population of 4.12 million. The city of Chisinau, the capital of the country, has a population of about 785,087 inhabitants, thus hosting over 18 per cent of the country population. 45 per cent of the population is living in urban areas, while the main urban centers are, besides Chisinau, Balti (148,114), Tiraspol (140,400) and Ribnita (52,200). The Republic of Moldova is experiencing a continuous decline in its population (since 1999 annually 1.3 per cent), due to low birth rates and emigration[171].

Current political situation and outlook

The Republic of Moldova is a parliamentary democracy with a unicameral parliament and a president elected by the parliament.

The Party of Communists of the Republic of Moldova (PCRM) has dominated politics since the 2001 parliamentary elections. Vladimir Voronin was elected as President in a parliamentary vote in April 2001. In March 2005 the PCRM won another parliamentary majority, and a month later Mr. Voronin was re-elected for a second presidential term. Zinaida Greceanii has served as prime minister since 31 March 2008[22]. Following the parliamentary elections on 5 April 2009, the PCRM won 60 parliament seats, one less than the 61 required for the party to control the presidential elections. After strong demonstrations and the failure of the PCRM to build the necessary majority for the president election, Mr. Voronin announced the dissolution of parliament and the calling of fresh general elections for 29 July 2009[172]. Following the elections, the PCRM lost its majorities[173]. The four non-communist parties that won seats in the election have agreed on setting up a coalition, the Alliance for European Integration (AEI), and, reportedly, on the distribution of top posts, but the four former opposition parties did not succeed as well in two attempts (first on 10 November, and the second on 7 December) to elect a new president and avoid another parliamentary election to take place in 2010. The Parliament has approved a new government based on the AEI coalition, as well as its governing programme. The new coalition's stated policies include liberalisation, reducing state interference in business, and greater local government autonomy. The new government has already scored some foreign policy successes, including securing the launch of talks on a new agreement with the EU on January 12th 2010, and in improving relations with Romania and Ukraine. The government has reached in October 2009 an agreement with the IMF on a new lending programme totalling US$588m[xv]. Also, the USA Millennium Challenge Corporation (MCC) announced a grant agreement with the Government to provide up to $3.19 million to support Republic of Moldova's development of a Millennium Challenge Compact. The Millennium Challenge Corporation will give also in January 2010 US $ 262m in aid to Moldova to improve agriculture and roads. The programme is designed to support macroeconomic, budget and financial stability[174].

The Republic of Moldova is divided into thirty-two districts (raioane, singular raion); five municipalities (Chisinau, Tiraspol, Balti, Bender and Comrat) and two autonomous regions (Administrative-Territorial Unit Gagauzia [ATU Gagauzia] and the Administrative-Territorial Units on the left bank of the Dniester [ATULBD]). The final status of ATULBD, which declared its independency in 1990, is still disputed.

Gross Domestic Product

As a result of reforms carried out in recent years, there have been a number of positive developments in the Republic of Moldova. The decline in GDP stopped in 2000 and the GDP growth averaged 5.7 per cent between 2000 and 2007 (see Figure 11.73), the industrial production has slightly increased, and a marked trend towards economic stabilization has become apparent. However, due to the global financial crisis, the country's economic outlook is decreasing as

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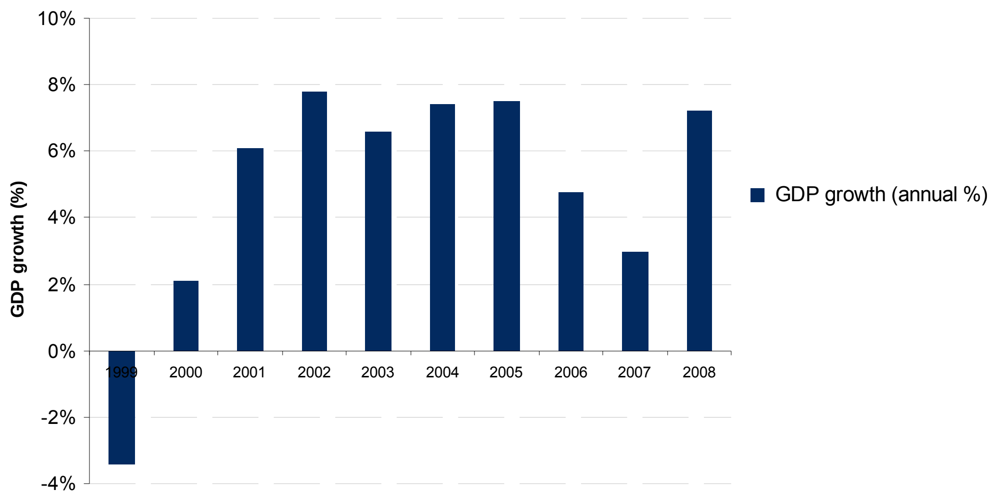
xv The Economist Intelligence Unit (2009) from http://www.eiu.com/index.asp?layout=VWArticleVW3&article_id=1455021730&region_id=&country_id=1060000306 &channel_id=210004021&category_id=&refm=vwCh&page_title=Article

remittance inflows, output, and exports fall, and the budget deficit is widening[172]. As a consequence the GDP is expected to contract by nine per cent in 2009, while for 2010 and 2011 a modest recovery of one and three per cent, respectively, are expected[174]. Integration into EU structures is a priority of the Republic of Moldova's foreign policy, which is reflected in the efforts for transposition of the EU legal foundation into national legislation.

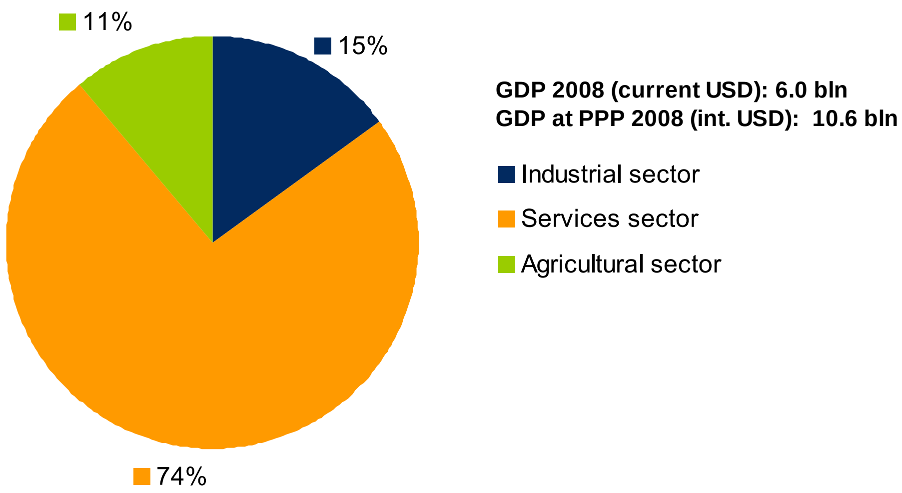
Figure 11.73: Real GDP growth of the Republic of Moldova



Source: World Bank[171] (2009)

The repartition of the Moldovan GDP in 2008 can be seen in Figure 11.74 and was clearly dominated by the services sector with 74 per cent. Agriculture plays a strong role in the Moldovan economy, with a contribution to the GDP of 11 per cent. The industrial sector, with a share of just 15 per cent, is mostly focused on agricultural production and food processing[171]. A more detailed repartition of the GDP of the Republic of Moldova (excluding Transnistra) can be found in Table A 1.3.7

Figure 11.74: Repartition of the Gross Domestic Product in the Republic of Moldova in 2008



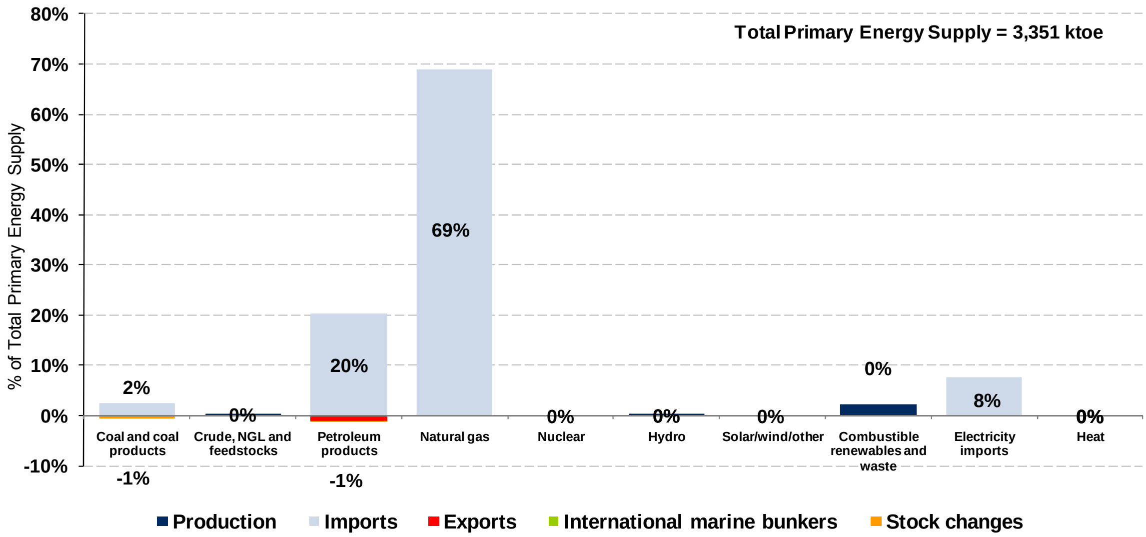
Source: World Bank[171] (2009)

11.7.2. Energy sector and development of energy markets

Energy supply

The Republic of Moldova has no reserves of coal and gas and only small domestic reserves of crude oil, which account for less than 0.1 per cent of the total primary energy supply, and a low hydroelectric potential[5]. This has led to a high dependence on energy imports (mainly from the Russian Federation and Ukraine) – with import levels reaching 98 per cent of total consumption (see Figure 11.75). The Republic of Moldova's total primary energy supply in 2007 amounted to 3,351 ktoe. Detailed information regarding the energy balance of the Republic of Moldova (excluding Transnistria) from 2000 to 2008 is provided in Table A 2.3.7[5].

Figure 11.75: Energy balance of the Republic of Moldova by primary energy sources in 2007



Source: IEA[5] (2009)

Moldovan energy production and imports amount to 3,412 ktoe, most of which derive from gas and petroleum products, with shares of 69 per cent and 20 per cent respectively (see Figure 11.76). In 2007 the Republic of Moldova was dependent on electricity imports, which accounted for seven per cent of the total energy supply[5] .However, as of 2009, the Republic of Moldova is not importing electricity anymore, as the supplies from the Moldovan Thermo-electrical Power Plant (MTPP), which is located on the left bank of the Dniester, have steadily increased[176].

The years of transition brought about changes in the fuel mix of energy supply and consumption. Significant changes have occurred in the gas demand. Coal consumption has substantially decreased, while natural gas has become the main fuel for the power stations and boiler houses and has reached a share of 69 per cent of primary energy supply[175].

In 2007, the Republic of Moldova electricity generation amounted to 3,846 GWh, produced at 98 per cent from imported gas (see Figure 11.77). The electricity generation of the Republic of Moldova (excluding Transnistria) for the period of 1990 to 2007 can be seen in Table A 2.3.8 and Table A 2.3.9. The energy system of the Republic of Moldova includes one large thermal power plant located in the Transnistrian region, three heat and power cogeneration plants, two hydropower plants, and nine CHP plants within sugar factories.

Table A 2.4.7 shows the installed capacities of the power plants in the Republic of Moldova. The total installed capacity of the country's power stations is about 3,000 MW, of which only about 1,600 MW are actually used. With small exceptions, all Moldovan power plants have an age of 20-45 years, showing an advanced rate of wear. The available capacity of hydroelectric power plants constitutes 30 MW. Sugar factories power plants have an installed capacity of 97.5 MW and are operated mostly seasonally to cover energy needs at the stage of processing sugar beet. Due to the obsolete and work-out condition of the generation equipment in the Moldovan Thermo-electrical Power Plant (MTPP), the available generation capacity is now estimated to be about 1,200 MW.

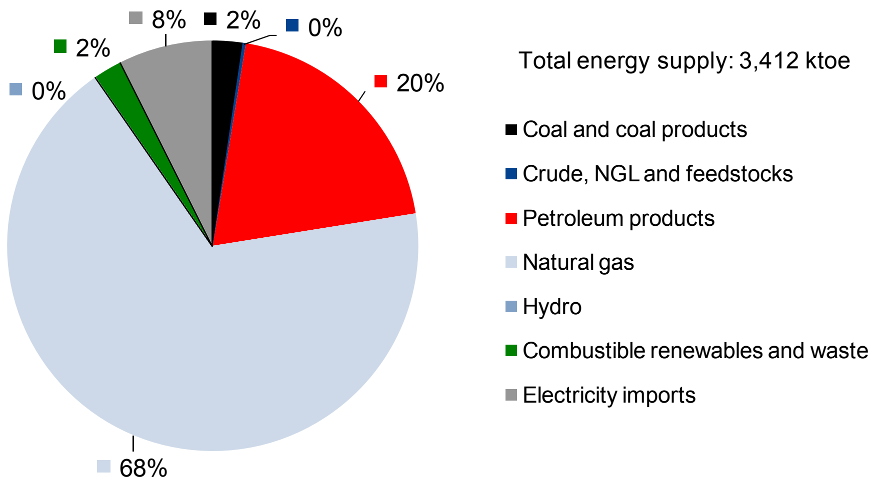
The electricity production capacities have a non-uniform territorial repartition, the majority (more than 80 per cent) being concentrated on the left side of the Dniester River, i.e. in the de-facto autonomous region of Transnistria. It has to be noted, however, that the IEA does not consider the energy from Transnistria as imported energy in the energy balances of the Republic of Moldova, while the National Bureau of Statistics of the Republic of Moldova considers it as import (see Table A 2.3.8 and Table A 2.3.9)[176].

In 2008, United Energy Moldova, a subsidiary of the Czech J&T Finance Group, announced its intention to invest EUR 600 million into the construction of a new coal power plant with a capacity of 350 MW in the Ungheni district. It is expected that the new power plant will generate annually 735 GWh of electricity. The project envisages the construction of a high-voltage line from Ungheni to the city of Iasi in Romania. The power plant is supposed to be operative by 2011[176].

In 2007, heat supply in the Republic of Moldova amounted to 13,568 TJ, covering around 13 per cent of the final energy consumption of the country. Heat is mainly produced by gas (97 per cent) as shown in Figure 11.77.

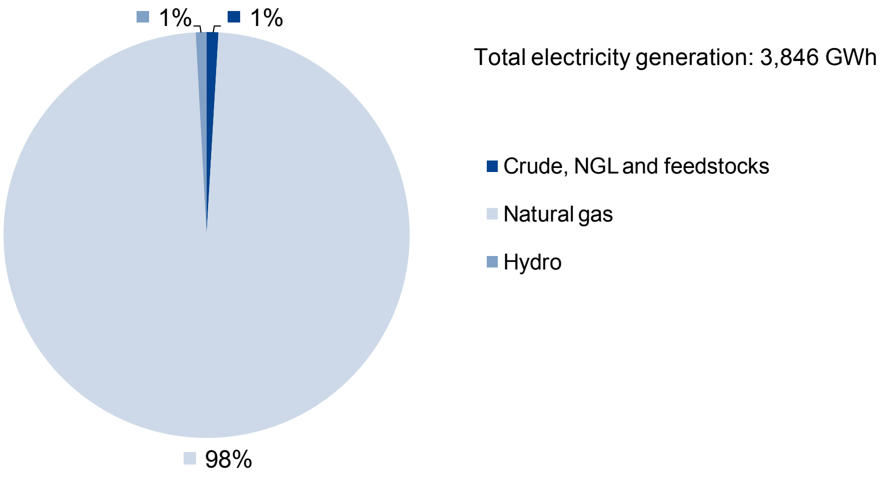
The heat sector consists of centralized heat supply systems, decentralized systems (autonomous heat supply installations), and local systems. Heat is supplied in the large centralized heating systems from combined heat and power and large heat-only plants. Municipal systems powered by large heat-only plants exist in Chisinau, Balti, and four other cities, while six other localities (towns and villages) are supplied with heat from the combined heat and power units of the sugar factories. Local heating systems provide heat from local or industrial thermal plants in small towns. In total, about 75 per cent of the urban dwellings in the Republic of Moldova have district heating systems. In the early to mid-1990s heat supplies were still adequate although inefficient, while from the mid-1990s a progressive degradation of the heating networks throughout the country started. Currently, the utilization of the installed heat generation capacity is extremely low. Many boiler-houses, both industrial and communal ones, do not operate at all, and at utilization factor is very low - about 0.40 for communal source, and between 0.1-0.7 for the industrial ones. The Chisinau and Balti combined heat and power plants generate more than 50 per cent of the produced heat[176].

Figure 11.76: Supply of primary energy by sources in 2007



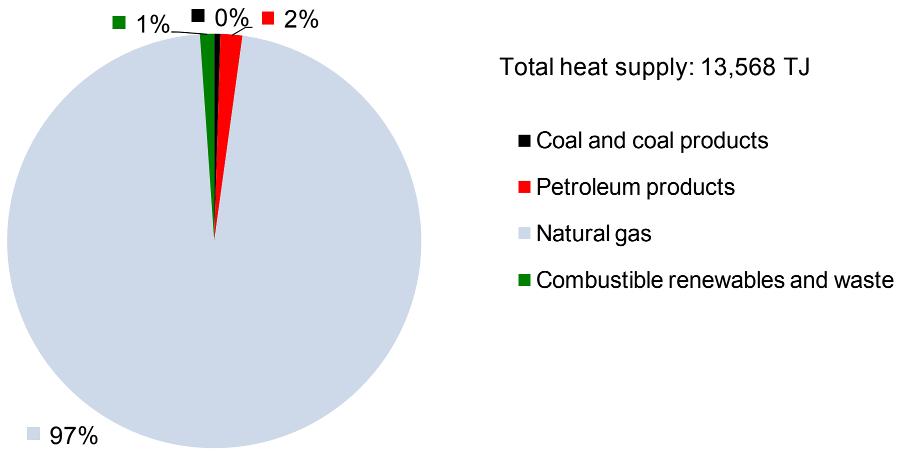
Source: IEA[5] (2009)

Figure 11.77: Electricity generation by sources in 2007[xvi]



Source: IEA[5] (2009)

Figure 11.78: Supply of heat by sources in 2007[xvii]



Source: IEA[5] (2009)

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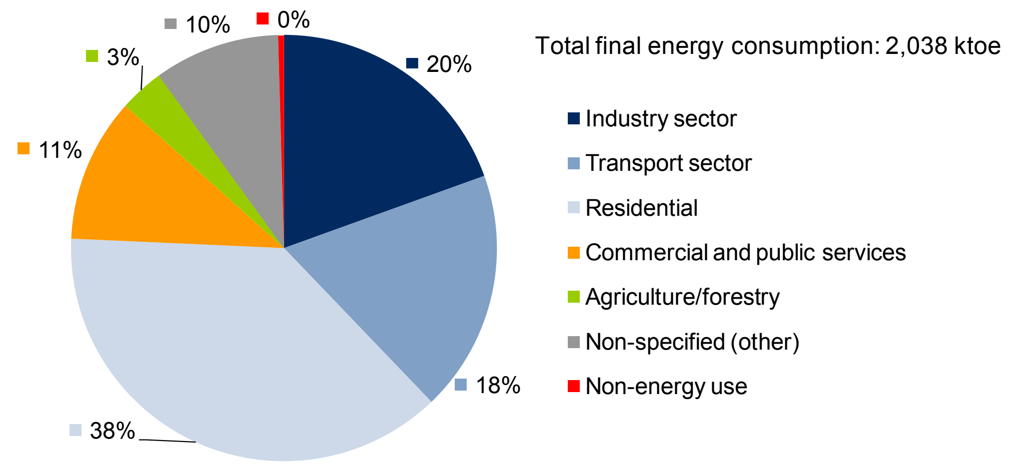
xvi Regarding the Republic of Moldova, there are discrepancies between IEA and national data. For instance, in 2006 the two Moldova's HPPs produced 352 million kWh (275 million kWh HPP in Dubasari and 77 million kWh the HPP in Costesti). The total electricity generated was 2,869 million kWh (1,192 million kWh on the right bank of Dniester and 1,675 million kWh on the left bank of Dniester). Thus, the share of hydro power in the total electricity generation in the Republic of Moldova in 2006 was around 12.3%.

xvii Regarding the Republic of Moldova, there are discrepancies between IEA and national data. According the National Bureau of Statistics of the Republic of Moldova (*Energy Balance for 2006 of the Republic of Moldova),* heat supply by sources (in % of total production – 14,365 TJ - 100%) was as following: Coal - 100 TJ - 0.7%; Oil Products - 486 TJ - 3.4%; Gas – 13,562 TJ - 94.4% and Biomass & Waste (Agricultural Waste) - 217 TJ - 1.5%.

Energy demand

The residential sector is the first consumer of primary energy, representing 39 per cent of the total consumption[5]. The industry and the transport sectors amount respectively for 19 per cent and 18 per cent of the total final consumption, as shown in Figure 11.79. The energy consumption in the residential sector represents in average five per cent of the yearly budget of households[177]. The final energy consumption by sectors on the right bank of the river Dniester (thus excluding Transnistria) is shown in Table A 2.2.8.

Figure 11.79: Total final energy consumption by sectors in 2007



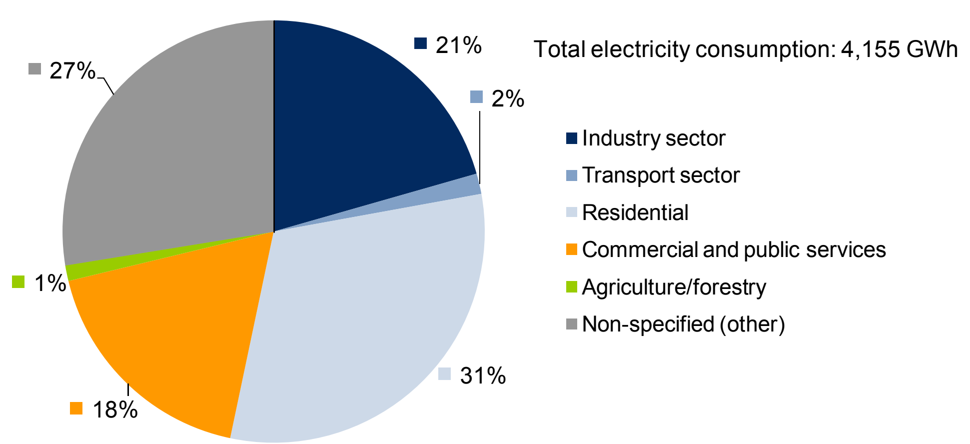
Source: IEA[5] (2009)

After residential users (30 per cent), the industry (21 per cent) and services (18 per cent) sectors are predominant electricity users as shown in Figure 11.80. The electricity consumption by sectors on the right bank of the river Dniester (thus excluding Transnistria) is shown in Table A 2.2.9. Overall, the electricity consumption in 2007 was with 4.1 TWh significantly lower than in 1990 when it used to be over 11.4 TWh[178].

Residential and industry sectors account respectively for 38 per cent and 37 per cent of total gas consumption, as shown in Figure 11.81. In 2008 the gas consumption decreased for all categories of consumers, except households, thus revealing the tendency of constant decrease in natural gas consumption, registered in recent years[176].

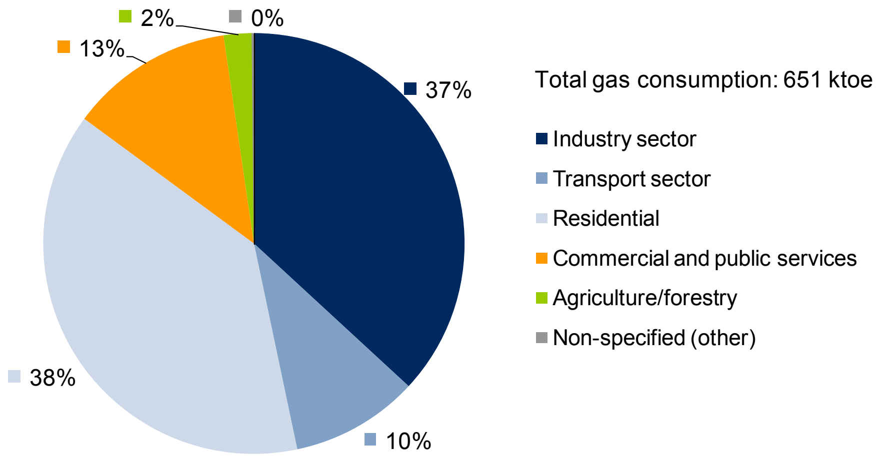
The dominant heat consumers are the residential (50 per cent) and the industry sectors (29 per cent), as Figure 11.82 indicates. The heat consumption by sectors on the right bank of the river Dniester (thus excluding Transnistria) is shown in Table A 2.2.10.

Figure 11.80: Final consumption of electricity by sectors in 2007



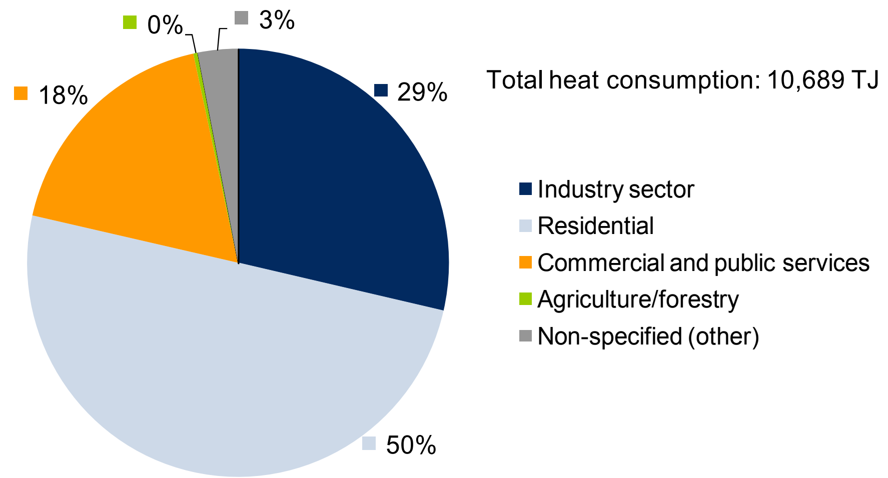
Source: IEA[5] (2009)

Figure 11.81: Final consumption of gas by sectors in 2007



Source: IEA[5] (2009)

Figure 11.82: Final consumption of heat by sectors in 2007



Source: IEA[5] (2009)

Energy markets

Electricity market

Before 1997, the state company Moldenergo was the sole enterprise in charge of the production of electricity and heat. In 1997, however, the energy sector was subject to a reform, leading to a break-up of Moldenergo into 16 new entities, i.e. eight electricity generation companies, three district heating companies, and five electricity distribution companies[176]. As a step towards liberalization of the electricity market, three out of the five electricity distribution networks of the Republic of Moldova have been sold to the Spanish utility and international investor Union Fenosa in 2000 for USD 26 million[22]. Overall, there are 27 licensed actors supplying electricity at non-regulated prices while five supply electricity at the regulated tariff[179].

Electricity networks in the Republic of Moldova were designed as part of the Southern area of the former Soviet electricity system. At present, the Republic of Moldova's electricity system operates synchronously with the Ukrainian electricity system and by extension with the Unified Electricity Systems of the Commonwealth of Independent States.

The Moldovan transmission and dispatching company Moldelectrica is responsible for the balancing and dispatching of the Moldovan power system. Presently the Republic of Moldova's electricity networks are interconnected with the Ukrainian electricity system via six lines of 330 kV, and with the Romanian electricity system through three lines of 110 kV, while a 400 kV over head power line (OHPL) ensures connection with the Bulgarian energy system; other connections with Romania and Bulgaria are being made occasionally under an island regime[22].

According to the Ministry of Economy, the Moldovan electricity market should be liberalized by 2015. The timeframe was deliberately set at 2015 since technical issues regarding the transmission and dispatching company Moldelectrica have still not been solved. Currently about ten per cent of the total electricity demand is based on the consumption of eligible consumers, who are directly connected to the highest voltage level and procure their energy on negotiated contracts[180].

Electricity tariffs

Electricity tariffs are determined by the National Agency for Energy Regulation (ANRE) for the different electricity distribution companies. This independent authority created in 1997 is in charge of defining the pricing principles, the methodology for price calculation and of regulating prices.

The tariffs are regulated for production, transmission, and distribution. Accordingly, for each sector of the energy value chain different methodologies are applied. Principally a cost-plus methodology is being applied in order to guarantee the recovery of investments.

In general the applied methodologies are valid for up to five years, while the prices are adjusted yearly. The tariffs for all components are calculated and approved gradually and by the end of the year the deviations are being calculated and necessary adjustments made. It has to be noted that the regulated prices from ANRE do not apply to the Transnistrian region[181].

Tariffs have been progressively raised from above 37 EUR/MWh in 2003 to 74.5 and 81 EUR/MWh in 2008[22]. For consumers connected to the high-voltage 110 kV lines and equipped with meters of high performance at the delineation points in the distribution network of Union Fenosa, tariffs reached 53.5 EUR/MWh. Social tariffs for low income households are available[175]. The prices of the state-owned distribution companies RED North, and RED North-West are slightly higher than the ones of their private counterparts RED Chisinau, RED Centre and RED South (Union Fenosa), which covers 60 per cent of the Moldovan population, despite their lower fuel purchasing costs and relatively lower distribution losses[176]. The exact electricity tariffs are shown in Table A 3.1.6

Gas market

Local demand of natural gas is covered by imports from Gazprom purchased by a Russian-Moldovan joint venture company called JSC Moldovagaz, whose shareowners are Gazprom (50 per cent), the Republic of Moldova (37 per cent) and the region of Transnistria (13 per cent). JSC Moldovagaz owns upstream pipelines for transporting natural gas on the territory of the Republic of Moldova[175]. Tiraspoltransgaz SRL is the transmission and distribution operator of natural gas on the territory of Transnistria[175].

The natural gas supply system consists of about 1,400 km network of upstream pipelines, four compressors stations and 74 distribution stations. The total length of high, medium, and low pressure pipelines were about 15,735 km at the end of 2007. The Republic of Moldova is also a transit country for gas deliveries from the Russian Federation to Central-Eastern Europe. International upstream pipelines towards Bulgaria cross the territory of the Republic of Moldova with a length of 100 km. The annual amount of transited natural gas is about 25 billion m^3.

In spite of the fact that the natural gas market was officially opened by law, at present it can not be considered a functional market, because the supply of natural gas is limited to a single supplier, i.e. Gazprom. Gazprom controls the transmission networks that provide access to other sources of supply such as those in Middle Asia. This makes it practically impossible to contract natural gas supplies from other sources[175]. In 2008, 12 gas distribution enterprises operated in the Republic of Moldova, the biggest of which is Chisinau-gas LLC, with a market share of over 60 per cent of the total final supply in 2008[175].

Gas tariffs

The contractual price for natural gas purchased from Gazprom increased significantly since 2007, from 170 USD/1000 m^3 to 284 USD/1000 m^3 in the fourth quarter of 2008. This price increase, together with milder temperatures, led to a decrease in gas consumption in the Republic of Moldova of about eight per cent in 2008 compared to the previous year[176].

Like for electricity, gas tariffs are determined by the National Agency for Energy Regulation. They are based on costs and depend on consumption and consumer types. Social tariffs exist for the low income households. In 2008, tariffs for gas supply were recalculated by the National Agency for Energy Regulation inter alia in order to abolish cross-subsidies and ranged between 206-244 EUR/1000 m^3 (3,200-3,800 MDL/1000 m^3. The exact numbers per consumer category are shown in Table A 3.2.3.

Heating market

District heating systems operate currently in Chisinau, Balti, and in some district centers in the country (Aneni Noi, Cahul, Calarasi, Cimislia, Edineti, Glodeni, Stefan Voda, Ungheni). Heat supply to consumers in Chisinau is performed by JSC Termocom. Transmission of thermal energy to customers in Chisinau is made by heat supply pipelines (224 km), inter-district heating pipelines (265 km), and hot water supply pipelines (214 km), as well as underground polyurethane insulated pipelines (9,173) km and 491 central thermal points. In the city of Balti the company CHP-North, operator of the local CHP plant, performs both heat production and distribution. Distribution of heat and hot water in Balti is carried out by a 195.2 km heat supply network and 67 heat distribution points[176].

The National programme for renovation and decentralization of heating supply responsibilities to municipalities sets up directions for developing the heating sector until the year 2010. Government objectives in this area include upgrading urban systems for heating supply through the rehabilitation of centralized district heating systems in Chisinau and Balti and by building small combined heat and power plants in other residential areas across the country.

The number of district heating companies decreased dramatically since 2000 and in 2004 only eight cities were fully or partially supplied with district heat. Decentralized heating systems now meet residential and public sector demands while industry has almost completely disconnected from district heating systems[182]. In the period of 2003 to 2005 over 400 thermal stations were built for the decentralized supply to customers, including 148 units in 2005. This trend will continue in the future, first of all in order to ensure heating supply to customers in rural areas. As primary energy natural gas and local renewable energy sources (solar energy and solid, liquid, and gaseous biofuels) will be used.

Heating tariffs

The tariff setting for heat supply in the Republic of Moldova was transferred to municipalities in 1999. There are different prices for hot water and steam. Prices of centralized heating and hot water supply are set by the suppliers in coordination with the governmental agencies. In case of disagreement, prices are defined by the agencies for a limited period. The heating tariffs vary substantially between cities, mainly depending on the fuel used. In Chisinau, where natural gas is used as a fuel, the heating tariff increased considerable from 15.5 EUR/Gcal (233 MDL/Gcal) to 35 EUR/Gcal (540 MDL/Gcal) in 2008[176]. This was a considerable increase over the last 20 years as prices were at around 4.5 EUR/Gcal (70 MDL/Gcal) in 1999. ANRE is setting tariffs for the steam and hot water supplied by the state owned combined heat and power plants.

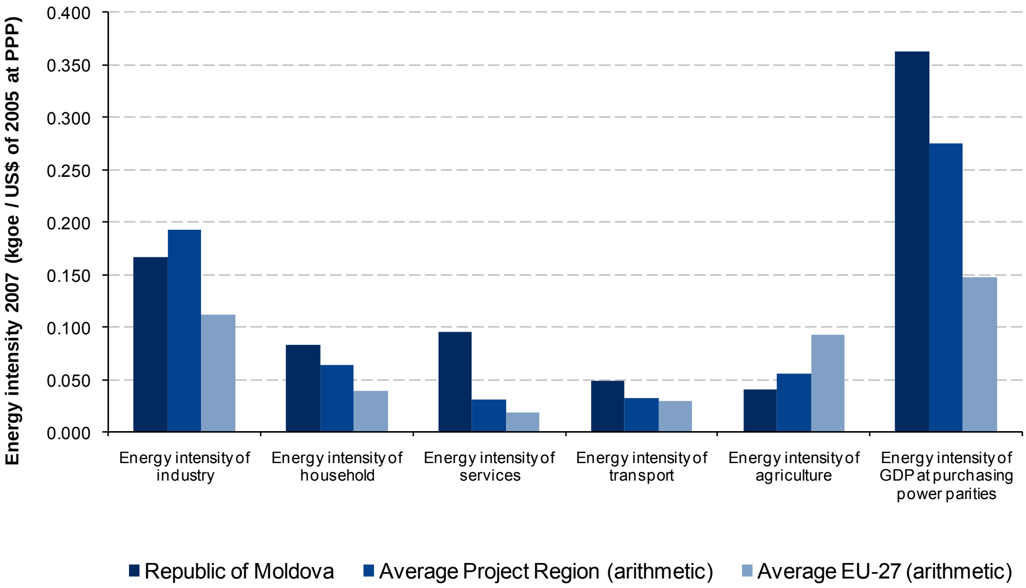
The payment rate in the district heating sector was 104 per cent in 2008, since consumers paid back debts that they accrued over the years[180] and because the government introduced social tariffs[178]. In the past, non-payments were related to the poor quality of the heating provided, since the temperature provided by the district heating system to the apartments was insufficient[180].

11.7.3. Current situation with respect to energy efficiency and future potential for energy savings and increase in efficiency

Energy intensity

The energy intensity of GDP at purchasing power parities for the Republic of Moldova in 2007 is significantly higher than the EU-27 average and the project region average (see Figure 11.83)[6].

Figure 11.83: Primary energy intensity at Purchasing Power Parity in 2007



Source: Enerdata[6] (2007)

The period following independence in 1991 has been characterized by a significant decrease in energy use in the country. This reduction in energy consumption is not a sign of improved energy efficiency, but is due to many other factors inherent to the transitional period, including production crisis, financial difficulties, and irregular energy supply. Final energy consumption in 2005 was still 77 per cent lower than in 1990[183]. In line with this development the energy intensity of GDP declined by 46 per cent in the past decade (see Figure 11.84). Despite this large decrease, the Republic of Moldova's economy still has a high level of primary energy consumption per unit of GDP compared with the two reference values (EU-27 and project region average) as stated above (see Figure 11.83).

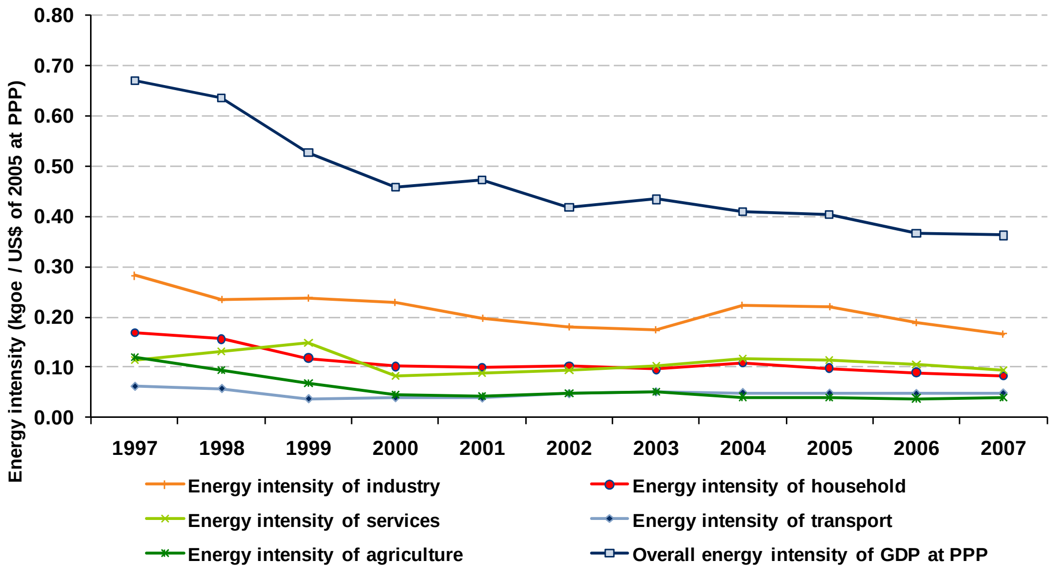
The energy intensity of the industrial sector is well above the EU-27 average but below the project region average (see Figure 11.83) and decreased by over 40 per cent since 1997 (see Figure 11.82)[6].

The energy intensities of the household, services, and the transport sector are significantly higher than both the EU-27 and the project region average (see Figure 11.82). Nevertheless all mentioned sectors witnessed a considerable drop in energy intensity levels in the last decade (see Figure 11.83)[6].

The only sector, which is below the EU-27 as well as the project region average, is the agricultural sector, which experienced the highest decrease in terms of energy intensity of all sectors since 1997.

Table A 4.16, provides indices on consumption of energy resources and energy intensity on the right bank of the river Dniester (thus excluding Transnistria) from 2000 to 2007.

Figure 11.84: Primary energy intensity in the Republic of Moldova by sector at Purchasing Power Parity



Source: Enerdata[6] (2007)

Energy losses from electricity and gas grids

According to Enerdata, in 2006, losses on the Moldovan transmission and distribution systems were estimated at around 40 per cent of the total electricity production[184]. However, according the Climate Change Office of the Ministry of Environment, the share of technological and commercial losses at the distribution level amounted to 14.5 per cent in 2008, showing a constant decrease compared to previous years. The effective losses of the distribution companies that were submitted to the National Agency for Energy Regulation for 2008 amounted to 11 per cent for RED North, 14 per cent for RED North-West, and 15 per cent for RED Union Fenosa. The total energy transmission and distribution losses are estimated to be in the range of 15 to 25 per cent[176]. Especially the distribution companies controlled by Union Fenosa have been upgrading the meter cables and replacing the domestic meters, thus improving the prevention of theft and reducing commercial losses[178].

100 per cent of industrial and residential electricity customers have a conventional meter installed. In case of non-payment, customers can be disconnected within 30 days. Reconnection to the electricity grid is possible after paying for consumption and an additional tax for reconnection. Gas meters for residential and industrial customers are installed. If one meter is installed for a house with more than one apartment then the indicated consumption is divided equally by the number of persons in the house[176].

District heating grid

Ever since the mid-1990ies a progressive degradation of the heating networks throughout the country has started. In addition to old and inefficient heat production plants, it is estimated that over 15 per cent of the heat produced is lost due to the long distribution lines of the two largest district heating systems in Chisinau and Balti[175]. According to JSC Termocom, losses of heat are as high as 19-21 per cent, but used to be even higher in 2001 with 36 per cent. Reducing losses of heat supply networks remains a priority for the energy sector and complies with EU policies including the Green Paper of 2006. A key issue in this context is energy efficiency regulation, including installation of energy efficient equipment and optimization of heat demand[176].

Around 80 per cent of residential buildings are equipped with collective heat meters but households do not have any incentive to reduce their consumption[182].

Other sources of inefficiency

Apart from the above mentioned inefficiencies in the energy sector, no information is available regarding other relevant sources of energy inefficiency in the Republic of Moldova.

Estimated potential for energy savings by sector

According to the Energy Strategy of the Republic of Moldova to the year 2020, it is estimated that a well-planned and concerted implementation of an energy efficiency programme in the Republic of Moldova could reduce the financial impact of the energy sector on the GDP by 1.6-1.7 per cent per year, starting with 2008[176].

ESCOs and other initiatives in energy efficiency

Lack of financing limits the demand for energy services until now. However, one ESCO has been established recently (ESCO-Voltaj was set up in 2007, being part of Proderox Group JSC). Also, there are few engineering companies that have worked on donor-financed turn-key contracts in the range of USD 50,000 to USD 150,000[22].

Nevertheless, there are a limited number of companies actively working in the field of energy efficiency in the Republic of Moldova. One example is the company SC Geotermal-AV SR, which is providing professional consulting services in the field of energy conservation. The main activities provided by the company are as follows: designing and building clean ecological and energy saving houses; design and installation of ventilation systems with heat recovery; development and implementation of heat/cooling systems based on heat pumps; providing the energy audits for buildings; installation of water saving systems; supplying the installations and materials; ensuring service of supplied installations[176].

Additionally the Moldovan company Dina-Cociug is the market leader in the Republic of Moldova for heating, water supply, conditioning, ventilation equipment, and energy conservation equipment[176].

11.7.4. Current situation with respect to renewable energy sources and future deployment potential

Deployment of renewable energy sources

In 2007 hydro power accounted for only one per cent of electricity generation in the Republic of Moldova[xviii], while biomass and waste represented one per cent of the heat generation[5].

The hydro power generation is mainly based on the output of two hydro power plants, i.e. Dubasari (48 MW) and Costesti (16 MW). The total installed capacity of six micro hydro stations, which have been built by individuals or enterprises, is 141 kW[176]. According to the National Bureau of Statistics of the Republic of Moldova[185] heat supply by sources (in % of total production – 14,365 TJ) was as following: Coal 100 TJ (0.7 per cent); Oil Products 486 TJ (3.4 per cent); Gas 13,562 TJ (94.4 per cent) and Biomass 217 TJ (1.5 per cent).

Estimated potential for renewable energy sources

In 2001, the Technical University of the Republic of Moldova conducted a research project with the goal to establish the Wind Atlas of the Republic of Moldova. The results of this study show that there are favorable zones for wind installations, with wind speed equal or exceeding 7 m/s at 50 m above ground. The overall wind potential is estimated to be 1,000 MW, while the Energy Strategy 2020, foresees an installed wind capacity of about 26-34 MW in 2015, capable of generating 89-111 GWh[176].

The Energy Strategy of the Republica of Moldova until 2020 (Government Decision No. 958 of 21 August 2007*)* plans to increase the share of renewable energy sources in the country's energy balance up to six per cent in 2010 and 20 per cent in 2020. In order to achieve these goals, about one million m^2 of solar installations for water heating and 80,000 m^2 of solar installations for the drying of agricultural products, such as tobacco, are required up to 2010. Based on this estimates up to 40,000 toe of fuel could be substituted, while the required installation of photovoltaic cells for electricity production would amount to 6,300 kW[176].

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xviii According to the Ministry of Environment and Natural Resources, the share of hydro in the total electricity generation in 2006 was 12.3%. According to them, the two Moldova's HPPs produced 352 million kWh (275 million kWh HPP in Dubasari and 77 million kWh the HPP in Costesti). The total electricity generated was 2869 million kWh (1192 million kWh on the right bank of Dniester and 1675 million kWh on the left bank of Dniester)

The potential for fuel wood and agricultural and forestry waste in the Republic of Moldova is estimated to be 820,000 toe, while the biogas potential is estimated to be 3.7 million m^3 [176].

The overall hydro potential is estimated at 3 TWh per year, of which 1.9 TWh per year could derive from large hydro and the remaining 1.1 TWh per year from small hydro plants[176].

The potential for biofuels in the Republic of Moldova is currently unknown. However, some estimates show that with the use of 50,000 ha, which represents 2.5 per cent of the overall arable land in the country, 52,500 t of biofuel could be produced, which would cover 26 per cent of the fuel need for agricultural works[176].

Projects and initiatives in renewable energy sources

The market for renewable energy sources in the Republic of Moldova is still in an early stage, but some renewable energy sources power plants are in construction or have already been built in recent years[176]: currently one power plant is under construction in Chisinau, which will be fuelled by solid waste. The power plant is expected to be operational by the end of 2011[186].

Additionally, five wind power plants with a total installed capacity of 204 MW are currently being considered for development in the Republic of Moldova by the project developer MODEOLE Ltd (64 MW in Cotihana, Cahul district; 44 MW in Baimaclia, Cantemir district; 58 MW in Pohorna, Floresti district; 26 MW in Nucareni, Telenesti district and 12 MW in Dubna, Soroca district[176]).

Furthermore, Accord, a non-governmental organization that has been set up in cooperation with the State Agrarian University of Moldova, is active in the exploration of new possibilities for utilization of biomass as renewable energy source. The aim of the project, which is being financed by the Czech Republic, is to explore all possibilities along the value chain of biomass and thereby identifying the biomass exploitation potential. Different residues have been analysed and storage and processing facilities, as well as boilers set up. The project was finalized in 2008 and proved that the overall energetic balance is positive (taking into account all energy used during the value chain)[187].

11.7.5. Institutional, regulatory and policy framework for energy efficiency and renewable energy sources

Policymakers in the energy sector

Institutional policymakers

The Ministries in charge of the energy policy in the Republic of Moldova are listed below.

- The Ministry of Economy is in charge of developing and implementing energy policy in the Republic of Moldova. Its main tasks related to the energy sector comprise the development of strategies and state policies such as the Energy Strategy 2020[180]. Furthermore, it elaborates and implements measures to ensure the energy security in the country and organizes and coordinates the draft legislative and normative acts in the area of energy. In 2008, the Ministry of Industry and Infrastructure, which took over the responsibilities of the energy sector from the Ministry of Energy in 2005, was dissolved, and the Ministry of Economy has taken over the responsibility of the energy sector[178].
- The Ministry of Environment of the Republic of Moldova (MEN) is the government body responsible for the development of policies and strategies in field of environmental protection and economical utilization of the natural resources[186].

Further governmental agencies involved in the energy policy in the Republic of Moldova are listed below.

- The Climate Change Office of the Ministry of Environment is mainly focused on the implementation of climate change issues and environmental projects. The main area of activity of the Climate Change Office is the elaboration, promotion, and implementation of national policy on climate change. Priority fields on climate change issues promoted by the Climate Change Office are related to decreasing of greenhouse gases and adaptation to new climate conditions. Furthermore the Climate Change Office is the national contact point for the Clean Development Mechanism of the Kyoto Protocol[178].

- The National Agency for Energy Regulation was established in 1997 as an independent authority to support the introduction of market mechanisms in the energy sector, while protecting the interests of consumers and investors. It issues licenses, regulates fuel and power prices, establishes energy pricing principles, and calculation methodology[176].
- The National Agency for Energy Conservation (NAEC) was established in 1994; however, it had to stop its activities in 2006 due to its restructuring. In July 2007, the Agency was re-launched and renamed as the Agency for Energy Efficiency. The regulation of the Agency for Energy Efficiency is currently under development[176]. It is expected that the Energy Efficiency Agency will be operational by January 2010[178].

Non-Institutional policymakers

Non-institutional policymakers in the field of energy in the Republic of Moldova are listed below.

- The Academy of Sciences of Moldova established in 1946, is the main scientific organization of the Republic of Moldova and coordinates research in all areas of science and technology. Together with the Ministry of Economy, the Academy of Sciency of Moldova has been responsible for the development of the Energy Strategy 2020[176].
- The Technical University of Moldova (TUM) is the only higher education institution in the Republic of Moldova offering engineering and technological programmes for almost all sectors of the national economy. Directly involved in the field of energy are the Faculty of Electrical Power Engineering, the Faculty of Mechanical Engineering and Management, as well as the Faculty of Urban Planning and Architecture[176].
- ENERGY plus is a Non-Governmental Organization (NGO) working on the promotion of renewable energy sources in the Republic of Moldova. Closely related to the Technical University of Moldova, the NGO conducts research studies on renewable energy sources, lobbying, and also pre-feasibility studies on solar and wind energy projects. The NGO created databases of the renewable energy sources potential and methodologies that could be consulted during future renewable energy sources projects[176].
- The Alliance for Energy Efficiency and Renewables (AEER) is a Moldovan NGO founded on 14 May 2007. The goal of AEER is to contribute to the promotion of strategies and policies in the field of energy efficiency, renewable energy resources, and environmental protection[176].

Regulatory and administrative institutions at the regional and local level

The five municipal authorities in the Republic of Moldova may establish their own energy efficiency programmes under the existing legal framework. However, no such programmes have been developed so far by the municipalities, even though the municipalities have their own budget formation mechanism, mainly derived from local taxes, and a certain degree of autonomy compared to the nation level[176].

The regional and district levels have the possibility to develop and implement policies. However, so far the only policies developed at the mentioned levels concern only strategic local action plans in the area of environmental protection, and not in the area of renewable energy sources or energy efficiency[176].

Energy policy and regulatory framework

The main energy policy documents of the Moldovan energy framework are shown in Table 11.19.

Table 11.19: Energy Framework of the Republic of Moldova

Document name	Type of document	Date
Methodology for the determination, approval and application of tariffs for the electricity generated from renewable energy and fuel sources	ANRE Resolution No. 321	22.01.2009
Energy strategy of the Republic of Moldova until 2020	Government Decision No. 958	21.08.2007
Law on Renewable Energy Sources	Parliament Resolution No. 160	12.07.2007
Establishment of the National Agency for Energy Conservation	Government Decision No. 1527	26.11.2002
Regulation on the National Fund for Energy Conservation	Government Decision No. 1528	26.11.2002
Law on Conservation	Parliament Resolution No. 1136	13.07.2000
Gas Law	Parliament Resolution No. 136	17.09.1998
Energy Law	Parliament Resolution No. 1525	19.12.1998
Electricity Law	Parliament Resolution No. 137	17.09.1998

Source: Climate Change Office of the Ministry of Environment and Natural Resources[176] (2009)

One of the most important energy policy documents is the Energy Strategy of the Republic of Moldova until 2020, which has been published in 2007 (Government Decision No. 958 of 21 August 2007*)* and has three strategic objectives: 1) security of energy supply; 2) promoting energy and economic efficiency; and 3) liberalization of the energy market and restructuring of power industry[176]. The Ministry of Economy monitors the progress of strategy implementation on a quarterly basis[188]. Based on the mentioned three strategic objectives the following priorities have been defined:

- Establishment of an acceptable level of energy security by both construction of own power plants and the enlargement of the capacity of Moldova-Ukraine and Moldova-Romania high voltage interconnections lines;
- Adherence to the regional electricity market in South-East Europe with the aim to join the Union for the Co-ordination of Transmission of Electricity (UCTE) system;
- Creation of conditions to ensure real market competition leading to cheaper electricity prices;
- Full liberalization of the power market;
- Strengthening of the gas transport network and improvement of energy efficiency.[176]

Policy and regulation on energy efficiency

Energy efficiency is a priority in the Republic of Moldova and strategic policy objectives for energy conservation have been defined in the National Programme of Energy Conservation for 2003-2010 (Government Decree No. 1078 of 5 September 2003*)*. It is the main enacted policy document guiding government actions in pursuing increased energy efficiency of the economy. It sets out quantitative targets for efficiency improvements, priority areas for energy conservation and efficiency interventions, and it indicates activities to carry out in order to achieve stated objectives. The Programme aims at increasing energy efficiency by minimizing energy intensity by two to three per cent annually[22].

Secondary legislation elements like the law on ESCOs or regulation regarding energy conservation incentives are under development and will play a crucial role in supporting the implementation of the energy conservation policy[22].

Policy and regulation on renewable energy sources

There are three major documents on renewable energy policy in the Republic of Moldova, i.e. the Law on Renewable Energy Sources (Parliament Resolution No. 160 of 12 July 2007); the Methodology for the Determination, Approval and Application of Tariffs for the Electricity Generated from Renewable Electric Energy and Biofuel (ANRE's Decision No. 321 from 22.01.2009, Official Monitor No. 45-46 of 27 February 2009), as well as the Regulation on the Guarantees for Origin of Electricity Generated from Renewable Electric Energy and Biofuel (ANRE's Decision No. 330 from 03.04.2009, Official Monitor No. 99-100 of 5 June 2009)[176].

The Energy Strategy of the Republic of Moldova until 2020 foresees an increase of the share of renewable energy sources in the country's energy balance up to six per cent in 2010 and 20 per cent in 2020. Furthermore, the Energy Strategy deals with objectives, measures, and activities orientated towards a more efficient, competitive and reliable national energy industry whilst ensuring the country's energy security, the upgrading of energy-related infrastructure, improved energy efficiency, and the utilization of renewable energy sources as well as its integration into the European energy market. The Energy Strategy stipulates the development of the energy potential of biomass (production of biofuel from cereals, sugar sorghum and oily technical cultures - rape, sunflower, grape seeds from wine industry etc.), solar energy by conversion to electricity and heat, wind, hydropower, and, in the future, new sources of energy[176].

International commitments and current status of implementation

EU Regulation

The EU Moldova Action Plan from 2004 is a political document laying out the strategic objectives of the cooperation between the Republic of Moldova and the EU. The implementation of the Action Plan will help fulfill the provisions in the Partnership and Cooperation Agreement (PCA) and will encourage and support the Republic of Moldova's objective of further integration into European economic and social structures. Regarding energy, the Action Plan outlines the preparation of an updated energy policy converging towards EU energy policy objectives, a gradual convergence towards the principles of the EU internal electricity and gas markets, and the improvement of the transparency, reliability and safety of the gas transit network[176].

Kyoto Protocol

The Republic of Moldova is a party to the United Nations Framework Convention on Climate Change as a Non-Annex I country. The Republic of Moldova signed the Kyoto Protocol in 2003 but is a Non-Annex B country to the Kyoto Protocol[189]. The Climate Change Office of the Ministry of Environment of the Republic of Moldova is the key institution responsible for the implementation of the Kyoto Protocol[178]. In order to meet the eligibility criteria for participation in the Clean Development Mechanism, the Republic of Moldova has established the Designated National Authority following the approval in December 2003. The Resolution established the composition of the National Commission (NC): it has 18 members representing the Parliament, Government, private sector, research, and academia institutions; and described its responsibilities and internal working procedures. The above mentioned documents became an important part of the Republic of Moldova's legislation. The legal basis for CDM activities also include the bilateral Memorandum of Understanding signed between the Republic of Moldova and the Kingdom of Denmark (it is expected that in the future similar Memorandum of Understandings would be signed with other Annex I Parties), two Governmental Resolutions on delegating authority for negotiating and signing the MoU, law on ratification of the MoU and the Agreement with the Prototype Carbon Fund (PCF).

The Republic of Moldova is currently implementing several CDM projects in partnership with the World Bank's Prototype Carbon Fund, which are listed in Table 11.20.

Table 11.20: Current CDM projects of the Republic of Moldova

CDM project name	Content
Moldova: Soil Conservation Project	The project has started in 2002 and focuses on the planting of new forests on 14,500 hectares of degraded agricultural land throughout the Republic of Moldova. The total resultant reductions in the GHG emissions will be 3,215,296 tonnes of CO_2 equivalent. The Project is scheduled for 21 years. The Beneficiary under the Project is the National Forestry Agency Moldsilva.
Use of biomass as energy source in rural communities (Projects 1 and 2)	The implementation of those projects started in the second half of 2005. Approximately 250-300 small projects focused on the improved energy efficiency in public buildings. The main activities under those projects will be focused around the switch from fossil fuel to biomass burning. The expected implementation period of those two projects is 2005-2015. The total reduction of GHG emissions will make 357,768 tonnes of CO_2 equivalent.
Moldova: Energy conservation and reduction of GHG emissions	Each of the 27 activities is represented by one of the beneficiaries under the Project – Ministry of Education (in case of orphanages and schools), Health Ministry (in case of hospitals) or municipalities (in case of public buildings). The project is scheduled for 2006-2015. The total reduction of GHG emissions will make 114,469 tonnes of CO_2 equivalent.
Community's Forest Development in Moldova	The Project is implemented as an afforestation and reforestation activities (CDM-AR-PFROM). The objective of the Project is to create new forests in the communities of the Republic of Moldova of total surface of 8,157.3 hectares by afforestation of eroded areas; application of agricultural practices for forestation; carbon and GHG sequestration; wood supply for local population and contribution to sustainable development of local community. Total CO_2 sequestration is 2,830,618 tonnes of CO_2 equivalent removal during the period of 2006-2035. The implementing agency under the Project is the Forestry Agency Moldsilva.
Project Design Document (PFROM) Biogas recovering at Tintareni landfill	The principal activity under that project is to capture and burn the biogas produced from organic decomposition of municipal solid waste at Tintareni landfill. The key project components are: biogas collection system, biogas generator unit, biogas boiler unit and biogas monitoring and control equipment. The station for biogas capture and burning/use was commissioned officially and started operating as at 25 September 2008. The project is scheduled initially for ten years (2008/2009- 2017/2018). The average annual reduction of GHG emissions will make round 75,412 tonnes in CO_2 equivalent. The project beneficiary is the Moldovan-Italian company 'Biogas Inter Ltd'
Project Idea Note (PIN) Construction of a cogeneration plant with the capacity of 31 MW at State Enterprise (SE) Tirotex in Tiraspol, Moldova	The principal goal of the project is the reduction of GHG emissions and more efficient use of primary energy sources in generation of electricity and heat. The construction of a cogeneration plant will make it possible to increase the efficiency of fossil fuel consumption and reliability of the enterprise's power system and contribute to the reduction of GHG emissions from burning of fossil fuel for power generation. The total design capacity of the cogeneration plant will be 31 MW for electricity and 35 Gcal per hour for hot water. The new cogeneration plant will consume annually 56,563 million m^3 of natural gas and generate annually about 248 million kWh of electricity. The intended project lifetime is 25 years (2009-2034). The average annual reduction of GHG emissions will vary between 47,640 and 54,760 tonnes of CO_2 equivalent. The project beneficiary is State Enterprise (SE) Tirotex in Tiraspol, Moldova.

Source: Climate Change Office of the Ministry of Environment and Natural Resources[176] (2009)

Other international commitments

The Republic of Moldova became a member of the Energy Charter in 1992 and signed the Energy Charter Treaty and its related Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects in 1994. Both were ratified in 1998, requiring the Republic of Moldova to formulate energy efficiency strategies and policy aims, to establish appropriate regulatory frameworks, and to develop specific programmes for the promotion of efficient energy usage and the reduction of harmful environmental practices in the energy sector[14].

11.7.6. Economic incentives and financing schemes for energy efficiency and renewable energy projects

General investment climate in the country

The Republic of Moldova benefits from the presence of the Moldovan Investment and Export Promotion Organization (MIEPO), whose mission is to support business development and partnership in the Republic of Moldova through involvement, communication, and promotion.

MIEPO's expert team provides professional assistance in the identification and exploration of investment opportunities in the Republic of Moldova[190].

According to the Heritage Foundation[191], foreign capital and domestic capital are legally equal. Although foreign investment is generally welcome, it is subject to some restrictions, and some sectors are reserved for state enterprises. The regulatory administration can be non-transparent, burdensome, and inconsistent. Government officials may interfere in business decisions in favor of a protected individual or use governmental power to pressure businesses for personal or political gain. Legal disputes may not result in impartial rulings. Residents and non-residents may hold foreign exchange accounts, which are however subject to certain approvals. Some payments and transfers require the National Bank of Moldova's approval. Nearly all capital transactions require approval by or registration with the National Bank of Moldova. Finally Non-Moldovians may not buy agricultural or forestry land.

Despite extensive reforms and external incentives in the framework of the European Union pre-accession process, the Republic of Moldova is not perceived as having significantly improved its anti-corruption stance and was therefore awarded with a score of 2.9 by Transparency International's Corruption Perceptions Index for 2008, resulting in the eighth rank within the project region[53].

Incentives for energy efficiency

Economic incentives to stimulate the implementation of energy efficiency projects have not been established so far in the Republic of Moldova[22].

Incentives for renewable energy sources

After the publication of the Methodology for the Determination, Approval and Application of Tariffs for the Electricity Generated from Renewable Electric Energy and Biofuel, as well as of the Regulation on the Guarantees for Origin of Electricity Generated from Renewable Electric Energy and Biofuel by the National Agency for Energy Regulation investments in the Republic of Moldova in the field of renewable energy sources have gained more attractiveness. The methodology offers to the energy producer from renewable sources the guarantee of income through a feed-in tariff[176].

The National Agency for Energy Regulation is responsible for the definition of the calculation methodology and for the approval of the feed-in tariffs. The companies, which produce electricity from renewables, calculate the tariffs by themselves according to the methodology and then submit the tariffs to ANRE for approval[181].

There are two methodologies for tariff calculation: one for biofuels and one for the production of electricity from renewables. The tariffs include the investment costs, which makes it possible for investors to amortize their investments. Furthermore, the tariffs must be benchmarked by ANRE with the existing tariffs on other European markets in order to hinder fraud or unjustified tariffs. The feed-in tariff methodology does not differentiate between large and small hydro. There is just a technical threshold in place, since power plants – regardless of their fuel input – can only be connected to the grid if they produce more than ten kWh annually[180].

Licenses for renewable energy power plants are issued by the National Agency for Energy Regulation; plants with an installed capacity below five MW do not require a license. Distribution companies are obliged to buy all energy produced from renewables and connect the power plants to the grid. However, the grid connection costs have to be settled bilaterally. The existing renewable energy power plants, i.e. the two hydro power plants, will not receive any feed-in tariffs.

The Moldovan Government recognizes that heating from renewables has a very big potential; however, at present no separate feed-in tariffs for heating from renewables are in place[180].

Financing mechanisms for energy efficiency and renewable energy projects

National financing mechanisms

According to the Law on Renewable Energy Sources (Parliament Resolution No. 160 of 12 July 2007), an Energy Efficiency Fund should have been created by the end of 2008. The Fund should be an independent and financially autonomous legal entity. The Fund's main activity shall be the management of finances, with focus on promoting the financing of energy efficiency and renewable energy in compliance with the state strategies and programmes for the development of these fields. The Fund's financial resources will originate from financial allocations of the

Government of the Republic of Moldova (at least ten per cent), donations, financial revenues from interests to the current accounts, and loans or other financial instruments from banks or investors. The Fund's financial resources shall be used exclusively for the financing of investment projects of energy efficiency and renewables in the Republic of Moldova, and the provision of guarantees for loans and technical assistance if this is considered necessary for implementation of the eligible projects[176]. The Energy Efficiency Agency will be responsible for the development of the legislation on energy efficiency and renewables and monitor the governmental strategy and the implementation of related projects. For 2009, MDL ten million have been allocated to the Energy Efficiency Fund. Nevertheless, these financing sources will only be available after the approval of the Regulation Act for the Energy Efficiency Agency, which is expected by January 2010[176].

International financing mechanisms

Energy efficiency and renewable energy projects have been so far financed only by international financial institutions and/or international donors:

- The World Bank has provided a USD ten million loan for investments in the thermal power/district-heating sector as part of the bigger loan (within the Programme Energy 2) for energy projects with a loan period of four years and an applied interest rate of 0.45 per cent. The loan is to be used in the first stage for investments in four cities (Cantimir, Falesti, Straseni, and Floresti). A pilot project is underway in Ungheni in which four small heating plants are being constructed. Under the conditions of this loan only heating for institutional buildings can be financed. However, in the case of Ungheni, the capacity of the heating plants constructed is large enough to accommodate local residential demand, if funding can be found to connect residential buildings to the heat distribution network. The projects, which are developed by the Moldova World Bank Energy Projects Implementation Unit, are acting as demonstration projects, encouraging the local authorities to continue to construct new boiler plants afterwards. Furthermore, the Energy 2 programme also finances the introduction of a new SCADA system, i.e. a dispatch management system, within the transmission and dispatching company Moldelectrica, which offers the future possibility to connect the Moldovan electricity grid to the Union for the Coordination of Transmission of Electricity grid[192];
- The European Bank for Reconstruction and Development is working on the implementation of a credit line dedicated to energy efficiency in the Republic of Moldova, based on the experience of similar energy efficiency credit lines in Bulgaria and Ukraine. EBRD has conducted a study on the energy efficiency market in the Republic of Moldova in 2008[193]. Furthermore EBRD is working as well on establishing the Moldova Sustainable Energy Financing Facility (MoSEFF)[194]. Credit lines will be offered through partner banks for on-lending to investments in sustainable energy (the focus will be on energy efficiency in industries, agribusiness and commercial buildings as well as renewable energy production). Donor (EU TACIS) funded technical assistance from specialized consultants to Sub-borrowers and Participating Banks will be offered. Incentive payments paid to Participating Banks and completion fees paid to Sub-borrowers upon successful implementation of eligible investments will be available as well. The next steps on the establishment of MoSEFF are as following: (1) project consultant Fichtner GmbH (Germany) settled in Moldova (September 2009); (2) commitment of interest from local banks (September-October 2009); (3) Loan agreements with participating banks (November 2009); and (4) first energy efficiency and renewable energy projects financed (December 2009 - January 2010);
- The United States Agency for International Development has completed four projects related to energy efficiency: Energy Sector Regulatory Development, Municipal Network for Energy Efficiency (MUNEE), Moldova Energy Efficiency Weatherization, and Power Sector Privatization. However, three years ago USAID decided to phase out energy projects and there are no current or prospective ones in this area[22];
- The Norwegian Ministry of Foreign Affairs is financing a four to five year project named Cleaner Production and Energy Efficiency in the Republic of Moldova. In the framework of the project a small revolving Fund for Cleaner Production and Energy Efficiency (USD 30,000) has been established[22].

Commercial financing mechanisms

So far commercial banks in the Republic of Moldova have not actively financed energy efficiency or renewable energy sources projects, or developed any dedicated credit lines.

One likely reason why energy efficiency and renewable energy projects have so far only been financed by international financial institutions is the high interest rates that Moldovan banks charge at the moment, in the range of 15 to 17 percent for foreign currency and 24 to 26 percent for the national currency[195].

Other support mechanisms

Currently, the EBRD operates the Turn-Around Management (TAM) and Business Advisory Services (BAS) Programmes in the Republic of Moldova, which help private enterprises to adapt to the demands of a market economy. The TAM Programme focuses on substantial managerial and structural changes within large companies, providing the advisory services of experienced senior executives from economically developed countries. The BAS Programme, on the other hand, supports short-term projects with smaller-range objectives and, at the same time, supports the development of a market for local business advisory services for support of small and medium enterprises. Since February 2009 energy efficiency programmes are carried out (mainly energy audits) within the BAS Programme. The BAS Programme can carry out 72 projects within 3 years based on a funding of EUR 400,000, which allocates around EUR 5,000 to each project. The TAM Programme supports only three companies with a funding of each EUR 150,000[193].

11.7.7. Barriers to the implementation of energy efficiency and renewable energy projects

Box 7: Summary of barriers to the implementation of energy efficiency and renewable energy projects in the Republic of Moldova

Legal, institutional and administrative barriers

1. The development of private business is low and all energy efficiency or renewable energy projects under development so far are being developed by state institutions.
2. According to international observers, the environment for foreign investments appears to be only moderately attractive, despite the presence of a dedicated state organization.
3. Excessive fragmentation of land ownership hinders the development of large-scale biomass residue collection.
4. The revision of the current law on energy conservation has created an unclear situation with respect to the former National Agency for Energy Conservation.
5. No secondary legislation to guarantee the implementation of the regulatory framework (e.g. support to the development of ESCOs) has been developed.
6. Public tendering process for project development by private companies have not been established.
7. Most of the electricity production capacity is located in the region of Transnistria, which is characterized by an uncertain administrative status.

Economic and financial barriers

8. There is currently no availability of national or municipal funds for the development of energy efficiency and renewable energy projects.
9. The private business sector is very limited in the Republic of Moldova.
10. The new feed-in tariff has not yet become effectively operational, since some technical details have not yet been solved.
11. High local interest rates hinder the formation of a market of private companies involved in the development of energy projects.

Lack of awareness, human capacities and professional skills

12. The Republic of Moldova is characterized by a low level of awareness among the population and policy makers.
13. The lack of private project developers in the Republic of Moldova is an indicator for the lack of financial resources and lack of awareness of investment return possibilities.
14. Commercial banks suffer from the lack of sustainable awareness, standards and instruments.

Legal, institutional and administrative barriers

Several legal, institutional, and administrative barriers could be identified during the preparation of the country analysis of the Republic of Moldova:

- The development of private business is low and all energy efficiency or renewable energy projects under development so far are being developed by state institutions (University, Ministries). No public tendering process for project development by private companies appears to be established;
- According to international observers (the Heritage Foundation, Transparency International), the environment for foreign investments appears to be only moderately attractive, despite the presence of a dedicated state organization (Moldovan Investment and Export Promotion Organization);
- At the local level, the problem of excessive fragmentation of land ownership which hinders the large-scale biomass residue collection constitutes a barrier to development of biomass projects. This barrier appears to be even more relevant in light of the fact that biomass fuels currently appear to be the most promising renewable sources of energy;

- The revision of the current Law on Energy Conservation is ongoing since 2008 and only recently a Draft Law on Energy Efficiency has been developed, which is still in the consultation process. Subsequently to this lack of progress, no secondary legislation to guarantee implementation of regulatory framework (e.g. to support the development of ESCOs) has been developed so far;

- Furthermore, the revision of the current Law on Energy Conservation has created an unclear situation with respect to the former National Agency for Energy Conservation, while there is no information available on the expected start of operations of the National Agency for Energy Efficiency, which was planned for January 2010;

- Similarly to the uncertainty surrounding the start of the operation of the National Agency for Energy Efficiency, and probably in relation with it, there is unclarity about the establishment of the new Energy Efficiency Fund, which was planned for the end of 2008;

- Another factor of instability and discontinuity in the Moldovan energy sector is the close-down of the Ministry of Energy and the transfer of its tasks to the Ministry of Economy. While there is no reliable information related to the motivation behind this reorganization, it appears obvious that this has led to a discontinuity in the implementation of energy-related activities;

- Relating to renewable energy sources, a major barrier to the development of investments is the new feed-in tariff, which has been developed in early 2009, but has not yet become operational. Additionally, there are existing gaps related to the size of the renewable power plants and the tariff that they might obtain and it is not clear how and when the feed-in tariff will be implemented, i.e. ANRE is still in the process of receiving technical assistance from the European Union regarding the feed-in tariff methodology (for the time being, there are no reference values for the feed-in tariff that would allow comparison of the price premiums compared to other countries in the project region);

- One of the most evident problems in the energy sector in the Republic of Moldova is not only the high dependency on energy imports but also the current situation of the energy infrastructure and its extreme vulnerability towards political factors: 80 per cent of electricity production capacity is located in the region of Transnistria, which is characterized by an uncertain administrative status and separatist tendencies towards central administration. Furthermore, the fact that the balancing of the national electric system is undertaken by the Ukrainian system and that no synchronous operation of the electric grid is possible with neighbouring Bulgaria and Romania, points out the urgency of a reorganization of the responsibilities for asset management and for the operations of the national transmission system (currently under the responsibility of the Republic of Moldova's transmission and dispatching company Moldelectrica). Providing security, transparency, and reliability of operations of the transmission grid would provide a positive environment for private project developers and allow further progress in the liberalization of the electricity market, which is currently stalled until these technical issues have been solved. In order to tackle these issues, the Republic of Moldova is under way to join the Energy Community and the Union for the Coordination of Transmission of Electricity.

Economic and financial barriers

Given the economic situation of the Republic of Moldova, it is evident that economic and financial barriers are of fundamental relevance for the development of investments:

- There is no availability of funds in national or municipal budgets for the development of energy efficiency and renewable energy projects and the current situation of degradation and disrepair of the municipal district heating systems is symptomatic for the lack of financial means for reconstruction of the infrastructure;

- The private business sector is very limited in the Republic of Moldova and only the TAM and BAS Programmes of the European Bank of Reconstruction and Development appear to bring a tangible support to the development of small and medium enterprises.

The high interest rates applied by commercial Moldovan banks for loans to private investors obviously don't support the formation of a market of private companies involved in the development of energy projects; the strong increase of interest rates and of request for collaterals following the current financial crisis makes the present situation even more dramatic.

Lack of awareness, human capacities and professional skills

While technological skills appear to be reasonably well developed in the Republic of Moldova, at the same time they appear to be concentrated in those public institutions that are in charge of the development of the projects (Ministries, University). Furthermore, because the current projects are financed through credit lines of international financial institutions (e.g. the World Bank), there are not enough skills available regarding business development and the preparation of bankable project proposals.

The lack of private companies active in the sector of project development is an indicator not only of a lack of financial resources, but also of a lack of awareness of the possibilities of investment return offered by the energy sector, and this despite the fact that Moldovan final customers currently pay by far the highest energy tariffs in the entire project region.

Finally, given that the Moldovan economy is strongly linked to agricultural activities, the development of a higher awareness of the economic value of biomass residues from agriculture, forestry, and animal husbandry as renewable fuels for electricity, gas, and heat production should be strongly supported.

11.8. *Romania*

11.8.1. Overview of economic situation

General demographic data

Romania has a surface area of 238,391 km^2, while its population amounts to 21.529 million, resulting in a population density of 90.3 inhabitants/ km^2. The Romanian capital is Bucharest with 1.925 million inhabitants. There are 26 cities with a population over 100,000. The share of the urban population in the total population is 55 per cent. The population fell by 1.1 million or 4.95 per cent in the decade of 1992 to 2002 and the population growth has been still in decline in recent years (-0.19 per cent in 2007)[196], partly due to low fertility and high emigration rates.

Current political situation and outlook

Romania is a semi-presidential democratic republic, where executive functions are shared between the President and the Prime Minister. Romania, which joined the European Union on 1 January 2007, began the transition from Communism in 1989.

The bicameral Parliament consists of the Senate (137 seats; members are elected by popular vote in a mixed electoral system to serve four-year terms) and the Chamber of Deputies or Camera Deputatilor (334 seats; members are elected by popular vote in a mixed electoral system to serve four-year terms).

The current Prime Minister is Emil Boc, president of the Democratic Liberal Party. He and his cabinet were confirmed by the Parliament on 22 December 2008. Traian Basescu has been the President of Romania since 20 December 2004. On 20 April 2007 he was suspended from the office after Romania’s Parliament accused him of abusing his constitutional powers. He re-assumed the office on 23 May 2007 after the Romanian Constitutional Court certified results of a referendum where 74 per cent of voters rejected Basescu's impeachment[197]. He was re-elected by a narrow margin on 6 December 2009 after a run-off vote against Mircea Geoana. The next parliamentary elections are scheduled for 2012.

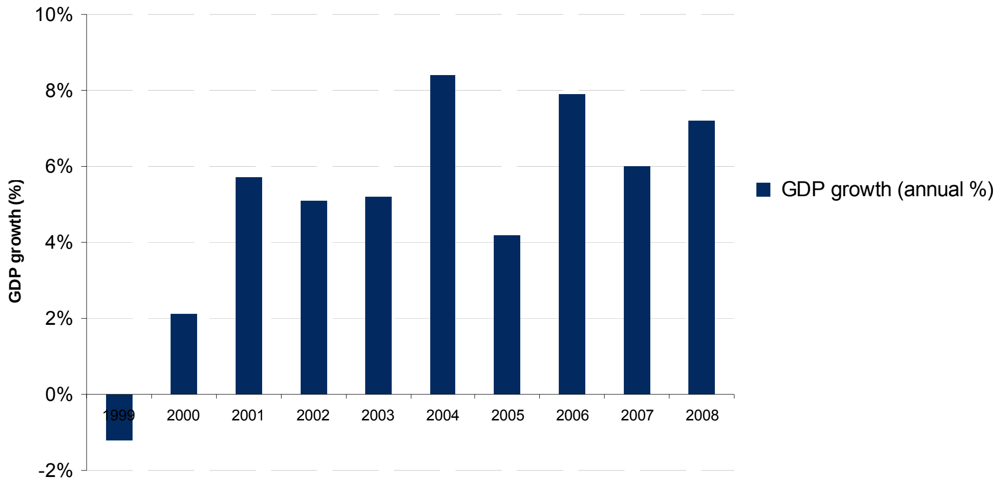
Romania is administratively divided into 41 counties, plus the municipality of Bucharest, which has equal rank. Each county is administered by a county council, which is responsible for local affairs, as well as a prefect, who is appointed by the central government, which is responsible for the administration of national affairs at the county level. Each county is further subdivided into cities and communes, the former being urban, and the latter being rural localities. There are a total of 319 cities and 2,686 communes in Romania. Each city and commune has its own mayor and local council. 103 of the larger and more urbanized cities have the status of municipality, which gives them greater administrative power over local affairs[198].

Gross Domestic Product

Romania emerged in 2000 from a three-year recession thanks to strong demand in EU export markets. Domestic consumption and investment have fueled strong gross domestic growth in recent years, but have led to large current account imbalances.

Romania's macroeconomic gains have only recently started to encourage the creation of a middle class and address Romania's widespread poverty. Inflation increased in 2007-08, driven in part by strong consumer demand and high wage growth, rising energy costs, and a nation-wide drought affecting food prices. Romania's strong GDP growth (see Figure 11.85), which averaged almost six per cent from 2000 to 2008, moderated markedly in the last quarter of 2008 as the country began to feel the effects of a global downturn in financial markets and trade, and growth is expected to be much weaker in 2009. According to Eurostat, Romania’s GDP is expected to contract by four per cent in 2009[199]. Romania plans to adopt the Euro by 2014.

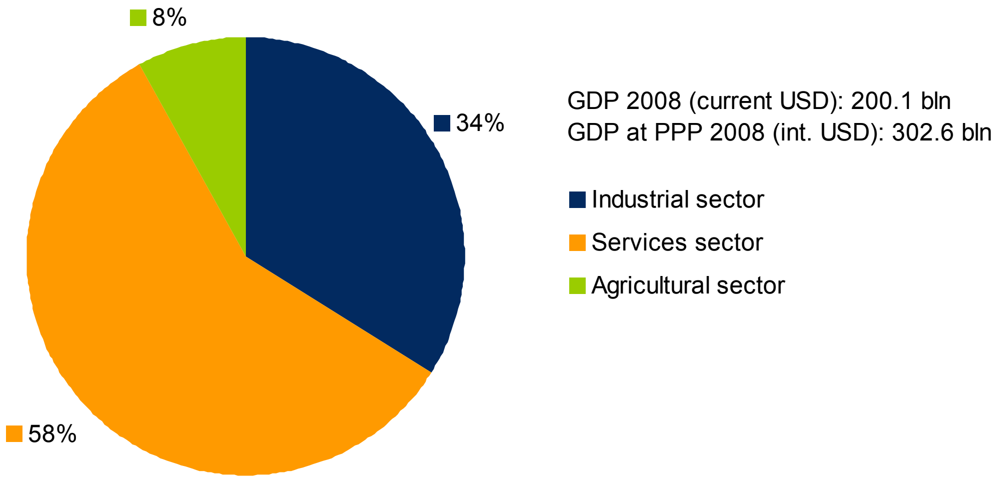
Figure 11.85: Real GDP growth of Romania



Source: World Bank[196] (2009) and Eurostat[199] (2009)

The repartition of the GDP in 2008 can be seen in Figure 11.86 and shows the strong role of the industrial sector with a share of 34 per cent. The industrial sector is mostly focused on the following sub-sectors: electric machinery and equipment, textiles and footwear, light machinery and auto assembly, mining, timber, construction materials, metallurgy, chemicals, food processing, and petroleum refining[196].

Figure 11.86: Repartition of the Gross Domestic Product in Romania in 2008



World Bank[196] (2009)

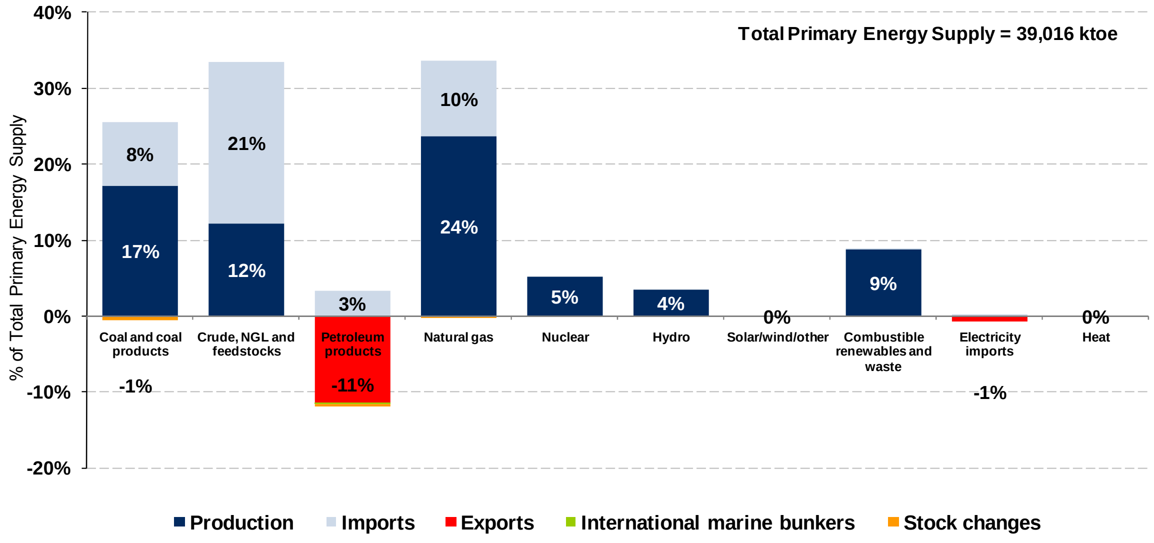
11.8.2. Energy sector and development of energy markets

Energy supply

Romania imports fossil fuels, mainly crude oil which is refined into petroleum products dedicated to export (see Figure 11.87). Its total primary energy supply in 2007 amounted to 39,016 ktoe. The demand of imported energy resources is expected to increase from 31 per cent in 2007 to 49-50 per cent in 2015. The demand of imported natural gas forecasts predicts an increase from 20 to 60 per cent[200]. Imports of crude oil, natural gas, and oil products represented over 80 per cent of the total imports in 2007 at the national level.

At present, Romania depends entirely on one natural gas supplier, the Russian Federation. Furthermore, the country was a net electricity exporter in 2007, although electricity exports amounted to only 0.5 per cent of the energy balance.

Figure 11.87: Energy balance of Romania by primary energy sources in 2007



Source: IEA[5] (2009)

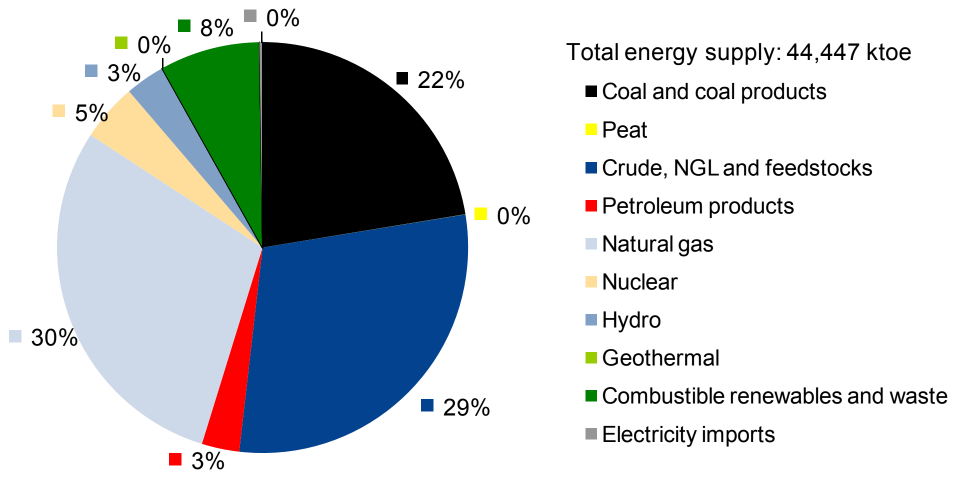
Romania's overall energy supply is well diversified, using the complete range of fossil fuels, dominated by gas (29 per cent) and crude oil (30 per cent), as shown Figure 11.87.

Romania has own fossil fuel and hydroelectric resources: crude oil reserves of about 82 Mt, proven natural gas reserves estimated at 394 Gm^3, and estimated coal reserves of 3.98 billion tonnes. Most of these reserves are lignite and sub-bituminous coal.

Hydropower, including a large network of small hydropower stations (<10 MW)[201], generates a large part of electricity (26 per cent), while the majority of electricity is generated from coal power plants (41 per cent), as shown in Figure 11.88. Gas is also an important source of electricity generation (19 per cent). Romania currently has 1,400 MW of nuclear power capacity by means of one active nuclear power plant (Cernavodă) with two reactors, which makes up to around 12 per cent of the national power generation of the country. Three more partially-completed reactors exist on the same site, but have been discontinued after the of the Nicolae Ceauşescu regime. However, Nuclearelectrica, the state-owned nuclear power operator, has units three and four already in their planning stages (740 MW), with expected completion dates of 2014 and 2015, respectively. When completed, the four units combined are expected to provide up to 40 per cent of Romania's total electricity needs, reducing its dependence on fossil fuels for electricity generation. In order to finance the projected EUR four billion costs, the government is planning to sell a stake in Nuclearelectrica[202].

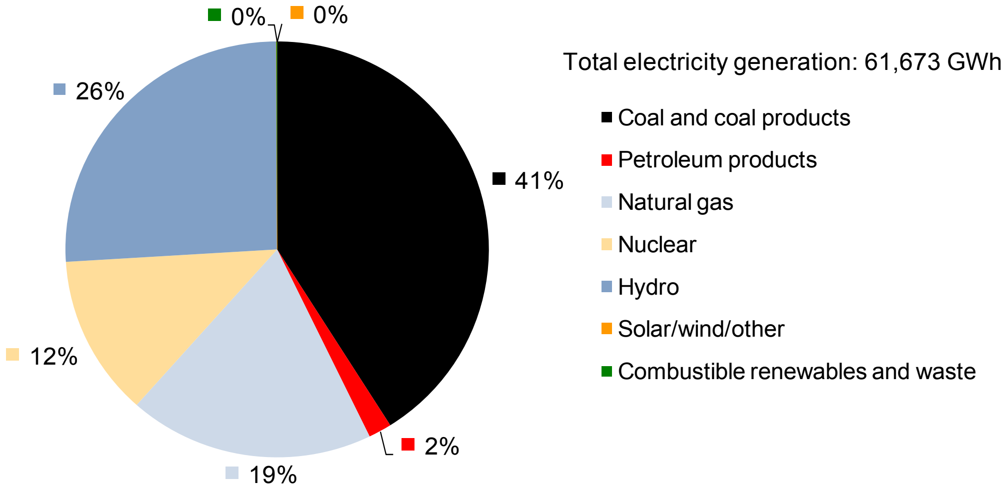
Gas represents a huge part of heat supply (66 per cent). National coal resources complement the heat supply with cogeneration infrastructures (26 per cent). Figure 11.89 depicts the heat supply.

Figure 11.88: Supply of primary energy by sources in 2007



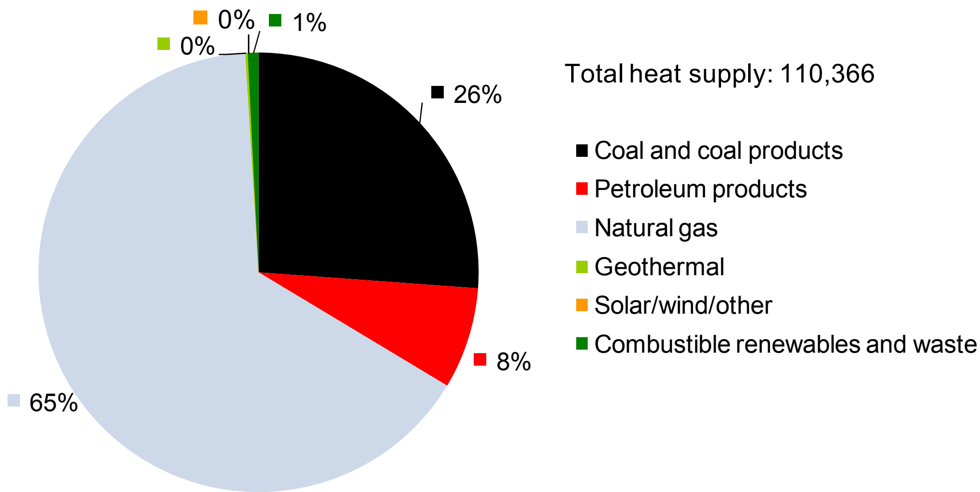
Source: IEA[5] (2009)

Figure 11.89: Electricity generation by sources in 2007



Source: IEA[5] (2009)

Figure 11.90: Supply of heat by sources in 2007



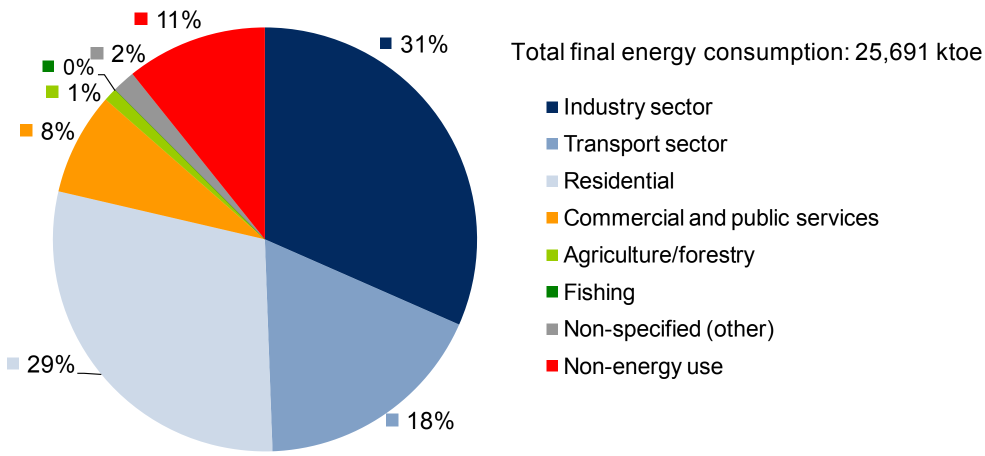
Source: IEA[5] (2009)

Energy demand

Industry and residential sectors are the two largest consumers of energy, with respectively 31 per cent and 29 per cent of the total primary energy consumption of Romania (see Figure 11.91).

The non-energy use of fossil fuels, i.e. fuels that are used as raw materials and are not consumed as a fuel or transformed into another fuel, is mainly based on crude oil (52 PJ) and natural gas (34 PJ)[5].

Figure 11.91: Total final energy consumption by sectors in 2007



Source: IEA[5] (2009)

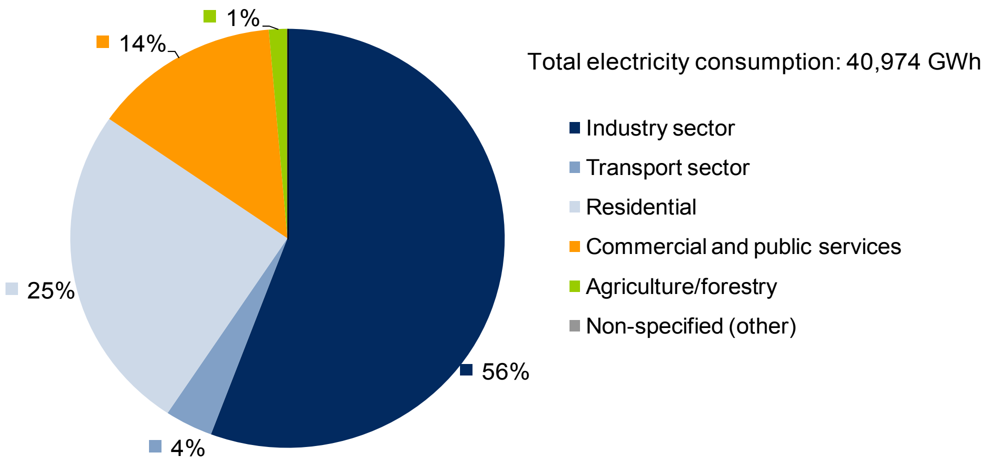
A strong demand for electricity from the industry sector (56 per cent) demonstrates an intense industrial activity, especially in automotive, machine manufacturing, and equipment (see Figure 11.92). A heavy concentration of automotive assembly lines of European, Asian, and even American brands in Romania explains this high share of electricity in the total energy consumption of the industry.

The industry sector shows a large consumption of gas (45 per cent), as shown in Figure 11.93. followed by the residential sector with a share of 28 per cent.

In Romania, the residential sector represents 70 per cent of the total heat consumption, as shown in Figure 11.94. In Romania, the duration of the heating period is in the range of 5.5-7 months/year. Therefore, heating accounts for an extensive share of the national energy consumption. The energy use of residential and commercial buildings has been increasing since 2000. According to the Agency for Energy Conservation (ARCE)[203], thermal energy consumed in housing represents 82 per cent of the total sector consumption (57 per cent for heating and 25 per cent for hot water)[22].

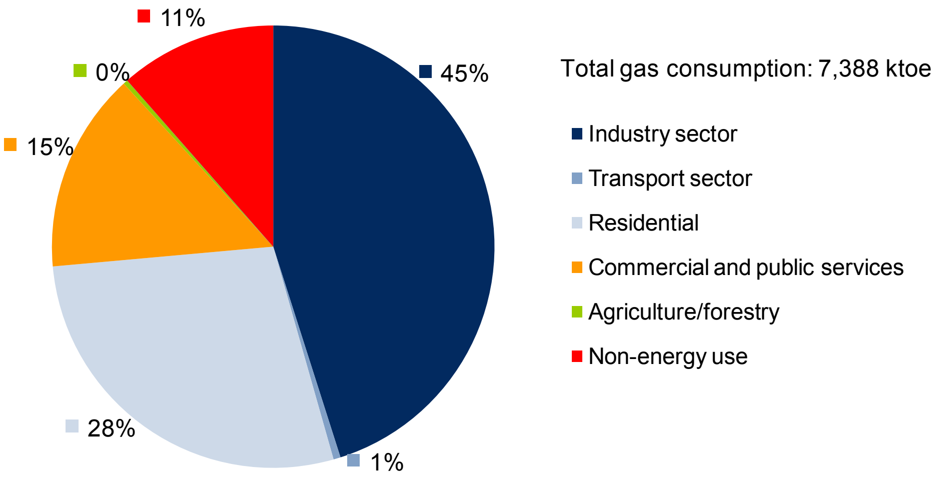
In 2005, district heating systems supplied heat and hot water to around 31 per cent of the total population, which includes 55 per cent of the urban population[200].

Figure 11.92: Final consumption of electricity by sectors in 2007



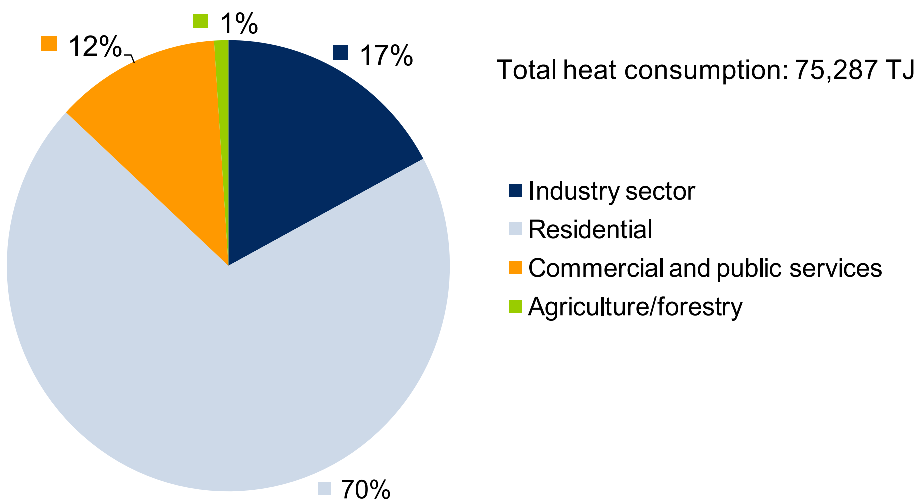
Source: IEA[5] (2009)

Figure 11.93: Final consumption of gas by sectors in 2007



Source: IEA[5] (2009)

Figure 11.94: Final consumption of heat by sectors in 2007



Source: IEA[5] (2009)

Energy markets

Electricity market

In July 2000, the Romanian government decided to break up the former national electricity company Compania Nationala De Electricitate (CONEL). As of today the electricity sector comprises separate companies for power transmission and balancing market administration (Transelectrica), electricity and district heating production from thermal power plants (Termoelectrica), hydro power generation (Hidroelectrica), electricity distribution and supply (Electrica), and nuclear power generation (Nuclearelectrica). The policy of the government is to transform the state-owned electricity monopoly into a competitive market, also by privatizing (parts of) generation and distribution assets[22]. Termoelectrica was responsible for the majority of thermal generation in the country, but divested sixteen cogeneration power plants to local administrations between 1998 and 2002, and to four commercial companies in 2002: S.C. Electrocentrale Rovinari S.A., S.C. Electrocentrale Turceni S.A., S.C. Electrocentrale Bucuresti S.A. (Elcen), and S.C. Electrocentrale Deva S.A..

In the distribution sector, foreign companies have already taken control of regional networks previously operated by Electrica. Five out of eight distributors have been privatized in 2007. Enel (Italy) purchased three of the eight distribution companies, i.e. Electrica Dobrugea, Electrica Banat, and Electrica Muntenia Sud, resulting in a 30 per cent distribution market share. Electrica Moldova, which is covering 15 per cent of the electricity market, was bought by E.ON, while CEZ (Czech Republic) took over Electrica Oltenia, thus obtaining a market share of 16 per cent[200].

The market model is based on bilateral contracts between generators and suppliers, contracts that can be negotiated or regulated. The regulated contracts are concluded between generators and suppliers of captive consumers. Besides contracts, participants to the wholesale electricity market have the possibility to participate in a physical electricity market organized one day before the delivery date. This market is administered by the market operator OPCOM. The participation in this market is voluntary, and is based on a simple price mechanism – quantity bids for each hourly trading interval of the next day. Market trades are concluded at the market clearing price. OPCOM administers also a centralized market for bilateral contracts since November 2005 and the green certificates market since October 2005. OPCOM works as a power exchange for the physical market since 2003[204].

Electricity tariffs

Residential consumers used to be considered as captive customers, supplied at tariffs established by the National Regulatory Authority in Electricity, but since July 2007, households are allowed to switch their supplier. Electricity suppliers are using two different tariffs for the population, i.e. a social tariff (annual consumption below 600 kWh) and an optional “monom”[xix] tariff with subscription. Between 1999 and 2004, the social tariff for electricity increased from 29 EUR/MWh to 46.4 EUR/MWh (60 per cent increase)[200]. The optional tariff “monom” (with subscription) is directed at consumers having up to 1,200 kWh or 3,500 kWh of annual consumption, respectively. For 1,200 kWh/year consumption, the price increased from 47.5 EUR/MWh in 1999 to 83.8 EUR/MWh in 2004, which means a 76 per cent increase. For 3,500 kWh/year the price increased by around 95 per cent.

Electricity prices for industrial consumers have been liberalized[200]. The exact electricity prices can be seen in Table A 3.2.4.

In the electricity sector, direct cross-subsidies between household and industrial consumers have been eliminated in 1999 and cross-subsidies between electricity and heat have been eliminated in 2000.

[xix] Means “monomial”, an electricity tariff, considering the reactive electricity consumed below a value set.

Gas market

Based on the Governmental Decision No. 334, the monopolist Societatea Nationala de Gaze Naturale Romgaz S.A (Romgaz), was restructured and reorganized, by totally unbundling the main gas chain activities into separate entities: Transgaz S.A. Medias is responsible for the natural gas transmission, Depogaz S.A. Ploiesti is responsible for the natural gas storage, Distrigaz Nord S.A. Targu Mures and Distrigaz Sud S.A. Bucharest are responsible for the natural gas distribution, Exprogaz S.A. Medias acts as a gas trading company, while the original monopolist Romgaz is responsible for the gas exploitation and owns 3,600 gas wells[205].

There are eight active distribution companies but Distrigaz Nord and Distrigaz Sud, respectively controlled by Gaz de France and E.ON, supply around 90 per cent of the connected communities. Furthermore, the competition level among gas suppliers is rather low due to the regional monopolistic nature of the market[22].

Gas tariffs

In the natural gas sector, cross-subsidies between household and industrial consumers have been removed in 2000[200]. Since 2005 households gas prices have risen by 26 per cent but are still about 49 per cent below the European average. Industrial user prices have risen by 120 per cent over the last four years, but remain about 39 per cent lower than the averages for the EU-15 and EU-25 countries. Prices for industrial users are lower in absolute terms than for households[206]. The evolution of Romanian gas prices from 2003 to 2008 can be seen in Table A 3.1.4

Heating market

District heating plays a very important role in Romania, covering 30 per cent of the building stock at the national level, and even 58 per cent in urban areas. A total of 179 operators of district heating networks supply thermal energy, some of which purchased the heat from third parties and the majority of which produced and distributed heat from their own heat stations and cogeneration plants. District heating systems are mainly fuelled with gas and according to the PEEREA report, the quality of heat supply is rather poor[200].

Heating tariffs

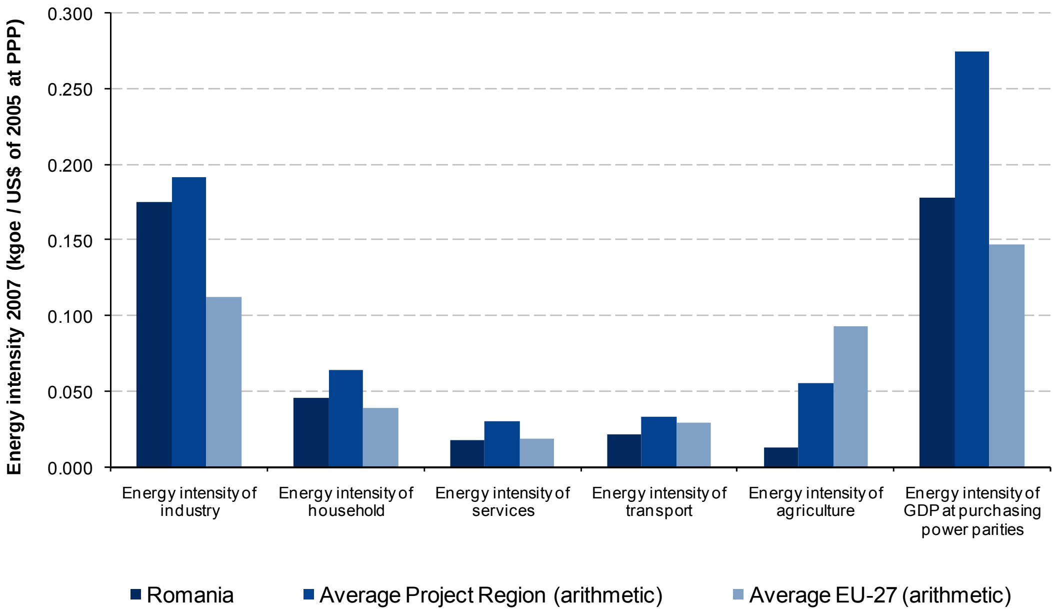
Heat prices for end-users are established on a local reference price, which replaced the national reference price set by the Romanian Energy Regulatory Authority until 2006. The Government Ordinance 36/2006 established local reference prices (LRP) for energy provided by district heating systems. The ordinance provides that local reference prices for each location are determined by regulatory authorities and prices of local heat are approved by local authorities. Local authorities may approve local prices higher or lower than the LRP. Energy providers can benefit from subsidies for purchase of fuel from the state budget and additional subsidies from the local budgets. The amounts granted by the state budget and local budgets can be provided in advance for the formation of stocks of fuel for winter. Subsidies should be only used for costs directly related to services of heat generation, transmission, distribution, and supply to the population[17].

11.8.3. Current situation with respect to energy efficiency and future potential for energy savings and increase in efficiency

Energy intensity

The energy intensity of GDP at purchasing power parities for Romania in 2007 is around 20 per cent higher than the EU-27 average and 35 per cent lower than the project region average (see Figure 11.95)[6].

Figure 11.95: Primary energy intensity at Purchasing Power Parity in 2007



Source: Enerdata[6] (2007)

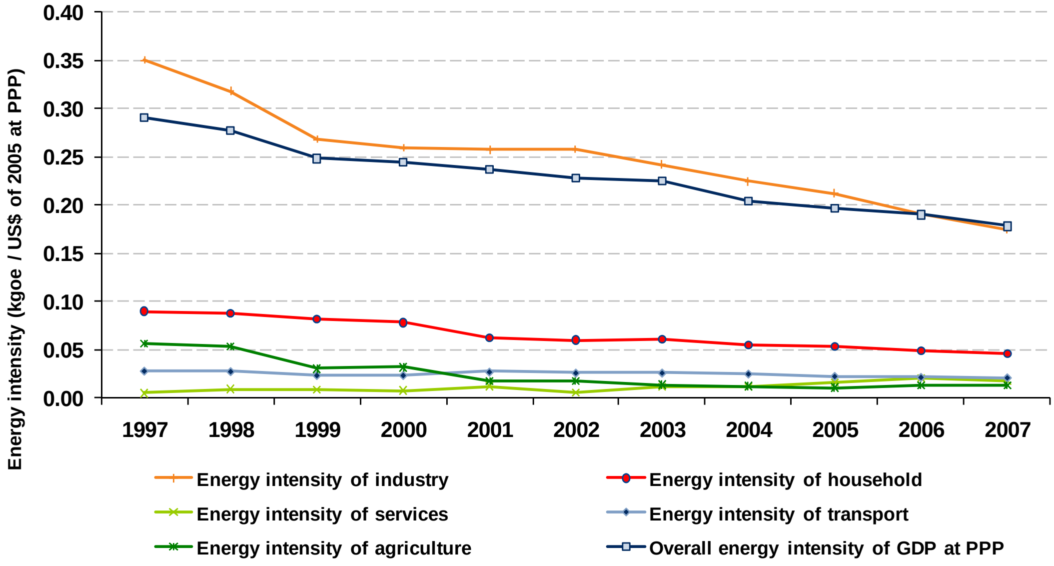
The period following 1990 has been characterized by a significant decrease in energy use in the country. This reduction in energy consumption is not a sign of improved energy efficiency, but is due to many other factors inherent to the transitional period. Final energy consumption in 2005 was still 40 per cent lower than in 1990[22]. Since 1997 the energy intensity of GDP decreased by 40 per cent (see Figure 11.96).

Industry consumes most of the fossil fuels (70 per cent of the total final consumption of the sector). The chemical and petrochemical, metallurgical, and construction sectors are the principal industrial consumers. In 2003, the National Agency for Energy Conservation (ARCE) estimates the potential for energy conservation around 17 per cent of the sector consumption. Although the energy intensity level of the industrial sector decreased by 50 per cent in the last decade (see Figure 11.96), for 2007 it is considerably higher than the EU-27 average and slightly below the project region average (see Figure 11.95)[6].

The energy intensity of the household sector decreased by 50 per cent since 1997 (see Figure 11.96) and for 2007 it is slightly higher than the EU-27 average and lower than the project region average (see Figure 11.95). Although the energy intensity level of the services sector for 2007 is lower than the two reference values (see Figure 11.95), it experienced an increase of 250 per cent in the last decade (see Figure 11.96).

Finally, the agricultural sector displays a very low energy intensity level compared to the two reference values. Although it decreased by over 75 per cent since 1997 (see Figure 11.96), the period of 2005 to 2007 saw actually an increase of energy intensity levels.

Figure 11.96: Primary energy intensity in Romania by sector at Purchasing Power Parity



Source: Enerdata[6] (2007)

Energy losses from electricity and gas grids

Electricity losses in Romania are low comparatively to the project region, amounting to less than ten per cent of total production[207].

District heating grid

Many district heating systems feature obsolete technology, designed in the 1970s, which exhibit low energy efficiency together with high production costs and energy losses (between 30-35 per cent). The economic value of losses inside district heating systems in 2002 amounted to 0.25 per cent of the GDP (around USD 126 million)[200].

Other sources of inefficiency

Besides the poor quality of most district heating networks, inadequate construction solutions and a lack of repair funds for apartment buildings led to important supplementary heat losses of around ten to 15 per cent. In many towns, these problems have been correlated to large-scale rehabilitation projects, sometimes co-financed by international financial institutions like the World Bank, the European Bank for Reconstruction and Development, and the European Investment Bank[200].

Estimated potential for energy savings by sector

The National Strategy for Energy Efficiency (Governmental Decision 163/2004) estimates the average value of the energy saving potential at 30 to 40 per cent. The potential energy saving targets have been set as a part of the energy efficiency policy over the period 2004 to 2015. The National Strategy for Energy Efficiency assumes an average annual growth rate of the GDP of 5.4 per cent. The maximum annual energy savings of primary resources is about 11.031 Mtoe. For the entire period 2004 to 2015 it results in total savings of about 132 Mtoe, representing a diminution of the financial effort estimated to about EUR 17.6 billion[200].

Table 11.21: Estimated potential energy savings by sector

Sector	Total annual primary energy savings	Total annual reduction of CO_2 emissions
	ktoe	kton CO_2
Industry	1,752	417
Residential	4,278	10,181
Transport	1,575	3,748
Tertiary	247	587
District Heating	3,179	7,566
TOTAL	11,031	26,252

Source: Energy Charter[200] (2006)

ESCOs and other initiatives in energy efficiency

There are currently three Energy Service Companies (ESCOs) operating in Romania:

- The private company Energy Serv S.A., has been created in 1996 as the first Romanian ESCO, and focuses on steam boilers, process heaters in the power sector, refineries, and petrochemicals. The maximum pay-back time is three years[208];
- In 2003, the EBRD which contributed USD 11 million and the Romanian American Investment Fund (RAEF) which contributed USD four million, established the Romanian Industrial Energy Efficiency Company (RIEEC). RIEEC was one of the first energy ESCOs in Romania to provide financing for energy efficiency investments in creditworthy industrial companies. RIEEC makes standardized investments in on-site cogeneration systems, which enable companies to significantly reduce energy consumption. Although RIEEC planned to finance around 15 such projects, as of 2008 only three projects have been financed[209];
- Eco-Energo, has been launched in May 2005, as a joint-venture between the Canadian company Econoler International and EnergoBit from Cluj-Napoca[18].

The Romanian Agency for Energy Conservation started several awareness-raising actions (seminars, publications in mass-media) in order to present the importance and the role of third-party financing or Energy Services Companies in the field of energy efficiency investments[200].

11.8.4. Current situation with respect to renewable energy sources and future deployment potential

Deployment of renewable energy sources

Combustible renewables and waste account for around eight per cent of the total Romanian primary energy supply, most of it being used directly by households for heating purposes, without any intermediary heat generation process (concerning process heat production, only one per cent come from renewable energy sources)[5].

Hydro power accounts for three per cent of the total primary energy supply and for 26 per cent of the total electricity generation of Romania[5].

Estimated potential for renewable energy sources

The renewable energy sources have an important untapped energy potential in Romania, which can be used at a local as well as national level[200].

The National Energy Observatory, which is in charge of establishing the main energy efficiency indicators for Romania, provided an estimation of the potential deployment of renewable energy sources in Romania and their yearly energy production, as shown inn Table 11.22.

Table 11.22: Estimated potential of renewable energy sources in Romania

Renewable energy source	Estimated annual potential
Solar thermal energy	1,433 ktoe
Photovoltaic energy	103.2 ktoe (1.2 TWh)
Wind energy	1,978 ktoe (23 TWh)
Hydro energy	3,440 ktoe (40 TWh)
Biomass	7,597 ktoe
Geothermal	167 ktoe

Source: Energy Charter[200] (2006)

According to the data presented above, biomass represents the greatest energy potential at present (7.6 Mtoe/year). It should be mentioned that firewood and agricultural waste (biomass) already hold a relatively significant share in the internal production of primary energy (eight to ten per cent). They are especially utilized in rural areas. The utilization of biomass in Romanian villages is the object of several programmes aiming at the use of modern technologies based on biomass burning. Hydro energy has also has an important potential, out of which less than half is utilized at present[200].

Projects and initiatives in renewable energy sources

Most renewable energy sources assets are owned by state-owned Hidroelectrica, which owns 326 power plants and pumping stations with a total installed capacity of 6,335 MW. However, more than half of the total number of micro-hydro power plants belonging to Hidroelectrica have been sold to foreign and Romanian companies[17].

As of April 2009, the total installed capacity of wind power plants in Romania is 11 MW. Nevertheless, several bigger projects are under construction or in the planning phase, as shown in Table 11.23.

Table 11.23: List of selected wind power plants under construction in Romania

Location	Status	Generation Capacity	Investment	Investor
Dobrogea	Planned	1,500 MW	EUR 2.5 billion	Iberdrola acquired licenses from Eolica Dobrogea
Moldova	Planned	700 MW	EUR 500-600 million.	Sinus Holding
Dobrogea	Planned	600 MW	n.a.	Tomis Team
Constanta offshore	Planned	500 MW	USD 1.4 billion	Blackstone Group
Dobrogea	Planned	2010: 50 MW 2012: 400 MW	EUR 560 million	Eviva Energy (member of Martifer Group)
Tulcea	Planned	210+70 MW	n.a.	Enel
Tulcea	Planned	200 MW	EUR 300-350 million	Green Energy
Tulcea	Planned	150-200 MW	EUR 300-400 million	Verbund
Gradina / Pantelimon / Targusor	Planned	150 MW	n.a.	Eolica Dobrogea AG
Gradina / Pantelimon / Targusor	Planned	150 MW	n.a.	Electrica
Vasluj	Planned	80 MW	n.a.	E.ON
Black Sea coast	Planned	36 MW	n.a.	Ecowind
Black Sea coast	Planned	26 MW	EUR 48 million	Rokura
Black Sea coast	Planned	36 MW	n.a.	Ecowind
Black Sea coast	Planned	30 MW	n.a.	Rukura
Black Sea coast	Planned	30 MW	n.a.	Energo
Cluj	Planned	45 MW	EUR 64 million	Ramina Eol
Fantanele, Constanta	Under Construction	2009: 347 MW 2011: 600 MW	EUR 1,100 million	CEZ
Falciu-Berenzeni, Vaslui	Under Construction	30 MW	EUR 50 million	E.ON
Valu lui Traian, Constanta	Under Construction	10 MW	EUR 12 million	Grivco
Baia, Tulcea Country	Under Construction	35 MW	EUR 60 million	Blue Investment
Liteni, Suceava	Under Construction	34 MW	n.a.	Ulli Rowing
Orsova, Mehedinti	Under Construction	35 MW	EUR 50 million	Toplet Energy

Source: Pöyry Expert Team[17] (2009)

11.8.5. Institutional, regulatory and policy framework for energy efficiency and renewable energy sources

Policymakers in the energy sector

Institutional policymakers

The ministries in charge of policymaking in the Romanian energy sector[22] are listed below.

- The Ministry of Economy and Finance is at present the dedicated institution carrying out the Romanian Government's policy in the energy sector. Some of its most important tasks comprise the development of energy strategies and programmes, as well as policies for the development of the energy sector (electricity, heat, hydro, nuclear energy, oil, gas, and mineral resources), the management of state-owned facilities in the field of mineral resources, energy transmission, oil and natural gas transport through economic agents and public institutions functioning under its authority, and the harmonization of legislative regulations with those in the EU;
- The Ministry of the Environment and Sustainable Development (MMDD) is the entity responsible for the management of environmental risks associated with energy activities and for instance organizes environment radioactivity monitoring on the entire territory of the country;

- The Ministry of Administration and Internal Affairs (MAI) plays an important part, as well. Most of the cogeneration plants, as well as all the district heating systems are subordinated to municipalities and, from a technical point of view, are coordinated by the Ministry of Administration and Internal Affairs.

Apart from the mentioned ministries, the governmental agencies in charge of policymaking in the Romanian energy sector[22] are listed below.

- The Romanian Energy Regulatory Authority (ANRE) has been created by the merger of the Romanian Electricity and Heat Regulatory Authority (also ANRE) and the National Gas Regulatory Authority (ANRGN). ANRE ensures the proper functioning of the electricity, gas, and heat markets under conditions of efficiency, competition and transparency, and consumer protection;
- The National Regulatory Authority of the Public Services and Communal Development (ANRSC) was established in 2002. The authority issues regulations for the heat generation and distribution and district heating systems;
- The Romanian Agency for Energy Conservation (ARCE), which was created in 1990, is considered to be the main specialized body, at national level, in the field of energy efficiency. It is subordinate to the Ministry of Economy and Finance.

Regulatory and administrative institutions at the regional and local level

According to the Romanian legislation, communes (2,686), towns, municipalities and counties (41 and the municipality of Bucharest) are legal entities that may own public and private property. They have full authority and responsibility in all matters related to administrating local public interests within their established territorial units. In order to provide a real public autonomy, local authorities can determine and approve revenue and expenditure budgets for which they can collect local taxes and charges[210].

The Law on Local Public Finances (No.189/1998) stipulates that long and medium-term loans may be authorized with the only purpose of financing the public investments of local interest or refinancing the local public debt. This provision limits the municipal debt destination to infrastructure projects that are included in the public domain and sets an advisable public purpose standard for all local government credits. Furthermore, the law does not allow local communities to use the loan funds for their operational expenditures[210].

Energy policy and regulatory framework

The Romanian Electricity Law (Law No. 13 of January 2007) created the legal framework for the performance of activities in the electricity sector under conditions of safety and high standards of quality with the goal to optimize the use of primary energy resources and to protect the environment. The Law also contains provisions for issuing authorizations and licences, the obligations resulting from these, the duties of the system operators and the suppliers, and the structure of the tariff system[17].

In September 2007, the Romanian Government approved a long-term Energy Strategy for 2007-2020 (Government Decision No. 1069/2007). The Government's strategy aims to increase energy efficiency, boost renewable energy, diversify import sources and transport routes, as well as protecting critical infrastructure. Furthermore, the Energy Strategy underlines Romania's ambitions to become a major electricity exporter by 2020. Roughly EUR 35 billion will be required for its energy infrastructure until 2020, to achieve its triple priorities of security of supply, sustainable development, and competitiveness. The strategy projects total domestic electricity production rising from 62.7 TWh in 2006 to 100 TWh in 2020. To achieve this target, Romania intends to focus on increasing production from nuclear, coal, and renewable energy sources. Renewable energy production is expected to increase from 18.4 TWh in 2006 to 32.5 TWh in 2020. The strategy stipulates investments of EUR 4.7 billion for the modernization of existing hydro capacity as well as new hydro power plants, compared to EUR 1.8 billion for other new renewable energy sources such as wind and biomass[17]. To achieve its policy objectives in the electricity sector, the strategy recommends the creation of a national power sector champion. The state aims to hold 25-40 per cent of the new holding company, while the investment fund Fondul Proprieties is envisaged to hold 20 per cent, the remaining shares will be listed on the Bucharest Stock exchange[211]. By creating a national sector holding company from the consolidation of distributors and generators, policy makers believe the new entity would have the critical mass to attract financing more easily[17].

Further important legislation issued by the Government concerning the energy sector are:

- Government Decision No. 540/2004 on approving of the Regulation for granting authorizations and licences in the energy sector, as further amended and supplemented;
- Government Decision No. 1661/2008 on approving the National Programme for increasing energy efficiency and using renewable energy resources in the public sector for the years 2009–2010; and
- Government Decision No. 90/2008 on approving the Regulation for the connection of users to public electricity networks.

Policy and regulation on energy efficiency

The National Strategy for Energy Efficiency, which is the most important document concerning the energy efficiency policy in Romania, was approved by the Government in 2004. The National Strategy on Energy Efficiency sets forth the objectives concerning energy efficiency for the period up to the year 2015. The main purpose of the strategy is to identify the possibilities and means to increase energy efficiency at all levels of the energy chain, by implementing specific programmes in order to reach its ultimate goal: the increase of primary energy efficiency by 40 per cent by the year 2015. The strategy sets a priority in the residential sector, followed by the industrial and the transport sectors[22].

The Law 372/2005 transposes the EU Directive 2002/91/EC on energy performance of buildings into the Romanian legislation; it is in force since 1 January 2007 and states that starting with this date, all new buildings and public buildings need to be evaluated and to have an energy performance certificate. As of 1 January 2010 all existing buildings will be subject to this requirement, too.

Under the EU Directive 2006/32/EC on energy end-use efficiency and energy services, Bulgaria is committed to reduce its energy consumption by 13.5 per cent of the average final inland energy consumption for the period 2001-2005 before 2016.

Policy and regulation on renewable energy sources

Since Romania has significant fossil fuel resources (coal, oil, and natural gas), the development of renewable energy sources, except for hydropower, which accounts for 29 per cent of the total electricity production, has not been a primary concern until now. However, within the process of Romanian legislation harmonization with the EU legislation (specifically the EU Directive 2001/77/EC on the promotion of electricity produced from renewable energy sources), the Government Decision No. 443/2003 on the promotion of electricity production from renewable energy sources was adopted, specifying the target thresholds assumed by Romania relating to energy production from renewable energy sources by 2010 (11 per cent for primary energy consumption and 33 per cent for electricity consumption). For 2015 the threshold share of renewables in the primary energy consumption is set at 11.2 per cent (35 per cent for electricity consumption), while for 2020 the threshold share in the primary energy consumption is 24 per cent (38 per cent for electricity)[212]. This was followed by the Government Decision No.1429/2004 through which the regulations certifying the origin (source) of electricity produced from renewable energy were approved[200].

International commitments and current status of implementation

EU Regulation

Romania is an EU member state since 2007. In 2006, the country was mostly compliant with the EU energy regulation with some provision still missing in a few areas (public service obligation and customer protection, generation, unbundling, and access to accounts and cross border trade mechanisms) as confirmed by the Energy Community in its final report on compliance for electricity benchmarks[206].

The Energy Community Treaty establishing the Energy Community was signed on 25 October 2005 in Athens by the European Community and then nine Contracting Parties from South East Europe. Following ratification, the Treaty entered into force on 1 July 2006. Romania endorsed the treaty as a Contracting Party. Following its accession to the European Union, the legal status of Romania changed from Contracting Party to Participant.

Kyoto Protocol

Romania ratified the United Nations Framework Convention on Climate Change in 1994 and the Kyoto Protocol in 2001. As an Annex I and Annex B country, Romania has committed itself under the Kyoto Protocol to reduce CO_2 emissions by eight per cent in the period 2008 to 2012, compared to 1989 levels. According to the aggregated emission projection of greenhouse gases, presented in the Second National Communication to the UNFCCC of April 1998, the national target can be achieved in 2010 for all scenarios considered. In Romania, the Ministry of Environment and Sustainable Development (MMDD) is the governmental institution authorized to develop and carry out the state policy in the field of climate change. The National Environmental Protection Agency (ANPM) is the subordinated institution that has been designated by the Ministry as the Designated National Authority. Romania has signed Memoranda of Understanding concerning cooperation on Joint Implementation with nine countries[200].

Other international commitments

Romania signed the Energy Charter Treaty and its related Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects. Both entered into force in 1998 requiring Romania to formulate energy efficiency strategies and policy aims, to establish appropriate regulatory frameworks, and to develop specific programmes for the promotion of efficient energy usage in the energy sector[14].

11.8.6. Economic incentives and financing schemes for energy efficiency and renewable energy projects

General investment climate in the country

Romania benefits from the investment promotion agency – Agentia Romana pentru Investitii Straine (ARIS), which is the leading governmental body for provision of consultative services to foreign investors. A service, which will attract, retain, and grow foreign direct investment in the Romanian economy, as a result of a friendly and attractive business environment for developing investment projects. Some of the services offered by ARIS include the specialized assistance to foreign investors interested in developing greenfield projects in Romania, the management of data bases containing information on industrial locations and parks available for receiving foreign investment, as well as the provision of all necessary information on the current legislation[213].

According to the Heritage Foundation[214], foreign and domestic investments receive equal treatment under the law. Deterrents to investment include judicial and legislative unpredictability and cumbersome and non-transparent bureaucratic procedures. Residents and non-residents may hold foreign exchange accounts, which are however subject to some restrictions. All payments and transfers must be documented. Most restrictions on capital transactions have been removed, but derivative-based transactions still require approval. EU citizens may own land in Romania, subject to reciprocity in their home countries, and foreign investors are allowed to acquire non-agricultural land for business use.

Transparency International Corruption Perceptions Index score of Romania for 2008 improved slightly compared to the previous year and currently stands at 3.8. Within the project region Romania is ranked second best, but is still the second last among all European Union members[53].

Incentives for energy efficiency

Measures for the improvement of energy efficiency include financial incentives such as subsidies, tax breaks on construction permits for heat insulation work on buildings and co-financing of renovation work[22].

Incentives for renewable energy sources

The Government Decision 1892/2004 introduced a quota system for new renewable energy sources for electricity production (green certificates). Distribution companies have the obligation to fulfill an annual quota of purchased green electricity (6.78 per cent for 2009 and 8.3 per cent in

2010). At the end of each year, distribution companies have to deliver a certain amount of green certificates corresponding with the annual quota. Since October 2005, the certificates are being traded at the newly created electricity market administrator OPCOM. According to the Energy Law, all producers of electricity have equal access to the network. The tariffs are regularly adapted to the actual production costs by the Romanian regulator, ANRE[22]. For the period 2008 to 2014, the annual maximum and minimum value for green certificates trading is 27 EUR/certificate, respectively 55 EUR/certificate, while between 2015 and 2030 the minimum price shall not fall under the minimum price applicable for 2014[17].

There is a purchase obligation for distribution companies for electricity from renewable energy sources and a feed-in tariff, although it is relatively modest (except for autonomous small wind systems that receive up to 110-130 EUR/MWh)[22].

Investors can receive additional incentives such as exemptions or reductions of taxes for a period of three years on profit reinvested in the development of renewable energy projects. Furthermore, individuals using renewable sources to produce a minimum of 20 per cent of their own consumption needs are entitled to deduct from the global annual income up to 50 per cent of the costs of equipment and installations purchased in order to produce electricity from renewable sources, depending on their monthly revenue[215].

Financing mechanisms for energy efficiency and renewable energy projects

National financing mechanisms

There are two national financing mechanisms available for energy efficiency and renewable energy projects in Romania:

- Government Decision 750/2008 has approved a scheme of regional state aid elaborated in accordance with the Sector Operational Programme Increase of Economic Competitiveness - Priority Axis 4 Increasing energy efficiency and security of supply, in the context of combating climate change to support investments in the construction and modernization of power plants. The funds are available until the end of 2013. The estimated budget is EUR 200 million consisting of non-reimbursable funds from the EU and domestic sources to be allocated to projects not exceeding EUR 50 million in value. The eligible applicants are small, medium and large businesses. The level of financing is 40 per cent for the enterprises located in Bucharest-Ilfov region and 50 per cent for the other regions of development[215];
- In order to promote the use of renewable thermal energy sources, Government Ordinance 25/2008, (Official Gazette of 29 August 2008) provided for the creation of a Programme for replacing and supplementing the traditional heating systems with systems that use solar power, geothermal power, and wind power or other systems that lead to improving the quality of air, water and soil. This Programme, named the Green Home (in Romanian "Casa Verde"), is financed using the revenue generated by the pollution tax instituted for auto vehicles. The Environment Fund Administration will be in charge of the implementation of this Programme and the funds necessary for the financing of this Programme allocated annually from the Environment Fund. The budget for the year 2009 was set at EUR 140 million (RON 520 million) with the funds disbursed being non-reimbursable[215].

International financing mechanisms

The following international financing mechanisms for renewable energy and energy efficiency projects are available in Romania[22]:

- EU structural funds: the European Commission pre-accession aid to Romania of over EUR 2.8 billion. Romania became a member of the EU on 1 January 2007 and, following on from pre-accession assistance, it continues to have access to the post-accession funding;
- Romanian Energy Efficiency Fund (FREE): in 2001, the Ministry of Finance and the World Bank launched the Global Environment Facility Energy Efficiency Financing Facility Project. The Fund started to work effectively in 2004. FREE aims at providing loans for commercially viable energy efficiency projects. The GEF starting capital (USD ten million, of which USD eight million for investment and USD two million for technical assistance) is orientated at leveraging co-financing by Romanian and foreign sources. FREE is designed to have a demonstrative effect and increase the banking sector's interest in investment in the field of energy efficiency in Romania;

- Romanian Energy Efficiency and Renewable Energy Credit Line: in 2008, based on the successful results of Energy Efficiency and Renewable Energy Credit Lines in neighbouring countries, the EBRD launched its first credit facility for the financing of energy efficiency projects by private industrial companies in Romania. This is part of the EU/EBRD Energy Efficiency Facility, a wider joint Programme of the European Commission and the EBRD. Funds of up to EUR 80 million will be provided through the programme to banks involved in lending for energy efficiency projects in Romania. Complemented by EUR 24 million in EU grant funding from the Phare programme for technical assistance to support energy efficiency projects and provide incentives for new investments, the Facility will provide an integrated package of loans, grants and technical assistance for industrial companies implementing eligible energy efficiency measures. In January 2008, EBRD claimed that three loans have already been signed: EUR 20 million for the Banca Comerciala Romana (BCR), EUR ten million for CEC, and EUR five million for Banca Transilvania (BT). In May 2008, the EBRD has agreed a EUR ten million loan to Romania's BRD Groupe Société Générale for on-lending to private industrial companies in the country to finance energy efficiency projects.

Commercial financing mechanisms

Commercial banks in Romania are financing renewable energy projects. Typical conditions for such projects depend strongly on the needed credit volume. Typical financing conditions for renewable projects are interest rates of six to seven per cent and loan durations up to 12 years. As securities act long-term energy delivery contracts with reliable customers[17].

Energy efficiency projects are also financed by commercial banks, but the conditions are too different to provide reliable average figures. The conditions depend strongly on the financial situation of the client, the amount of the loan and the macroeconomic situation. Therefore the financial crisis led to a more restrictive granting of loans by commercial banks[17].

11.8.7. Barriers to the implementation of energy efficiency and renewable energy projects

Box 8: Summary of barriers to the implementation of energy efficiency and renewable energy projects in Romania

Legal, institutional and administrative barriers

1. There are no major administrative barriers to the development of energy efficiency and renewable energy sources projects in Romania.

Economic and financial barriers

2. At the municipal level, the availability of co-financing on a non-guaranteed basis remains uncertain as project preparation, utilization capacity, and co-financing ability are generally weak.

Lack of awareness, human capacities and professional skills

3. The relatively low activity in energy efficiency and renewable energy sources outside existing support schemes from international cooperation, suggest that the capacity to develop fully bankable project proposals corresponding to financial institutions standards and practices is rather restricted.

Legal, institutional and administrative barriers

There are no major administrative barriers to the development of energy efficiency and renewable energy sources projects in Romania.

Economic and financial barriers

With the strong development of the financial sector and the adoption of feed-in tariffs and green certificate schemes, there are no major economic or financial barriers to the development of energy efficiency and renewable energy sources projects in Romania.

However, at the municipal level, the availability of co-financing on a non-guaranteed basis remains uncertain as project preparation, utilization capacity, and co-financing ability are generally weak. These issues are particularly apparent in smaller municipalities, which to date have not had the benefit of either IFI or local bank financing.

Lack of awareness, human capacities and professional skills

As no National Counterpart was provided to the UNECE Assessment Mission in Romania, there is not much information about the lack of awareness and human capacity in the country.

Main characteristics of the Romanian energy sector like the existence of dedicated energy agencies, the presence of energy services companies, and of international energy utilities cause to believe that there is no big capacity building need in Romania. However, the relatively low activity in energy efficiency and renewable energy sources outside existing support schemes from international cooperation, suggest that the capacity to develop fully bankable project proposals corresponding to financial institutions standards and practices is rather restricted to a limited number of actors.

11.9. *Russian Federation*

11.9.1. Overview of economic situation

General demographic data

The area of the Russian Federation is 17.1 million km^2 with a population of 142.5 million, thus resulting in a population density of about 8.4 inhabitants per km^2. The capital is Moscow, with 10.1 million inhabitants. The Russian Federation has 1,067 major cities, with 13 of them inhabited by one million and more people each. The largest cities are Moscow, St. Petersburg, Nizhny Novgorod, Novosibirsk and Yekaterinburg. In total 73 per cent of the population lives in urban areas[216]. From 1990 to 2007 the Russian Federation experienced a decline of the population of 0.2 per cent per year. While the birth rate in the Russian Federation is comparable to that of other European countries, its death rate is much higher[217].

Current political situation and outlook

The Russian Federation is a presidential republic with a bicameral parliament, the Federal Assembly of Russia, which is composed by the Federation Council of Russia and the State Duma. The former President Vladimir Putin left the office in May 2008 and was replaced by Dmitry Medvedev, who won the presidential elections of March 2008 by an overwhelming majority. After the victory of Medvedev, Vladimir Putin was nominated by his successor to be the Russian Federation's Prime Minister by 8 May 2008.

The next elections are planned for December 2011 (parliamentary) and March 2012 (presidential).

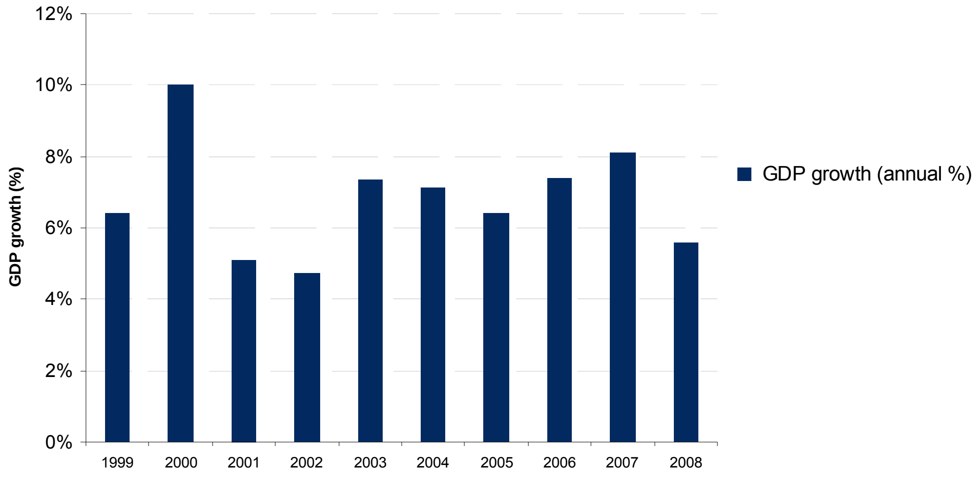
The Russian Federation is composed of 83 federal subjects, subdivided into: 21 republics, 46 oblasts (provinces), nine krais (territories), one autonomous oblast (autonomous province), four autonomous okrugs (autonomous districts) and two federal cities. These subjects have equal federal rights in the sense that they have equal representation, i.e. two delegates each in the upper house of the Federal Assembly of Russia.

Gross Domestic Product

After the financial crisis of 1998, the Russian Federation experienced a decade of high gross domestic growth, averaging seven per cent between 1999 and 2007 and subsequently witnessed a solid growth in 2008 of 5.6 per cent (see Figure 11.97)[218]. However, due to the worldwide financial crisis the GDP has decreased by 14.2 per cent in the first seven months of 2009[219]. Although the Russian Government has laid out plans to diversify the economy, the Russian Federation's economy is still heavily dependent on oil and natural gas exports[220], as witnessed during the first seven months of 2009 when the overall exports of the Russian Federation declined by 50 per cent mostly due to declining gas and oil prices compared to the previous years[219].

Since 2002, growth rates of fixed capital investment and personal income have both averaged above ten per cent, but the growth was slower in 2008. Ever since the end of the 1990ies, poverty has declined steadily and the middle class has continued to expand. The Russian Federation has also improved its international financial position, running surpluses since 2000. Foreign debt is approximately one-third of the GDP[220].

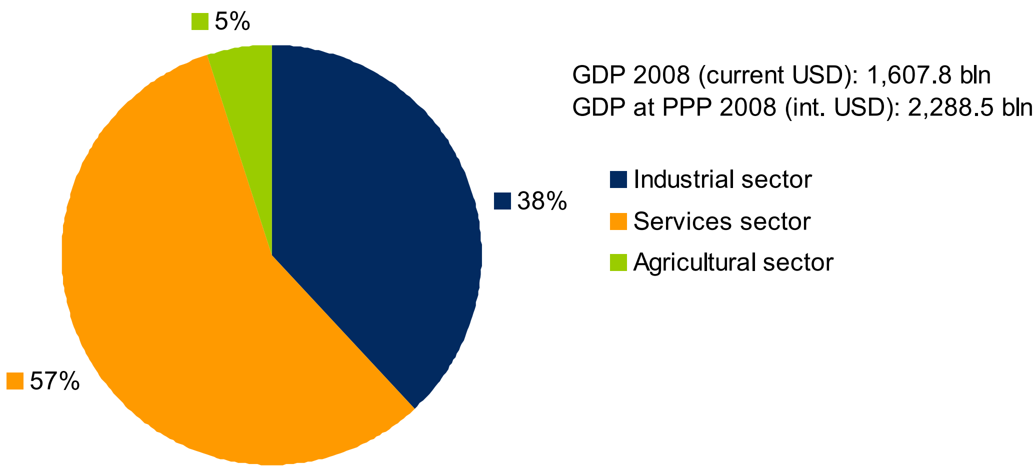
Figure 11.97: Real GDP growth of the Russian Federation



Source: World Bank[5] (2009)

The repartition of the GDP in 2007 can be seen in Figure 11.98. The industrial sector, with a share of 34 per cent, plays a significant role in the Russian economy and is mostly focused on the following sub-sectors: mining and extractive industries producing coal, oil, gas, and metals, all forms of machine-building industries, defense and military industries including radar, missile production, and advanced electronic components, shipbuilding, manufacturing of chemicals, medical and scientific instruments, consumer durables, textiles, food products[221].

Figure 11.98: Repartition of the Gross Domestic Product in the Russian Federation in 2007[xx]



Source: World Bank[5] (2009)

11.9.2. Energy sector and development of energy markets

Energy supply

Russian energy imports consist of fossil fuels and represent only 3.3 per cent of the total energy supply. The total primary energy supply of the Russian Federation in 2007 amounted to 677,632 ktoe. Due to large domestic production of crude oil, gas, petroleum products, and coal, the Russian Federation generates an energy export surplus of 80 per cent (see Figure 11.99).

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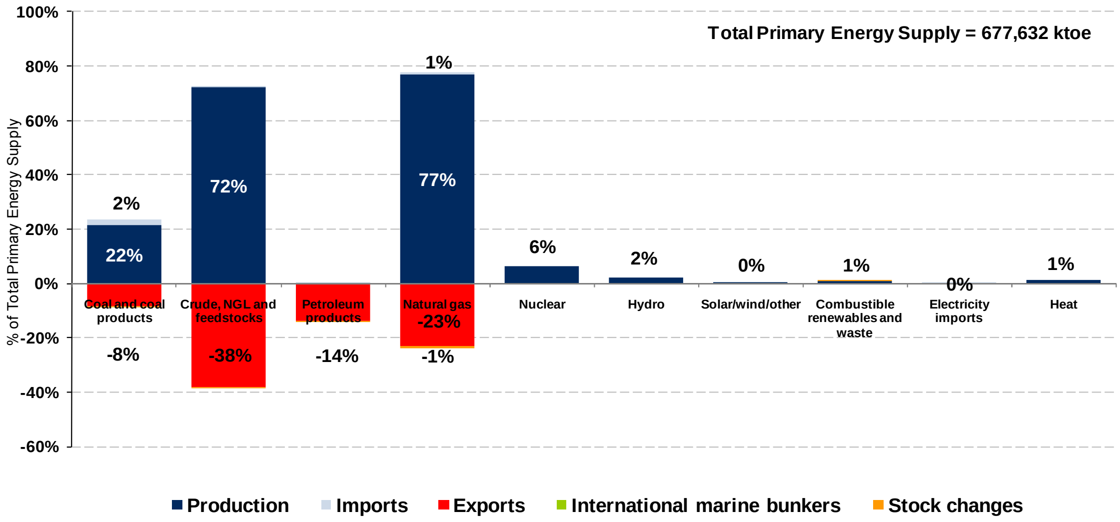
xx For the Russian Federation the repartition values of the GDP per sector are only available for 2007, while absolute GDP values are from 2008.

The Russian Fuel-and-Energy Complex (FEC) plays an important role in the Russian Federation's economy. Thus, in 2005 the FEC accounted for 31 per cent of the GDP, 32 per cent of industrial production, 64 per cent of export earnings, and 58 per cent of the budget's tax revenues[220].

Figure 11.99: Energy Balance of primary energy sources of the Russian Federation (2007)



Source: IEA[220] (2009)

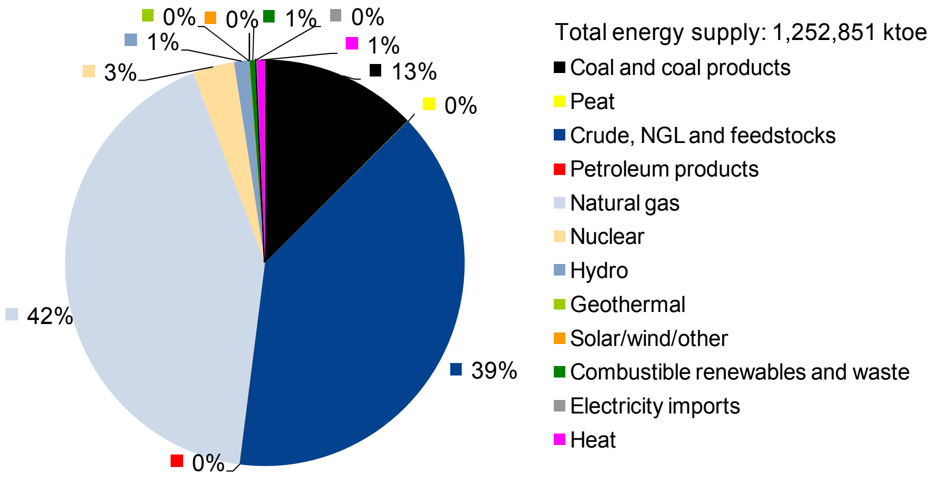
Energy production and imports of the Russian Federation amounted to 1,252,851 ktoe in 2007.As can be seen in Figure 11.100, the primary energy supply is dominated by gas and crude oil, with shares of 42 per cent and 39 per cent respectively. Around 1.7 per cent of the total energy supply (sum of production and imports) is based on renewable energy sources (mainly hydro power). The Russian Federation has proven oil reserves of 60 billion barrels, most of which are located in Western Siberia. Overall, the Russian Federation holds the world's largest natural gas reserves, the second largest coal reserves and the eighth largest oil reserves[220]. In 2006 the Russian Federation was the world's largest natural gas producer (656 billion m^3), as well as the world's largest exporter (187 billion m^3). According to official Russian statistics, production during 2007 amounted to around 654 billion m^3, of which 85 per cent (549 billion m^3) was produced by Gazprom. Russian government forecasts expect gas production to grow to 881 billion m^3 by 2030[220].

In 2007, the Russian electricity generation amounted to 1,003 TWh, mostly produced by gas (48 per cent), coal (17 per cent), and hydropower (17 per cent). Nuclear power amounts to 16 per cent as can be seen in Figure 11.101.

The Russian electric system has a total generation capacity of 217 GW[220] and includes more than 440 thermal plants (approximately 77 of which are coal-fired) plus 29 nuclear reactors. The electricity generation capacity located in the far-eastern part of the country is not connected to the integrated Russian power grid, but operates in an autonomous grid system, the United Grid of the East.

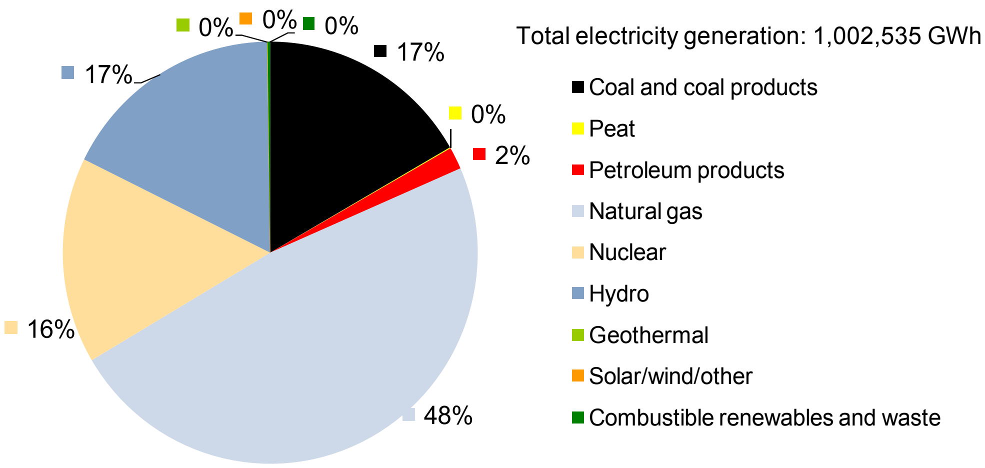
Heat production in the Russian Federation amounts to 6,145,266 TJ (or almost twice the electricity generation), and uses 32 per cent of total fossil consumption. It is mainly produced by gas (67 per cent) and coal (19 per cent), as shown in Figure 11.102.

Figure 11.100: *Supply of primary energy by sources in 2007*



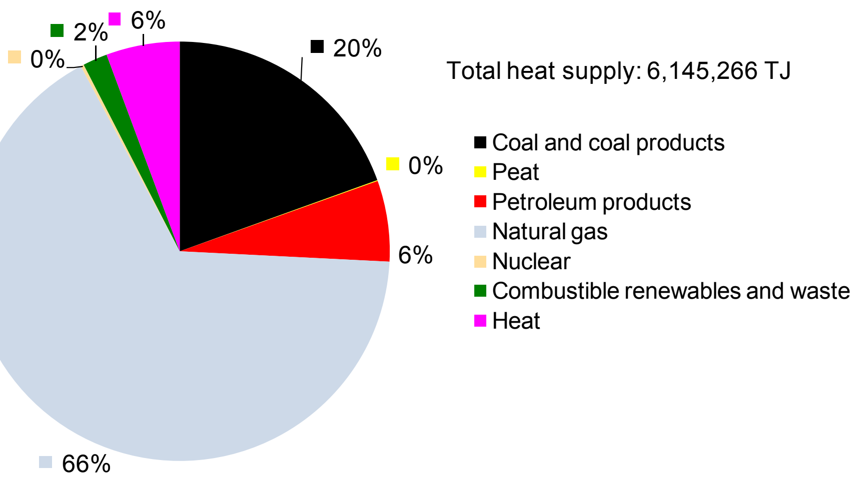
Source: IEA[220] (2009)

Figure 11.101: *Electricity generation by sources in 2007*



Source: IEA[220] (2009)

Figure 11.102: *Supply of heat by sources in 2007*



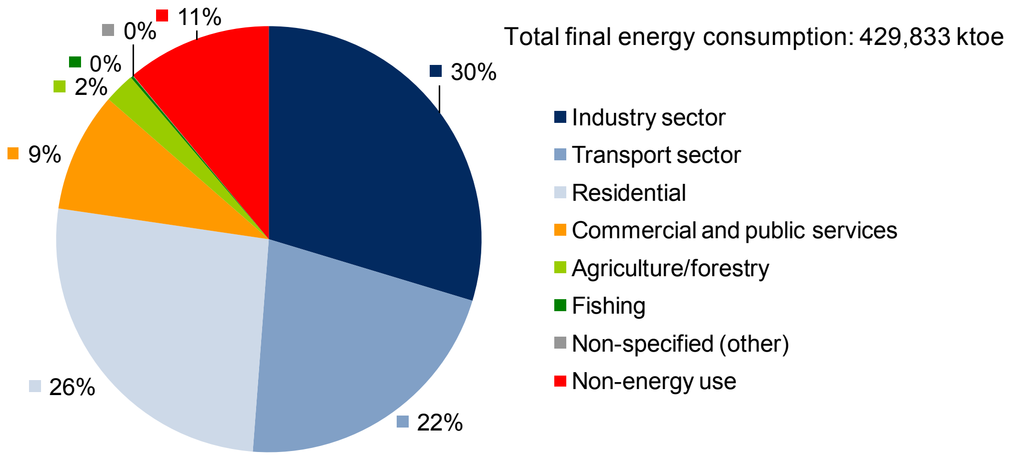
Source: IEA[220] (2009)

Energy demand

The Russian Federation is the third largest energy consumer worldwide[220]. Within the Russian Federation, the industry and residential sectors are the biggest consumers of primary energy, representing 52 per cent of the total consumption (see Figure 11.103).

The ten per cent of non-energy use in the Russian Federation reflects the current growth of manufacturing of synthetic materials and chemical products with the use of coal and coke, natural gas, oil, and petrochemical products.

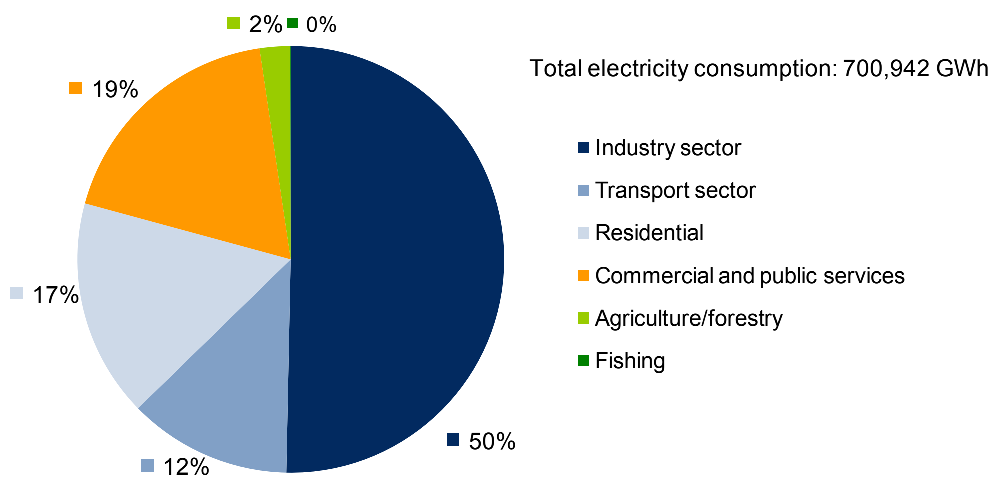
Figure 11.103: *Final consumption of primary energy sources by sectors in 2007*



Source: IEA[220] (2009)

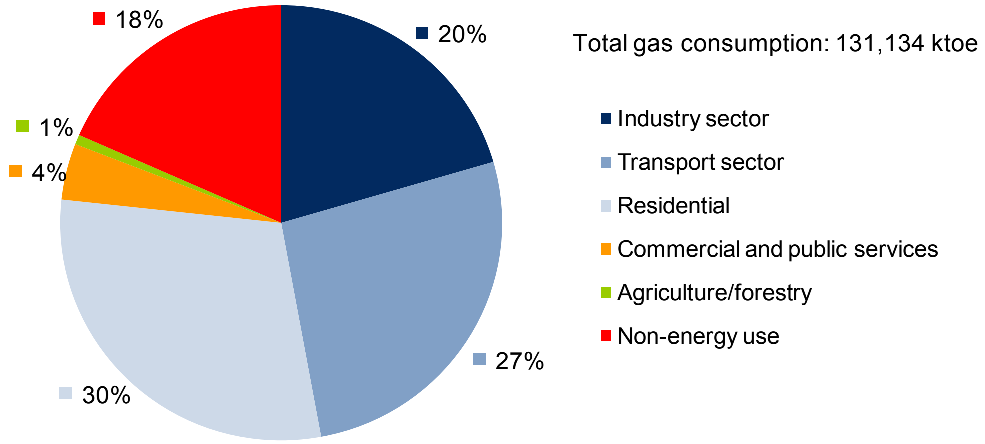
The industry sector is by far the biggest consumer of electricity with a share of 51 per cent of the total consumption (see Figure 11.104). The size of the country explains also the high consumption of electricity by the transport sector (mainly railways and urban infrastructures). As shown in Figure 11.105, the gas demand of the residential sector amounts to 30 per cent, while the gas demand of the transport sector amounts to 27 per cent, and the gas demand of the industrial sector accounts for 20 per cent.The residential sector is a large consumer of heat with a share of 45 per cent of the country's final consumption (see Figure 11.106). The industry sector's heat use amounts to 38 per cent of the total consumption, both for heating purposes and for industrial processing.

Figure 11.104: *Final consumption of electricity by sectors in 2007*



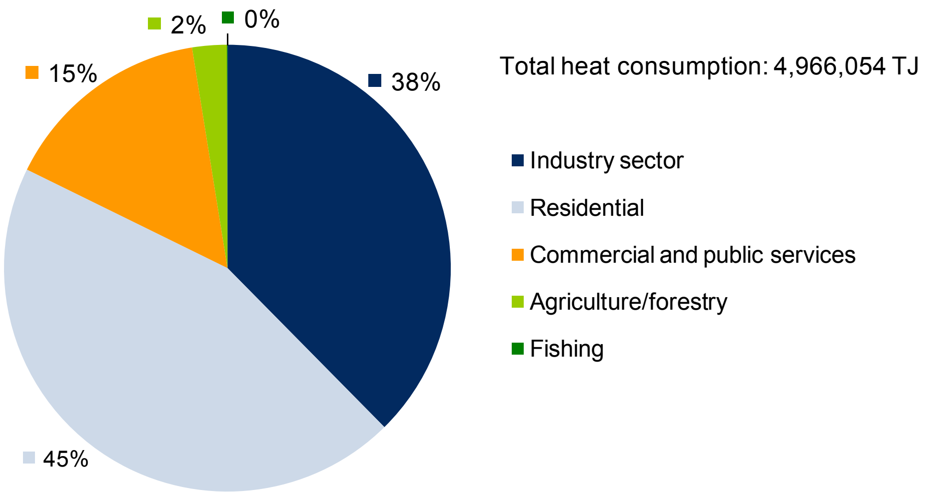
Source: IEA[220] (2009)

Figure 11.105: *Final consumption of gas by sectors in 2007*



Source: IEA[220] (2009)

Figure 11.106: *Final consumption of heat by sectors in 2007*



Source: IEA[220] (2009)

Energy markets

Electricity market

The Russian electricity market used to be dominated by Unified Energy System of Russia (RAO UES), which was established on 15 August 1992 as an electric energy holding company. Most of the state-owned electric energy assets, such as thermal and hydroelectric power plants, transmission lines as well as state-owned shares in power companies, research and engineering companies, and construction entities of the industry were transferred to RAO UES, with exception of assets related to nuclear energy. In total, RAO UES owned more than 70 energy companies and more than 400 power plants with federal level importance. It also owned the transmission system operator, i.e. the Federal Grid Company (RAO FGC).

However, by 2006 RAO UES underwent a complete reorganization. The first stage of the reorganization, during which the generation companies WGC-5 (fifth generation company for the wholesale power market) and TGC-5 (fifth territorial generation company) were spun off from RAO UES, was completed on 3 September 2007. WGC-5 and TGC-5 were the first two private generation companies in the Russian Federation to be established in the course of the electricity reform. At the second stage, all other subsidiaries of RAO UES were spun off. These former subsidiaries comprise now seven wholesale generation companies that have been established, six of them contain major thermal power plants, while RusHydro (operating 25,000 MW of hydro power) is purely hydroelectric[222]. Apart from the seven wholesale generation companies, fourteen independent territorial generating companies have been created. These territorial generation companies contain predominantly combined heat and power plants, which generate both electric and thermal power[222].

Apart from the mentioned territorial and wholesale generation companies, the companies UES FGC (Federal Grid Company), SO-CDA (System Operator), IDC Holding (comprising the interregional distribution grid companies), RAO ES of the East (operating in the Far Eastern Federal District), and Inter RAO UES (managing foreign assets and organizing import and export of electricity in the Russian Federation) continue as independent entities.

After the completion of the structural transformation, which resulted on 1 July 2008, in the merger of RAO UES with UES FGC, the Federal Grid Company, the Russian State owns more than 75 per cent of shares in the Federal Grid Company (with account of budgetary funds and part of state-owned shares in wholesale generation companies and territorial generation companies), more than 75 per cent of shares in the System Operator, more than 50 per cent of shares in RusHydro, more than 50 per cent of shares in Inter RAO UES and more than 52 per cent of shares in the IDC Holding and RAO ES of the East, while minority shareholders own the rest[222].

The reorganization of RAO UES was intended as a massive privatization process of the power industry with the goal of attaining about USD 79 billion in investment value. Several international energy utilities like Germany's E.ON, which bought a 69 per cent stake in the fourth wholesale generation company and owns 6.4 per cent of Gazprom, and RWE and Italy's Enel, which bought a 30 per cent stake in the fifth wholesale generation company, and the Finnish Fortum, which bought a 26 per cent stake in the first territorial generation company, have paid premiums for strategic or controlling stakes in the generating companies[222].

Furthermore, E.ON is planning to invest EUR 2.3 billion into the construction of new power plants with a capacity of 2,300 MW in the Russian Federation[223].

The country's transmission grid is under state control. There are seven separate regional power systems in the Russian electricity sector: Northwest, Center, Middle Volga, North Caucasus, Urals, Siberia, and Far East. The Far East region is the only one not connected to an integrated power system, while all others operate under the control of the Federal Grid Company.

Electricity tariffs

The state policy on electricity tariffs is implemented by the Federal Agency for Tariffs, which approves minimum and maximum tariffs for the energy producers. The concrete tariffs in the oblasts (regions) of the country are decided by the Regional Energy Commissions in accordance to the local conditions.

The tariffs for electricity can vary considerably in the different regions. Social sphere users (hospitals, schools etc) benefit from preferential tariffs in comparison to other users (for example industry). The structure and amounts of preferential tariffs are prerogative of the respective Regional Energy Commission, which sets them in accordance to the local conditions.

Gas market

Although Gazprom, whose majority owner is the Russian Government, is the largest gas market player in the Russian Federation, owning 80 per cent of the total production assets, controlling the pipeline network and having established an export monopoly, there are several independent gas producers and oil companies who can sell gas on a deregulated sector.

Gazprom’s natural gas production forecast shows a moderate growth of 1-2 per cent per year by 2010. The Russian Federation’s natural gas production growth reflects its aging fields, state regulation, Gazprom’s monopolistic control over the industry, and insufficient export pipelines. Although the company expects increases in its natural gas output between 2008 and 2030, most of the Russian Federation’s natural gas production growth will come from independent gas companies such as Novatek, Itera, and Northgaz[220].

Gas tariffs

Gas prices are differentiated according to 11 territorial zones. In 2008, following a 14 per cent increase in 2007 and a 15 per cent increase in 2006, they averaged EUR 0.04/m^3 (USD 0.06/m^3). Export prices are considerably higher with levels largely above USD 0.2/m^3.

The prices for gas extracted and supplied by Gazprom and its affiliates are set by the Service of Federal Tariffs every year. Different prices are set for different price belts. There were seven price belts until 2005, but since 1 January 2006, there are 13 price belts.

Heating market

The heat market in the Russian Federation is one of the largest domestic markets and is split into more than 50,000 local markets with USD 33 billion annual sales[224].

Heating tariffs

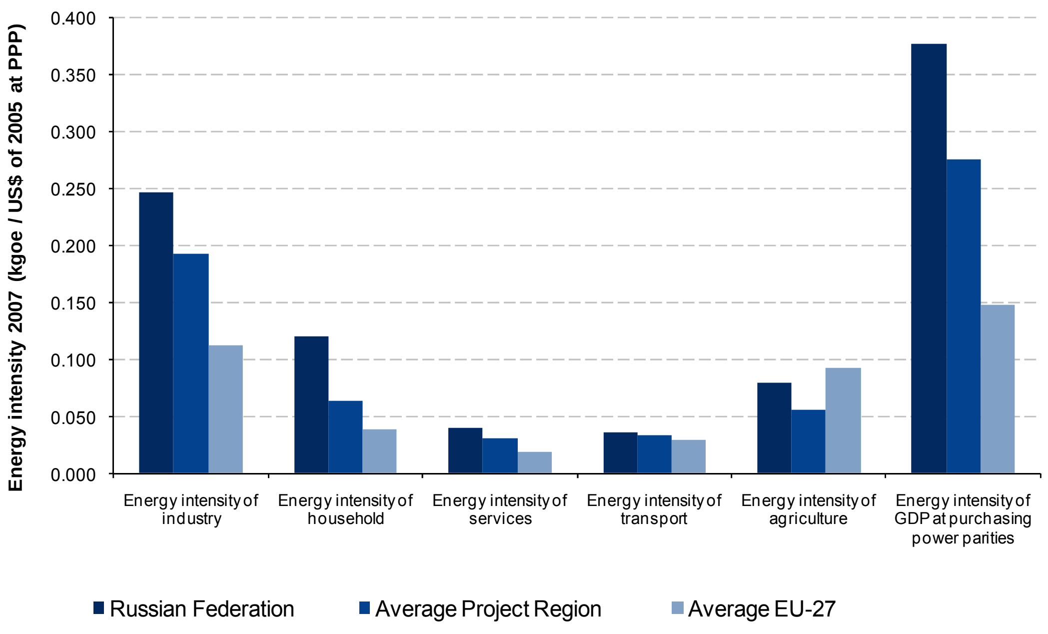
In 2005, average heat prices in the Russian Federation were 11 EUR/Gcal (473 RUB/Gcal).

11.9.3. Current situation with respect to energy efficiency and future potential for energy savings and increase in efficiency

Energy intensity by consumption sector

The energy intensity of GDP at Purchasing Power Parity for the Russian Federation in 2007 is more than 150 per cent higher than the EU-27 average and around one third higher than the project region average (see Figure 11.107)[6]. Nevertheless, the Russian Federation has experienced a significant reduction in its energy intensity levels since 1990. According to the IEA, however, it is likely that the decline in energy intensity is due more to the growth in the value of GDP rather than technical energy efficiency improvements[225].

Figure 11.107: Primary energy intensity at Purchasing Power Parity

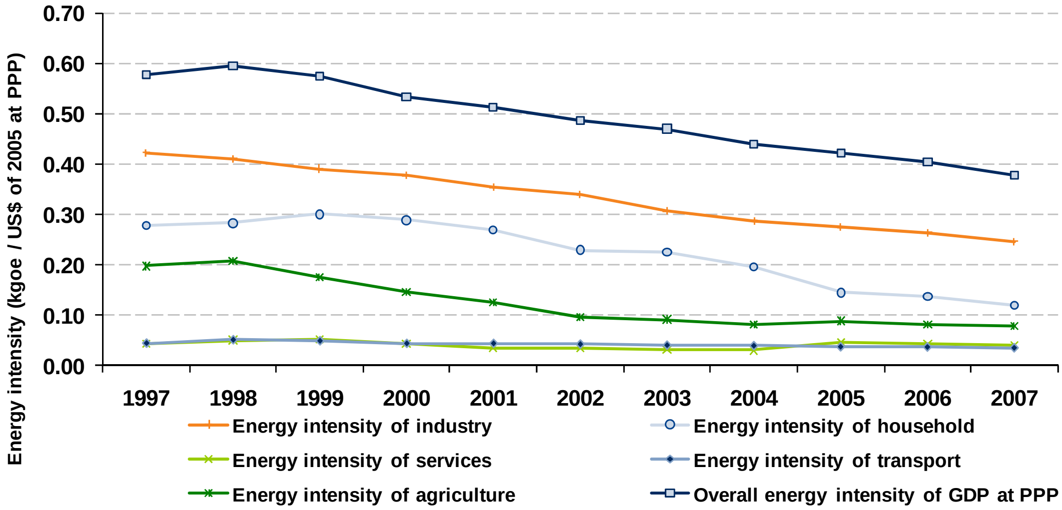


Source: Enerdata[6] (2007)

While certainly climatic conditions and long transport distances within the country may play a significant role in the high energy consumption in the Russian Federation, the main reasons for the high intensity of the Russian economy are the high share of energy-intensive industries (which represent more than 60 per cent of the industrial sector), as well as substantial amounts of outdated technological energy equipment still in use in the Russian Federation[221].

With the exception of the agricultural sector, which is below the EU-27 average, all other sectors are significantly higher than the two reference values (see Figure 11.107). Nevertheless, all sectors have experienced a considerable decrease in energy intensity levels since 1997 (see Figure 11.108).

Figure 11.108: *Primary energy intensity in the Russian Federation by sector at Purchasing Power Parity*



Source: Enerdata[6] (2007)

Energy losses from electricity and gas grids

In 2006, losses on the Russian transmission and distribution systems were estimated at around 11 per cent of the total electricity production[226], while for 2005 the average losses were 12.2 per cent[224]. These figures represent a fairly normal value for electricity losses, therefore no specific need for action is assumed in this area.

The gas distribution losses in the Russian Federation in 2006 amounted to 259,333 TJ or 1.55 per cent of the domestic gas supply.

In the Russian Federation around 66 million electricity customers are equipped with a meter. Most of these meters are conventional electromechanical meters, but more recently the use of electronic meters has been increasing[227].

According to IMS Research's estimate, around three-quarters of the households in the Russian Federation were connected to the gas distribution grid in 2005[228]. At the same time, the penetration of gas metering in the Russian Federation is estimated to be around 56 per cent. Final customers can choose to buy the gas meters by themselves. The owner of the meter is the final consumer, while the gas supplying company fulfills its annual maintenance.

District heating grid

Heat losses from the distribution system in the Russian Federation account for 20 to 22 per cent of the total production. The average heat boilers efficiency is around 73 per cent[224].

Many Russian households do not have a heat meter and heating is billed based on household surface instead of actual consumption. The number of households served by district heating is estimated to be around 50 million, yet only around 1.5 per cent of these households are actually metered[228].

Other sources of inefficiency

Gas flaring – the process of burning-off surplus combustible vapors from a well – has been pointed out as one of the greatest inefficiencies in the production of oil and gas in Russia. Estimates vary as to the amount of gas flared in the Russian Federation each year. The official estimate of gas flaring in the Russian Federation in 2006 was 15 billion m^3/year, making Russia the second largest contributor to gas flaring behind Nigeria. Former President and current Prime Minister Vladimir Putin acknowledged that more than 20 billion m^3/year are flared and, according to a recent World Bank-sponsored study, Russia flares as much as 38 billion m^3/year. If the estimate is correct, Russia flares approximately five per cent of its total gas production and 45 per cent of its associated petroleum gas production, roughly equal to the volume of gas it sold to Germany in 2006[229].

Estimated potential for energy savings by sector

The Russian Federation could save up to 45 per cent of its total primary energy consumption as calculated for 2005[229]. The Russian Federation's current energy inefficiency is equal to the annual primary energy consumption of France. The World Bank's study points out that achieving the Russian Federation's full energy efficiency potential would cost a total of USD 320 billion to the economy and result in annual costs savings to investors and end users of about USD 80 billion (if considering 2007 internal prices), paying back in just four years[229].

ESCOs and other initiatives in energy efficiency

There are several energy efficiency centers operating under different external supporting programmes in the Russian Federation. Some of the largest are: Center for Energy Efficiency (CENEF), Center for Energy Policy, AcademEnergoServis, Institute for Energy Policy, RusDem, ESCO Negawatt, Rus Esco, 3E, Energo Servis, and regional centers for energy efficiency with the major located in Kaliningrad, Murmansk, Kola, Karelia, and Ekaterinburg.

According to the Russian Ministry of Energy, the establishment of the state Energy Services Company Federal Service Company (OAO FESCO) and regional (municipal) public-private Energy Service Companies (RESCO) is planned. It is envisaged to create a network of such companies in the regions to cover with their activities all the territory of the Russian Federation[230]. These federal and regional ESCOs will however only serve state-owned enterprises and municipal buildings[231].

Some of the Russian Federation regions have already established or are currently establishing regional energy efficiency programmes or initiatives. One example of such a regional initiative is the territorial project of the region of Archangelsk, called White Sea Energy. Jointly with the Russian energy company Roskommunenergo, the administration of the Archangelsk region, established a public-private partnership programme. The participating financing institutions are the Russian banks Mosuralbank and Sberbank, as well as the Czech Export Bank and the Foreign Trade Bank of the Russian Federation. The aim of the project is the comprehensive optimization and development of the power supply of the regional enterprises and the housing sector. Furthermore, it is envisaged to implement efficient, high-tech and ecological projects in the electricity, industry, and municipal services sector in the Archangelsk region[232]. The third project task comprises the improved competitiveness of the enterprises in Archangelsk through the optimization of the energy costs. The programme envisages investments of USD one billion[233].

11.9.4. Current situation with respect to renewable energy sources and future deployment potential

Deployment of renewable energy sources

In the Russian Federation, renewable energy sources account for around 18 per cent of the total electricity generation, with a large dominance of hydro power. The number of renewable energy sources based power plants and the overall installed capacity and electricity generation per type of renewable energy source for 2005 can be seen in Table 11.24.

Table 11.24: Renewable electric power generation in the Russian Federation in 2005

Type of power plant	Number of power plants	Installed capacity (MW)	Electricity generation (GWh)
Hydro with capacity of more than 25 MW	n.a.	44,200	174,000
Hydro with capacity below 25 MW	68	683	2,800
Biomass fueled power plants	27	1,412	5,200
Geothermal power plants	3	71	400
Tidal power plants	1	2	For in-house consumption
Wind power plants	8	12	10
Total	n.a.	46,380	182,420

Source: International Sustainable Energy Development Centre (ISEDC)[224] (2009)

According to the EnCharter PEEREA report on the Russian Federation, the share of heat generated from renewable energy sources in 2004 amounted to around five per cent (a third of which originated from small biomass boilers)[220]. If considering the large scale heat production only, renewable energy sources (biomass and waste) account for only two per cent of the total generation.

Estimated potential for renewable energy sources

The size of the territory of the Russian Federation holds a strong potential for the development of renewable energy sources, although it should be noted that the utilization of intermittent resources like wind energy, which requires long transmission lines if the plants are located in remote locations, might pose some economical and technical challenges.

The Russian Federation has excellent potential for wind power generation. An attempt to utilize just 25 per cent of its total potential would yield some 175,000 MW of power. The highest wind energy potential is concentrated along seacoasts, in the vast territories of the steppes, and in the mountains.

The overall technical potential of biomass is estimated at 35 million toe, which, if converted to electrical power, could generate nearly 407 TWh. This includes sewage sludge, cattle manure and forestry and wood waste.

The potential for hydropower is also quite large, as nine per cent of the world's hydro resources are concentrated on the territory of the Russian Federation. Hydropower currently provides 18 per cent of total electricity generation capacity and there is still a large potential for small to medium hydro power projects.

Geothermal potential is also high, with theoretical resource estimates of high temperature (>90 C) steam, water, and brine at about 3,000 MWth. The most promising geothermal locations have been identified in the North Caucasus, Western Siberia, Lake Baikal, and in Kamchatka and the Kuril Islands.

Solar potential is reasonable despite the country's location in the northern latitudes. The highest solar potentials are located in the North Caucasus, the Black Sea and the Caspian Sea areas, and southern parts of Siberia and the Far East. It has been estimated that the gross potential for solar energy is 2.3 trillion tce.

An estimate of the economic potential of primary renewable energy sources from the PEEREA Report on Russian Federation in 2007 gives an overall figure of 181 Mtoe/year. This would represent around 20 per cent of the domestic energy consumption, much higher than the current one per cent[220].

Projects and initiatives in renewable energy sources

The market for renewable energy sources is currently dominated by RusHydro, which owns most of the hydro power plants in the Russian Federation. Nevertheless, small independent power producers are slowly emerging: One example is Nord-Hydro[234], which is located in St. Petersburg and has been created in 2007. This company is active in the design, construction, and operation of small hydro power plants. The main aim of the company is to renovate or rebuild small hydro power plants with a capacity of 200 kW – 20 MW. As of July 2009, Nord Hydro already acquired 54 small hydro power stations, which will be rehabilitated in the near future. The company plans to own up to 200 MW of small hydro power plants by 2020, which would require investments of about USD 450 million[234].

Regarding the supply of renewable energy sources equipment, the Russian company OJSC Ryibinskij zavod priborostroeniya should be mentioned. Since 25 years, this company, whose main focus actually lies within the production of avionic equipment, has been active in the production of renewables equipment, such as wind turbines, hydro lifting equipment, and heat pumps. It was the first company in the Russian Federation to manufacture heat pumps as wells as equipment for biomass power plants[235].

11.9.5. Institutional, regulatory and policy framework for energy efficiency and renewable energy sources

Policy makers in the energy sector

Institutional policy makers

The main governmental institutions responsible for the development and implementation of policies and measures in the fields of energy, energy efficiency, and renewable energy sources in the Russian Federation are listed below.

- The Federal Council and the Duma (respectively their appointed energy committees for these matters);
- The Government of Russia has appointed two energy commissions, i.e. the Commission on Fuel and Energy Complex is located at the Prime Minister’s Office and is engaged in legal aspects, institutional structures and approves and monitors the National Programme, while the Commission on modernization and technological development of the Russian economy, which is located at the President’s Office, is engaged in choosing and funding the most innovative projects in energy efficiency and renewable energy that can be implemented within the Russian Federation[231];
- The Ministry of Energy is responsible for the development of a modern legal and regulatory framework and the creation of adequate institutional structures. It prepares the annual Progress Report to the Government of the Russian Federation on energy saving and energy efficiency improvement, and provides informational and educational support of activities at international, federal, regional, and municipal levels. It also provides support regarding the creation of a favorable investment climate for attracting business and interacts with the business community and financial institutions on the basis of public-private partnerships[231];
- The Ministry of Natural Resources of the Russian Federation performs the functions related to state policy in the sphere of study, renewal, and conservation of natural resources, including the state subsoil stock and forestry, water resources, forests, as well as in the sphere of environmental conservation;
- The Federal Agency for Tariffs implements the state policy on tariffs and approves minimum and maximum tariff for the energy producers. The concrete tariffs in the oblasts (regions) of the country are decided by the Regional Energy Commissions in accordance to the local conditions;
- The recently approved Federal Law No. 261 on Energy Saving and on Increasing Energy Efficiency and on Introduction of Changes in Selected Legislative Acts of the Russian Federation (approved on 23 November 2009)[236] defines the power and the competences of a state agency dedicated to Energy Efficiency and Energy Savings. Subsequently, the Russian Energy Agency, is currently being established. The priority task of this agency will be to monitor the energy savings policy at the federal and regional level and provide information on Russian Fuel-and-Energy-Complex developments. Furthermore, the Agency will establish energy efficiency criteria and indicators.

Non-institutional agencies

The International Sustainable Energy Development Centre (ISEDC) is an international site for scientific dialogue between scientists and experts in the field of energy. The Centre has been established jointly by the Ministry of Energy of the Russian Federation and the United Nations Educational, Scientific and Cultural Organization (UNESCO) in 2008. The mission of the Centre comprises the pursuit of sustainable development and management of energy resources ensuring sustainable and environmentally responsible use of energy. The Centre develops institutional and organizational capacity at national, regional, and international levels through scientific research studies, seminars, training courses, and conferences. It furthermore provides technical assistance and expertise in the definition of energy policies and strategies.

Regulatory and administrative institutions at the regional and local level

The 83 regions of the Russian Federation have a substantial degree of autonomy in the field of energy efficiency and renewable energy sources. They are allowed to develop their own energy efficiency and renewable energy sources legislative acts. More than 43 regional laws on energy efficiency have been adopted in the Russian regions. The regions of Tatarstan, Nizhni-Novgorod, and Archangelsk have been especially active in the field of energy efficiency and even established their own regional energy efficiency programmes[231].

The newly adopted Federal Law No. 261 on Energy Saving and on Increasing Energy Efficiency (approved on 23 November 2009) defines the power and areas of competences for regional and local agencies for energy efficiency. Therefore, it can be expected that the development and implementation of reqional energy policies will start also in those regions which had not undertaken any actions in this direction so far. Additionally, the establishment of local energy efficiency agencies will ensure implementation not only at the regional but also at the sub-regional and municipal level.

The responsibilities of the regional and local energy efficiency agencies will be primarily the implementation of federal guidelines at the regional and local level as well as the development and implementation of regional and local energy efficiency programmes, the provision and distribution of information as well as monitoring activities.

Energy policy and regulatory framework

The main regulatory framework in the energy sector is set by the federal laws and the governmental regulations as shown in able 11.25.

Table 11.25: Relevant energy sector laws in the Russian Federation

Publication	Name of the legislation
04.11.2007	Federal Law No. 250 –"On the Introduction of Amendments to Certain Legislative Acts of the Russian Federation in connection to the Accomplishment of Measures for the Reforming of the Unified Energy System of Russia"
23.05.2006	Governmental regulation No. 307 – “On provision of communal services”
27.12.2004	Governmental regulation No. 861 – “On regulation of access”
26.03.2003	Federal Law No. 36 – “On Functioning of electrical energy”
26.03.2003	Federal Law No. 35 – “On electrical energy”

Source: UNECE (2009)

The main policy document in the energy sector is the Energy Strategy of the Russian Federation for the period up to 2030, which was approved in November 2009 by the Government and replaced the previous Energy Strategy of the Russian Federation for the period up to 2020.

The Energy Strategy up to 2020 outlined several main priorities: an increase in energy efficiency, reducing impact on the environment, sustainable development, energy development, and technological development, as well as improved effectiveness and competitiveness[237].

The main targets set by the Energy Strategy up to 2020 can be summarized as follows:

- Reduction of the specific energy intensity of GDP with the correspondent growth of energy effectiveness of economy;

- Moderate growth of expenses for fuel and energy supply;
- Increase of the annual income from the fuel and energy complex activity;
- Expected growth of energy exports of 45-64 per cent by 2020.

The new Energy Strategy of the Russian Federation for the period up to 2030 is based on two scenarios. The first scenario envisages a quick recovery of the national economy, i.e. the consequences of the economic downturn will be successfully tackled before 2015, while the second scenario envisages a slower pace of economic recovery, i.e. a full recovery is expected by 2020/2022[238].

The strategy outlines three phases for the process of the national Fuel Energy Complex (FEC) transformation. In order to make the FEC an additional engine for the recovery of the domestic economy, it is foreseen to reorganize it during the first stage (2013 to 2015). In the second phase (2016 to 2020/2022), several cutting-edge, highly efficient innovations and technologies are to be introduced; greenfields are to become operational and significantly expand the sector's production and export capacity. In the period of 2021/2023 to 2030, a considerably improved energy efficiency coupled with enhanced use of non-fuel energy sources (nuclear, solar, wind, etc.) are expected to boost the economy.

The overall goals of the strategy can be summarized as follows: energy security, energy efficiency of the domestic economy, economic efficiency of the national Fuel Energy Complex and ecological security of the national fuel energy complex.

The first steps towards liberalization and privatization of the Russian electricity market were undertaken with the reorganization of the former monopolist Unified Energy System of Russia (RAO-UES) described in section 11.9.2 and the subsequent creation of several electricity generation, transmission, and distribution companies located over the territory of the Russian Federation.

Since 1 September 2006, the new rules of operation of wholesale and retail electricity markets have come into force. As a consequence, the wholesale electricity (capacity) market saw a transition to regulated contracts to be concluded between buyers and generation companies, the free trade sector (FTS) was liquidated, spot market – day ahead market (DAM) was launched. In accordance with Russian Federation Government Resolution of 7 April 2007 there are plans to replace regulated contracts by free (unregulated) ones by 2011. The rules of operation of retail markets suggest that gradual liberalization of retail markets should go in parallel with wholesale market liberalization. It is important to note that during the transition period electricity tariffs for the population will remain regulated[239]. So far 30 per cent of the electricity market has been liberalized and this share is to grow to 50 per cent by 1 July 2009.

Despite the existence of several independent gas producers and oil companies which can sell gas on a deregulated sector, the overall gas sector is not fully liberalized yet, since the market is dominated by the de-facto monopolist Gazprom.

Policy and regulation on energy efficiency

The legal framework for energy efficiency is based on the Law on Energy Saving and on Increasing Energy Efficiency and on Introduction of Changes in Selected Legislative Acts of the Russian Federation (Federal Law No. 261, signed by the President on 23 November 2009) and on various Codes and Federal Laws, such as the Civil Code, the Tax Code, the Forestry Code, the Customs Code, the Urban Development Code and the Laws on Electricity Sector and on Municipal Housing Sector[220].

The new law replaces the previous Law on Energy Efficiency (Federal Law No. 28), which was in force since 1996 and which was distinguished by its declarative nature and absence of real measures allowing real development of energy saving technologies in the Russian Federation. Furthermore, it provides the regulatory framework for implementation of the decree of the President of the Russian Federation On measures to increase the energy and environmental efficiency of the Russian economy (No. 889 from 4 June 2008) which was adopted in 2008, thus marking the first step in a comprehensive revision of the regulation on energy efficiency of the Russian Federation. The presidential decree envisages energy intensity target reduction of 40 per cent by 2020.

The new Law on Energy Saving and on Increasing Energy Efficiency is a central and groundbreaking act embracing general principles of the policy of the Russian Federation in the area of energy efficiency and energy savings. The approval of the Law is accompanied by various legislative changes (including the Tax Code and the Federal Law on Public Procurement). Furthermore, the adoption of the Law, as a framework act, requires the development of numerous bylaws: 17 Decrees of application will be adopted by the Government and plural bylaws will be adopted by relevant federal ministries before 1 May 2010.

The declared aim of the Law is to create a legislative, economic and organizational stimulus for energy savings and for the development of energy efficiency initiatives and programmes. Its effect extends to all kinds of activities associated with energy use. More specifically, the Law introduces the following provisions:

- **Energy Efficiency rules for the circulation of goods:** manufacturers and importers of certain goods (particularly energy-consuming household appliances) will have to disclose the energy efficiency class of these goods starting from January 2011. Furthermore, as from January 2011, placements of orders for the supply of incandescent bulbs for state or municipal needs will no longer be permitted. Incandescent bulbs will be entirely banned from the Russian market by January 2014;
- **Energy Efficiency regulation in the construction industry and the housing and utilities sector:** the Law establishes a general rule that buildings (both for residential and for non-residential uses) must meet applicable energy efficiency requirements during the commissioning and the operation period. State construction supervisory authorities shall assign energy efficiency classes to residential buildings; consumption meters for electricity, gas, heat and water must be installed and put into operation in all existing building by January 2012. The responsibility of compliance to these regulations is placed on the persons responsible for the maintenance of the buildings or alternatively on the owners of the premises, which must also bear the related costs;
- **Energy Audits**: the Law introduces energy audits on a voluntary basis, but also foresees mandatory energy audits for certain energy-intensive industries and organizations. The mandatory energy audits must be undertaken for the first time at the latest by the end of 2012 and reiterated at least once every five years. The findings of the energy audits are to be recorded in an “energy passport”, a copy of which shall be sent to the responsible Energy Efficiency Authority;
- **Energy Service Contracts:** the Law introduces for the first time the energy service contract as a special form of civil-law agreement. In particular, the Law specifies terms and conditions of an energy service contract, such as extent of energy savings to be achieved by the contractor, duration period and other obligations. Special aspects concerning the execution of state and municipal energy service contracts are envisaged by the Russian budgetary legislation as by the one on the placement of state and municipal orders (both being restated by the Energy Efficiency Law);
- **Energy Saving Programmes**: organizations with state or municipal equity participation and those engaged in regulated activities are mandated, by May 2010, to approve energy-saving and energy efficiency programmes for their subsequent implementation. Such programmes must include relevant targets, related measures and expected results in volume and monetary value;
- **Energy Efficiency and Government Procurement orders**: The Law institutionalizes a principle whereby public procurement orders must be placed with due regard for current energy efficiency regulations which shall be established by the responsible state authority, regarding types of goods and services involved, the required energy efficiency classes and other obligations to be met;
- **Support of Energy-Saving Technologies**: the use of energy-saving technologies (including, but not limited to the use of secondary energy sources and renewable energy sources) shall be encouraged by the introduction of a series of tax and fiscal incentives (these will be described later on);
- **Information support for the Energy-Saving System**: the Law provides for a variety of measures of informational support for activities related to energy savings and energy efficiency increases. Particularly, a state information system on energy savings and energy efficiency increases must be established and awareness raising campaigns are foreseen. Suppliers of energy are obliged to inform their customers on ways to save energy resources and use them more efficiently. Legal entities are now also required to have the explanatory

notes accompanying their annual financial statements to indicate total expenses on energy resources incurred in the respective calendar year.

- **Administrative Liability**: finally, the Law changes the Administrative Code in order to add a number of offences related to saving energy and energy efficiency increases. The penalties are to include heavy fines, which may in certain cases be accompanied by confiscation of goods.

Policy and regulation on renewable energy sources

There is no specific law on renewable energy sources in the Russian Federation[231]. However, the Federal Law No. 35 On the electric Power Industry as amended by Federal Law No. 250 On amendments of legislative acts of the Russian Federation related to reformation of the United Energy System of Russia, which was ratified on 4 November 2007, contains a number of measures to support generation of electricity from renewable energy sources[224]. First of all, it constitutes the set of energy sources considered as renewables. Furthermore, the law obliges the government to adopt long-term state policies in the area of renewable energy source by fixing the share of renewable energy sources in production and consumption by periods and years. The law envisages federal budget subsidies, including coverage for grid connection costs for renewable energy sources producers with a capacity below 25 MW. It obliges grid companies to purchase preferentially renewable energy for the compensation of their transmission losses. Furthermore, the law introduced a premium to the wholesale market price for renewable energy[224].

The overall list of federal laws, governmental decrees, and drafts that are related to renewable energy sources can be seen in Table 11.26.

Table 11.26: Legislative framework regarding renewable energy sources in the Russian Federation

Publication	Name of the legislation	Content overview
04.11.2007	Federal Law No. 35 "On the Electric Power Industry" as amended by Federal Law No. 250	• Classification of renewable energy sources • Basic measures of state support of renewable energy sources development • Powers of state authorities related to mechanisms of renewable energy sources state support
04.06.2008	President's Decree No. 899 "On Some Measures to Increase Energy and Ecological Efficiency of Russian Economy"	• Increasing economic and ecological efficiency of basic industries • Instructing to draft Federal Laws stimulating the use of ecologically clean technologies • Increasing responsibility for failing norms of acceptable impact on environment • Employing measures of budget support of using renewable energy sources and ecologically clean technologies
03.06.2008	RF Government Decree No. 426 "On qualifying a RES-E generating facility"	• Establishes rules and criteria for attributing a particular generator to a certain category of renewable energy sources generation facility • Sets up directions and specifies four basic documents to be adopted by 2009 on priority basis
Draft	RF Government Resolution "Main directions of state policy in the area of raising energy efficiency of power industry based on RES-E use and comprising targets of RES-E generation and consumption in the overall balance of generation and consumption of electric power"	• Presupposes goals and principles of state policy for raising renewable energy sources efficiency as well as measures stimulating and supporting renewable energy sources
Draft	RF Government Decree "On procedure of determination of premium added to a wholesale electric power market equilibrium price to determine price on electric power produced by qualified RES-E generators"	• Presupposes premium on wholesale market price for a qualified renewable energy sources generating facility as a fixed sum aimed at return of investments in construction of a given facility under condition of sufficient level of return on invested capital
Draft	RF Government Decree "On criteria to provide federal budget subsidies to compensate the cost of grid connection of qualified RES-E generators with installed capacity of less than 25 MW and persons to whom such facilities belong to"	• Presupposes compensation from Federal Budget of the cost of grid connection by qualified RES-E generation facility. Experts current estimate the cost of grid connection at 2.2 million Rub for MW/km

Source: International Sustainable Energy Development Centre (ISEDC)[224] (2009)

International commitments and current status of implementation

EU Regulation

The Russian Federation is neither a member of the European Union nor a candidate country. However, since October 2000 a Russia–EU Energy Dialogue is pursued with a special area dedicated to energy efficiency. The purpose of the dialogue is to raise all issues of common interest relating to the energy sector, including the introduction of cooperation on energy saving, rationalization of production and transport infrastructures, European investment possibilities, and relations between producer and consumer countries. However, the most recent summit in Khabarovsk on 21-22 May 2009 was marked by articulate tension between the Russian Federation and the European Union. The Russian Federation and the EU had drafted contradictory proposals for the summit in Khabarovsk. The Russian Federation came up with its conceptual approach as a substitute for the Energy Charter, while the EU prepared a new energy strategy and a mechanism of early warning, both of which are an extension of the Energy Charter[240].

Kyoto Protocol

The Russian Federation is a party to the UNFCCC as an Annex I country and to the Kyoto Protocol as an Annex B country since 2004. It is eligible for Joint Implementation projects and can trade Emission Reduction Units with other Annex B countries.

The commitment undertaken by the Russian Federation not to exceed the level of greenhouse gases of the baseline year 1990 is very favorable to the Russian energy policy: the level of greenhouse emissions in the Russian Federation used to be 2,400 Mt CO_2 equivalents in 1990. Due to the economic crisis in the 1990ies, energy consumption and, consequently, greenhouse emissions dropped to 1,600 Mt in 2000. Assuming a doubling of the GDP as well as changes in the energy production and consumption patterns, it is expected that by 2010 such emissions could reach 1,900 and by 2015 2,030 Mt, i.e., reach 80 per cent and 85 per cent, respectively, of the Kyoto Protocol quota for 2008 to 2012. In other words, the Russian Federation's commitments under the Kyoto Protocol will not hamper the country's development and, on the contrary, offer a significant reserve, which could partially be used commercially within the context of emission trading[220].

Other international commitments

Presently, the Russian Federation cooperates in energy efficiency with many countries of the world within bilateral and multilateral agreements. A Memorandum of Understanding between the Ministry of Industry and Energy of Russia and the Ministry of Economy of the Netherlands regarding energy efficiency and renewable energy sources was signed in 2006; the Joint Ministry of Industry and Energy of Russia and U.S. Department of Energy Working Panel on Energy Efficiency has been active since 1997.

The Russian Federation signed the Energy Charter Treaty in 1994, but has never ratified it. On 6 August 2009, the Russian Federation publicly announced its intention to withdraw from the Energy Charter Treaty. The announcement followed Prime Minister Vladimir Putin's signing of a decree on 30 July 2009, completing the necessary domestic procedures for withdrawal to take place[241].

11.9.6. Economic incentives and financing schemes for energy efficiency and renewable energy projects

General investment climate in the country

The Russian Federation has a National Investment Agency (NIA), which aims to assist international companies in establishing and building their businesses in the Russian Federation. NIA works closely with the local and regional government of the Russian Federation. Some of the services offered by NIA include business start-up services, consulting in taxation, law, accounting, customs and investments, market research, competitive analysis and market entry strategies, and promotional and advertising work in the Russian media[242].

Although the Russian Federation experienced record foreign direct investment inflows of USD 27.8 billion in 2007 and the overall investment climate has strengthened in the past years[243], the FDI inflows collapsed significantly in the first seven months of 2009 (-45 per cent)[219]. Furthermore, some doubts still linger over the protection of property rights[244]. The most striking cases involve the expropriation of Yukos, a giant Russian oil company, by the Russian Government and the forcing of foreign oil companies out of production-sharing agreements, as for instance happened with Shell regarding the exploration of the giant Sakhalin II field[245].

According to the Heritage Foundation, foreign and domestic investments are treated equally under the law, although the government tends to prefer joint ventures with foreign companies as a minority shareholder, especially in strategic sectors. However, investment is restricted in many areas. Government approval is required for all investments over RUB 50 million (about USD two million), investment ventures in which the foreign share exceeds 50 per cent, or investments in housing and construction projects. Other investment impediments are inconsistent and burdensome government regulation, unreliable contract enforcement, inadequate infrastructure, and corruption. Capital payments and transfers are also subject to restrictions. Foreign ownership of non-agricultural land that is not located near international borders is permitted[246].

Contrary to other Eastern European or Central Asian countries, Transparency International's Corruption Perceptions Index score for 2008 of the Russian Federation continued a downward trend and currently stands at 2.1, ranking it eleventh, and thus second last, within the project region. Although giving and receiving bribes are criminal acts punishable up to 12 years of incarceration in the Russian Federation, little progress has been made in the limitation of corruption, which appears to have systemic nature[244]. According to the Russian Federation's INDEM foundation, a Russian NGO founded in 1990, millions of corruption offences are committed every year in the Russian Federation and the total sums involved now total USD 300 billion, almost equal to the Russian Federation's entire federal budget[244].

Roughly three-quarters of the Russian economy have been privatized so far, although the state continues to hold significant blocks of shares in many privatized enterprises. According to the U.S. Department of State, foreign investors participating in Russian privatization sales often are confined to limited positions facing problems with minority shareholder rights and corporate governance[244].

Incentives for energy efficiency

While under the previous regulatory system there were no specified economic or tax incentives for the promotion of energy efficiency measures amongst producers or consumers in the Russian Federation, the new Law on Energy Saving and on Increasing Energy Efficiency approved in November 2009 introduces significant tax incentives to support energy-saving technologies.

The new tax incentives, which are in force since December 2009, include in particular investment tax credits up to 30 per cent for companies investing in energy efficiency and energy saving technologies, accelerated depreciation of assets belonging to the category of objects with high energy efficiency or classified in top energy efficiency classes and finally partial compensation of interests on loans granted by Russian banks for the purpose of investing in energy savings and increased energy efficiency technologies.

Incentives for renewable energy sources

According to the Federal Programme Use of renewable sources for energy for raising energy efficiency electric power industry the total federal investments in renewable energy sources in the Russian Federation in 2009 to 2020 will amount to RUB 1,407 billion (USD 56 billion)[224]. This support consists of RUB 120 billion in form of subsidies for the grid connection of renewable energy sources generators and RUB 1,115 billion in form of a premium on the wholesale price on electricity generated from renewable energy sources, which are paid to owners of newly constructed renewable energy sources power plants. Furthermore, all new renewable energy sources power plants with a capacity below 25 MW will receive compensation from the federal budget for the electricity grid connection[237]. The exact breakdown of this federal financial support can be seen in Table 11.27.

Table 11.27: Federal financial support for electricity from renewable energy sources (2009-2020)

Type of renewable energy source	Support (in RUB billion)
Tidal power plants	585
Wind power generators	338
Biomass (incl./solid household waste), biogas, coal deposit gas, industrial waste gas	229
Hydro power plants with a capacity below 25 MW	176
Geothermal power plants	56
Generators using energy of sewage streams; waves of water basins, rivers and oceans; low potential heat energy of earth, air, water with special thermocarriers	20
Solar	2
Total	**1,407**

Source: International Sustainable Energy Development Centre (ISEDC)[224] (2009)

The premiums on the wholesale and retail price of electricity generated by renewable energy sources are shown in Table 11.28.

Table 11.28: Premium on market prices for electricity from renewable energy sources

Type of renewable energy source	Term of action of premium (years)	Premium (RUB/kWth)
Wind	10	4.31
Geothermal	10	3.59
Biomass	7	1.95
Tide	15	5.10
Small rivers	10	2.28
Solar	15	16.73
Others	10	3.0

Source: International Sustainable Energy Development Centre (ISEDC) [224] (2009)

Financing mechanisms for energy efficiency and renewable energy projects

National financing mechanisms

The new Russian Federal Law on Energy Saving and on Increasing Energy Efficiency No. 261, approved on 23 November 2009, sets ambitious goals to be reached and introduces a comprehensive set of regulations to be implemented by public institutions, manufacturers, service companies and final customers. Unfortunately, the Law does not mention the establishment of a National Fund to finance energy efficiency programmes or to support implementation of the mandatory provisions required by the Law. However, several implementation Decrees and bylaws are planned to be developed and approved by the Government and the relevant Ministries by mid-2010 and therefore, some provisions for financing mechanisms might be approved soon to complement this new comprehensive regulation.

International financing mechanisms

The EBRD has launched a new EUR 300 million framework facility called the Russian Sustainable Energy and Carbon Finance Facility (RSECF). This facility, approved in May 2009 by the EBRD Board of Directors, envisages lending credit lines to participating banks for on-lending to private sector companies for sustainable energy projects in the industrial sector. It is envisaged that six to seven Russian banks will act as participating banks. In July 2009, the EBRD provided the first long-term loan under the new facility of up to EUR 60 million to Promsvyazbank for on-lending to private customers for energy efficiency projects. Participating banks and sub-borrowers can benefit from free-of-charge assistance to identify profitable energy saving measures and quantify the associated benefits. Since 2006, the EBRD energy efficiency related investments in the Russian Federation amounted to over EUR 755 million[247].

The International Finance Corporation (a member of the World Bank Group) operates an investment facility, called the Russia Sustainable Energy Finance Programme (RSEFP), to provide credit lines for Russian financial institutions who will lend these funds to energy efficiency and renewable energy projects. The RSEFP is a five-year donor-funded programme, which has been launched in 2005 to stimulate investment in energy efficiency in projects by supporting financial institutions in building an energy efficiency product. The programme consists of three parts, i.e. advisory services, investments, and activities to improve the awareness of and regulatory environment for energy efficiency and renewable energy[248]. The overall volume of the credit line is USD 150 million, of which USD 100 million have already been disbursed to six participating banks. The average project financed by this programme is USD 500,000 to USD one million, while the payback period averages 3.5 years[248].

The Nordic Environment Finance Corporation (NEFCO), an international finance institution established in 1990 by five Nordic countries, has financed a wide range of environmental projects in the Russian Federation[249]. NEFCO places emphasis on direct investments from public-private partnerships and corporate public services. As of 2007, NEFCO, had 20 active and 37 completed energy sector projects in the Russian Federation, with a specific focus on renewable energy technologies, energy efficiency, fuel switching, waste (biogas) and wastewater treatment. Project examples are listed in Table 11.29.

Table 11.29: Project examples of NEFCO in the Russian Federation

Project	Project description	Investment	Energy savings/ emission reduction	Payback period
Onega hospital boiler house	Efficiency of not less than 80 per cent complete with mechanized fuel conveying plant, service platforms, valves, safety devices and automation	RUB 29 million	4,440 t/a of CO_2 2,150 t coal/a 382 t of CH_4	8.8 years
Petrozavodsk School No. 3	Insultation of pipes and balancing heat system, heating substation upgrade, sealing of windows, improved roof insulation, renovation of greenhouse and cold water meters	USD 36,000	490,500 kWh/a	4.3 years
Waste Coke Gas Utilization, Western Siberia	Waste coke utilisation at chemical works to displace natural gas consumption	n.a.	332,000 tCO_2	n.a.
Kotlas Social Sphere Facilities (Archangelsk)	Upgrading of heating systems in 32 schools and kindergartens by installation of new heat sub-centrals, automatic temperature control and thermostatic valves	RUB ten million	440 t/a of natural gas 1,100 t/a of CO_2	4 years

Source: NEFCO[249](2008)

Commercial financing mechanisms

At present Russian banks actively use syndicated lending as one of the main sources of financial provision. For example, the Programme of the Russian Development Bank (RusDB) for Financial Support for Development of small- and medium-sized enterprises is based on a two-tier lending procedure. The RusDB provides financing to 90 partner banks, which on-lend money to their clients (small- and medium-sized enterprises). The volume of loans provided to small- and medium-sized enterprises by the Russian Development Bank as of 1 July 2008, amounted nearly to RUB 7.5 billion. The loans are provided for the time period of up to ten years. However, the largest part of the Russian Development Bank loan portfolio in 2007 (47 per cent) consisted of loans with the term of up to three years. Currently, the Russian Development Bank lends to partner banks at a rate close to the Central Bank refinancing rate, with the weighted average annual rate around 13 per cent as of January 2009. Final on-lending rate is determined by the partner bank independently. Range of interest rates for small and medium-sized business varies from 11 to 22 per cent, with the average annual interest rate about 16 per cent.

Nevertheless, serious doubts linger over the stability of the Russian commercial banks. It is estimated that about 20 per cent of the overall lending volume of the Russian commercial banks consists of non-performing loans[219].

Other support mechanisms

Other support programmes are related to technical assistance programmes. For instance, the cost of the technical assistance programme integrated into the International Finance Corporation project initiative will be USD 6.25 million on funded through the Global Environment Facility, donors and using the International Finance Corporation's own internal resources.

The United Nations Development Programme[250]/Global Environment Facility is very active in the field of energy efficiency. Project examples are listed in Table 11.30.

Table 11.30: Project examples of the UNDP/GEF in the Russian Federation

Project	Project description	Investment
Standard and Labels for Promoting Energy Efficiency in the Russian Federation	The projects aim was to facilitate market transformation towards more energy efficient building equipment and appliances through the introduction of energy efficiency standards and labeling. The goal of the project is to reduce electricity consumption-related CO_2 emissions in residential, commercial and tertiary sector buildings in the Russian Federation	USD 8 million
Transforming the Market for Efficient Lighting	The project aims at transforming the Russian market towards efficient lighting, thereby reducing national greenhouse gas (GHG) emissions. The project will focus on phasing out outdated technologies for residential, office and street lighting, resulting in 58 Mtons of CO_2 emissions mitigated cumulatively	USD 7 million
Building Energy Efficiency in the North West of the Russian Federation	The aim of this project is to build local capacities for and demonstrate local solutions to improved energy efficiency in construction and maintenance of buildings in the North West of the Russian Federation, i.e. Pskov, Vologda and Arkhangelsk	USD 5.8 million

Source United Nations Development Programme in the Russian Federation[256](2009)

Several other projects related to capacity building and technical assistance or the provision of grants for direct investments in energy efficiency, renewable energy sources and sustainable forest management have been financed by the Global Environment Facility, the International Bank for Reconstruction and Development, the World Bank, the United Nations Economic Commission for Europe, the Global Opportunity Fund, EuropeAid (through the TACIS project), the Renewable Energy and Energy Efficiency Partnership, the German government (through the creation of a joint agency on energy efficiency and power saving) and USAID.

11.9.7. Barriers to the implementation of energy efficiency and renewable energy projects

Box 9: Summary of barriers to the implementation of energy efficiency and renewable energy projects in the Russian Federation

Legal, institutional and administrative barriers

1. Foreign investors are often limited to a role of minority shareholders and have no influence on the corporate governance of the companies.
2. Public organizations are not able to retain or reallocate savings on communal expenses or to conclude long-term contracts or contracts that pay for investments with future savings (this situation might be changed significantly by the new Law on Energy Efficiency and Energy Savings).
3. The establishment of a network of dedicated State authorities at the federal, regional and local level has started at the end of 2009 and it will therefore take some time until tangible results of their actions can be perceived.
4. No action or implementation plans have been developed for the previous Energy Strategy until 2020.
5. The partial absence of databases with consumption data on public and residential buildings is a barrier in the development of analysis work and assessments (this situation might be changed significantly once the new Law on Energy Efficiency and Energy Savings is operational).

Economic and financial barriers

6. The absence of operational dedicated credit lines provided by national funds form a strong barrier for development of projects.
7. The absence of tariff components to cover environmental implies the absence of a potential financial mechanism for energy efficiency and renewable energy projects.
8. The privatization and liberalization process in the Russian energy sector is not yet completed and there are still strong state influences in the strategic decisions of market operators.

Lack of awareness, human capacities and professional skills

9. The vast availability of fossil resources has so far not provided any incentive to increase efficiency of resource use or the deployment of renewable energy sources.
10. The absence of operational credit lines among financial institutions suggests a general lack of experience in the Russian banking sector regarding financing schemes for energy efficiency and renewable energy projects.

Legal, institutional and administrative barriers

So far, in the Russian Federation there was a lack of a clear policy framework for the support of energy efficiency and renewable energy sources as well as the lack of clear responsibilities for policy implementation and monitoring of progress and this clearly constituted a significant legal and institutional barrier. However, the new Law on Energy Saving and on Increasing Energy Efficiency, approved at the end of 2009, sets ambitious goals to reverse this situation, by the establishment of federal, regional and local energy efficiency authorities and by the definition of clear deadlines for implementation of the comprehensive mandatory provisions. However, the effective implementation of the new Law is highly dependent of the relative bylaws and implementation decrees which still need to be approved. Furthermore, even if the legal framework set by the new Law is implemented in the ambitious timeframes mentioned in the Law, it will take long time before the beneficial effects at the institutional and administrative level can become tangible – this relates especially to the setup of new authorities and to the development of consumption databases and particularly in those regions of the Federations which so far had not developed any programmes or initiatives in the area of energy efficiency.

Regarding renewable energy sources, there is still no defined regulatory framework in place or under development.

Finally, other barriers pointed out by the UNECE assessment mission of late 2008 pointed out complicated guarantee procedures for investments in projects concerning the administration and the impossibility for public organizations to retain or reallocate savings on communal expenses or to conclude long-term contracts or contracts that pay for investments with future savings.

Economic and financial barriers

The main economic and financial barriers in the Russian Federation concern the availability of financing mechanisms for energy efficiency and renewable projects as well as the current progress in market development:

- The privatization and liberalization process in the Russian energy sector is not yet completed and there are still strong state influences in the strategic decisions of market operators: foreign investors are often limited to a role of minority shareholders and have no influence on the corporate governance of the companies;
- The absence of tariff components to cover environmental externalities leads on one side to diminished awareness of the value of natural resources on behalf of the customers and on the other side it implies the absence of a potential financial mechanism for energy efficiency and renewable energy projects;
- The planned premium tariff for electricity produces from renewable energy sources is not yet operational and furthermore, it does not ensure absence of market risks for investors (being linked to the market prices for energy). Furthermore, the planned tariff will need to ensure a return on investment sufficiently attractive for private investors;
- The absence of operational dedicated credit lines provided by national funds obviously form a strong barrier for development of projects, as the only financing mechanisms currently available are ordinary commercial loans, which are only available for short- to mid-term time periods and to relatively high interest rates. Unfortunately, the new Federal Law on Energy Saving and on Increasing Energy Efficiency does not mention the establishment of a national fund to support the implementation of the ambitious mandatory provisions set by the Law (however, this may be done through one or more of the several bylaws and implementation Decrees which are expected to be approved by mid-2010).

Lack of awareness, human capacities and professional skills

All barriers for investments pointed out so far are an indicator for a general and diffused lack of awareness on the relevance of energy efficiency and renewable energy sources in the Russian Federation:

- The vast availability of fossil resources has so far not provided any incentive to increase efficiency of resource use or the deployment of renewable energy sources; without a clear political will to realize tangible progress in this direction, increase of awareness in the public and private sector will develop very slowly;
- The partial absence of databases with consumption data on public and residential buildings is a barrier in the development of analysis work and assessments which would support stronger awareness of customers and provide a quantitative background for the identification of attractive energy efficiency projects. Even if the establishment of such databases is foreseen by the new Law on Energy Saving and on Increasing Energy Efficiency, it might still take a long time before these databases become statistically significant, as in many cases there are no past data to refer to;
- The same consideration refers to the incomplete metering of energy consumption on final customers, which are today often billed not on actual consumption but on living surface or other similar norms: while the new Law on Energy Saving and on Increasing Energy Efficiency envisages full metering of consumption of all energy resources by 2012, it will still take some time before the awareness-raising effects of such a measure become tangible and lead to the development of a motivation to change consumption behaviors;
- The Kyoto Protocol which sets a baseline emission reference for the Russian Federation (year 1990) which is far above the emission footprints of the country in the last decade does not provide any motivation for progress in energy efficiency and climate change mitigation.

- The absence of operational credit lines among financial institutions suggests a general lack of experience in the Russian banking sector regarding financing schemes for energy efficiency and renewable energy projects.

11.10. *Serbia*

11.10.1. Overview of economic situation

General demographic data

Serbia has a population of 7.395 million and a surface area of 88,361 km^2 (including Kosovo). The population density of Serbia is 83.7 inhabitants per km^2. The capital is Belgrade, with about 1.57 million inhabitants. Further major cities with a population over 100,000 are Novi Sad (255,000), Nis (237,000) and Kragujevac (175,000). The population growth in Serbia has been negative in recent years, ranging between -0.3 and -0.4 per cent p.a. between 2005 and 2007[251].

Current political situation and outlook

In 2003, the Federal Republic of Yugoslavia was renamed the State Union of Serbia and Montenegro, a loose federation of the two republics with a federal level parliament. Since June 2006, the Republic of Serbia has been the legal successor of the State Union of Serbia and Montenegro due to the fact that Montenegro declared its independence on 3 June 2006. At this time Kosovo is governed under the provisions of the UN Security Council Resolution 1244.

In October 2006, a draft of the new Serbian constitution was approved by the Serbian electorate through a referendum. The Government of the Republic of Serbia (Vlada Republike Srbije) is the main element of the executive branch of the Government in Serbia. The Prime Minister is elected by the National Assembly. Ministers are nominated by the Prime Minister and ratified by the Parliament. The National Assembly of Serbia has 250 members elected for a four-year term. Last parliamentary elections in Serbia were held in May 2008[22].

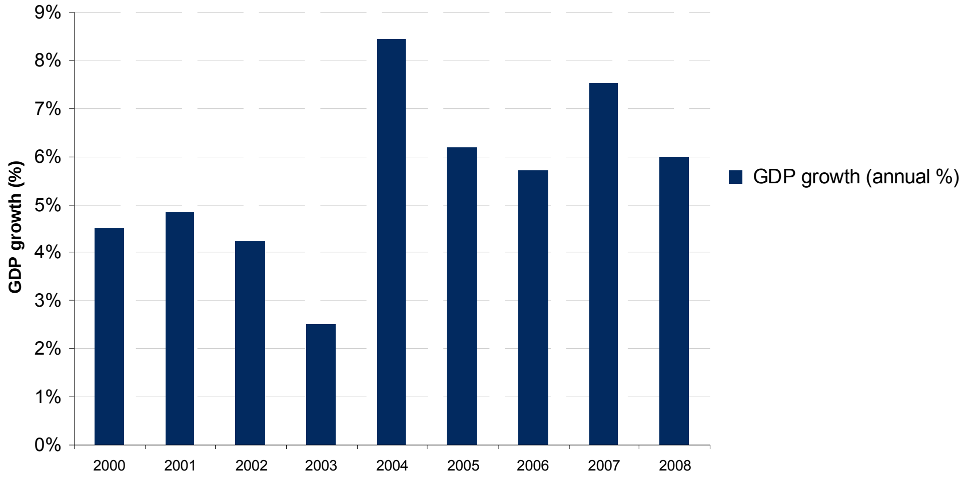
The actual President of the Republic of Serbia is Boris Tadic, re-elected on 3 February 2008. The current Prime Minister is Mirko Cvetkovic, who was elected on 7 July 2008. The next elections are planned for 2013 (parliamentary and presidential).

The Republic of Serbia is divided into 29 districts (including five districts in Kosovo, which are governed under the provisions of the UN Security Council Resolution 1,244) and the district city of Belgrad. These districts, which are the administrative units of Serbia, comprise in total 200 municipalities.

Gross Domestic Product

After the transition from the Federal Republic of Yugoslavia, Serbia has made progress in trade liberalization, enterprise restructuring and privatization, and the development of small and medium size private companies. From 2004 to 2008, real gross domestic growth varied between six and eight per cent, as shown in Figure 11.109[252]. However, the impacts of the worldwide financial crisis are being felt in Serbia. There is a substantial decline in economic activity throughout all sectors coupled with a rise of unemployment and losses on the stock exchange. Particularly the metal and chemical industries have been hit very hard by the financial crisis (e.g. US Steel has stopped production and no date has been set for resumption). Even the Serbian Government is planning to cut its workforce by up to 8,000 people in the next one and a half years[253].

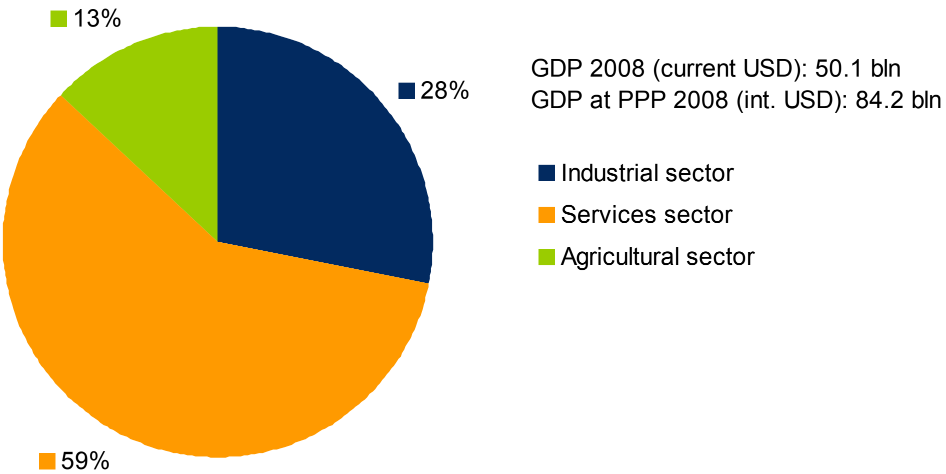
Figure 11.109: *Real GDP growth of Serbia*



Source: World Bank[252] (2009)

The repartition of the GDP in 2007 can be seen in Figure 11.110 and was dominated by the services sector with 59 per cent The industrial sector, with a share of 28 per cent, is mostly focused on the following sub-sectors: sugar, food industry, agricultural machinery, electrical and communication equipment, pulp and paper, lead, and transport equipment[252].

Figure 11.110: *Repartition of the Gross Domestic Product in Serbia in 2007*[xxi]



Source: World Bank[252] (2009)

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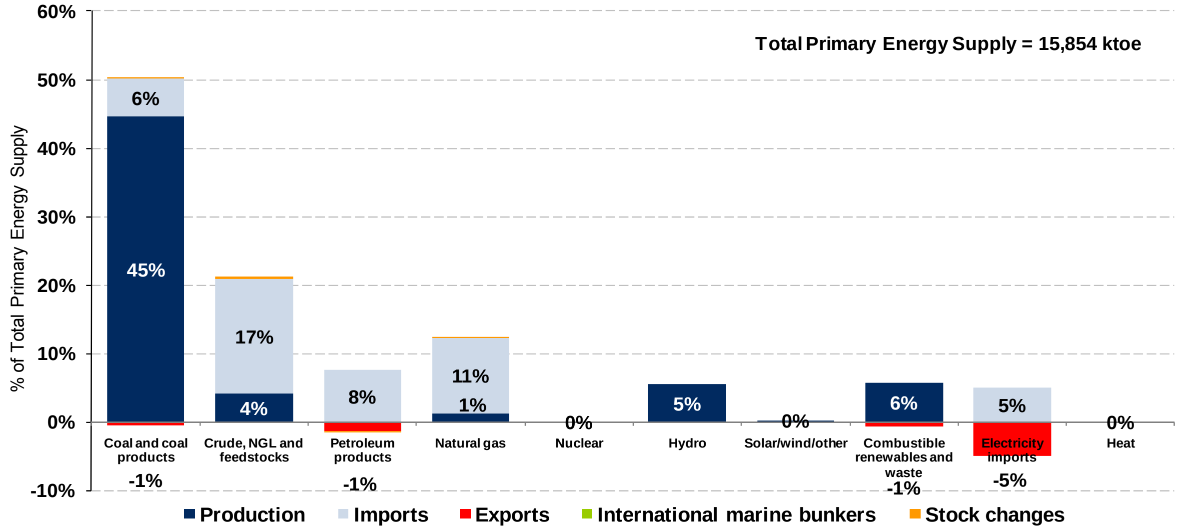
xxi For Serbia the repartition values of the GDP per sector are only available for 2007, while absolute GDP values are from 2008.

11.10.2. Energy sector and development of energy markets

Energy supply

Despite its significant coal resources, Serbia's import dependency amounted to 38 per cent in 2006 (see also Figure 11.111)[5].

Figure 11.111: Energy balance of Serbia by primary energy sources in 2007



Source: IEA[5] (2009)

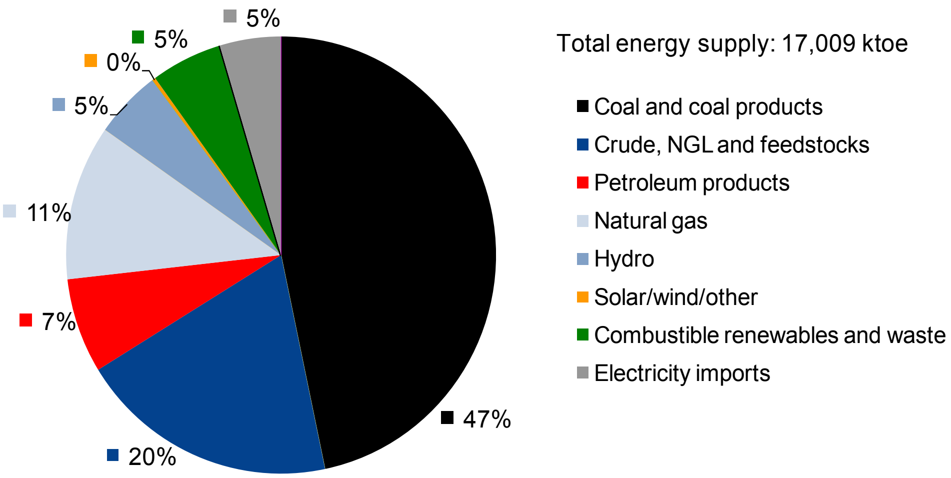
Serbia's total energy supply (sum of domestic production and imports) and total primary energy supply amount to 17,009 ktoe and 15,854 ktoe respectively and are largely dominated by fossil fuels, especially coal (see Figure 11.112). More than 90 per cent of total supply of coal comes from Serbia's own mines; mainly from lignite deposits in Central Serbia[22].

In 2007, electricity generation in Serbia amounted to 36,523 GWh, mostly dominated by coal and large hydropower, as shown in Figure 11.113. The total installed capacity for the electric power generation is 8,355 MW. Of this capacity, 5,171 MW derive from lignite-fired thermal power plants and 2,831 MW from hydro power plants. The installed capacity of oil- and gas-fired combined heat power plants is 353 MW[254].

The last electricity power plants were built in the early 1990ies. From the early 1990ies until 2000 no additional investments were undertaken to expand the production capacity. Since 2000 significant resources have been spent into the modernization and revitalization of production assets, especially into flue gas purification and the reduction of the environmental impact of the thermal power plants. Additionally, significant resources have been added to the refurbishment of hydro power plants. In 2009, the state-owned utility Electric Power Industry of Serbia (EPS) launched an international tender for the construction of the two thermal power plants TE "Kolubara B" and TE Nikola Tesla B3, with a capacity of 2x350 MW and 700 MW respectively. These two power plants will use state of the art technology[254].

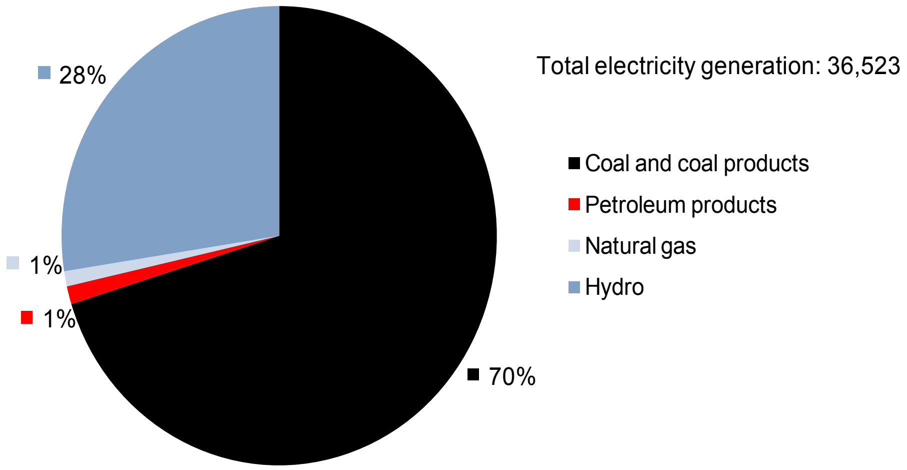
Heat production in Serbia amounted to 44,780 TJ in 2007, produced by coal (16 per cent), oil (33 per cent), and gas (46 per cent), as shown in Figure 11.114. Most of the installed capacity is based on heat-only-boilers fuelled by natural gas with the possibility to switch to heavy fuel oil, lignite and brown coal. Two systems with about five per cent of the total capacity are linked to large power plants in Obrenovac and Kostolac[254].

Figure 11.112: *Supply of primary energy by sources in 2007*



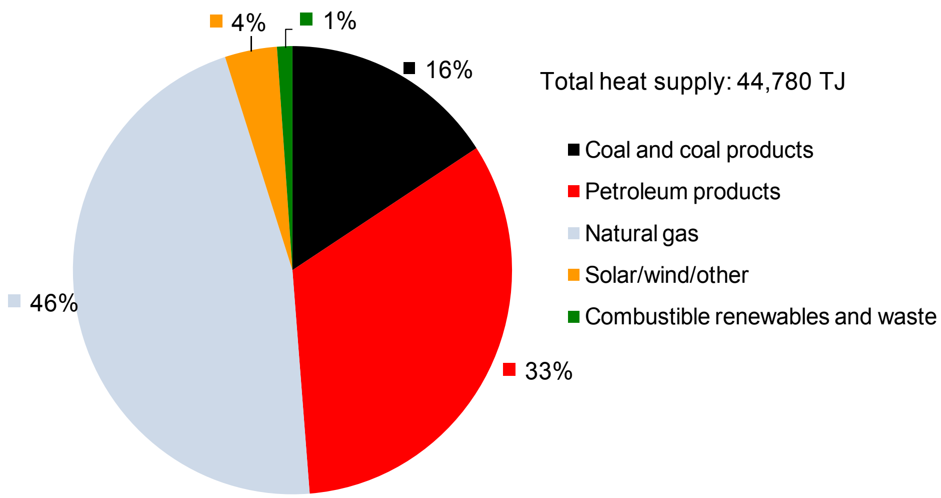
Source: IEA[5] (2009)

Figure 11.113: *Electricity generation by sources in 2007*



Source: IEA[5] (2009)

Figure 11.114: *Supply of heat by sources in 2007*

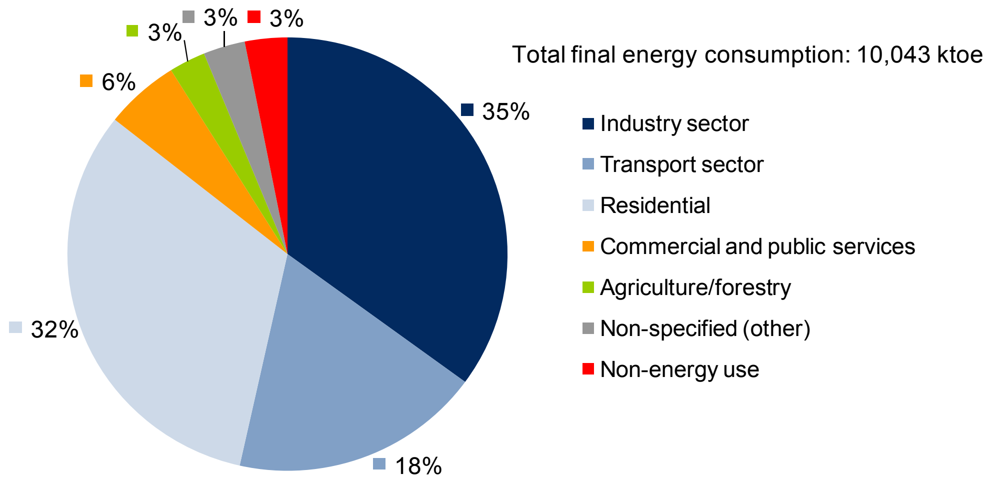


Source: IEA[5] (2009)

Energy demand

The industry and residential sectors are the largest consumers of primary energy, representing jointly 68 per cent of total consumption in 2007. Commercial and public services represent only five per cent of this consumption although their share of GDP is 59 per cent (see Figure 11.115).

Figure 11.115: Total final energy consumption by sectors in 2007



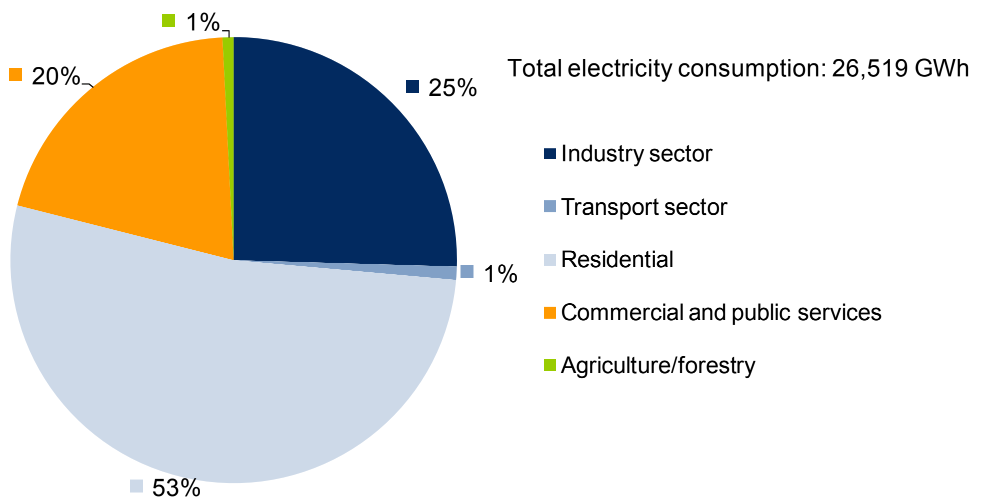
Source: IEA[5] (2009)

The residential sector is the first consumer of electricity (53 per cent). The industry sector accounts for a quarter of the electricity consumption while the services sector represents 20 per cent, as shown in Figure 11.116.

Gas demand in Serbia accounts for more than 13 per cent of the total final energy consumption. The industry sector accounts for up to 74 per cent of the national gas consumption, while 3 per cent of the overall gas demand is used for non-energetic purposes mainly in the chemical industry (see Figure 11.117).

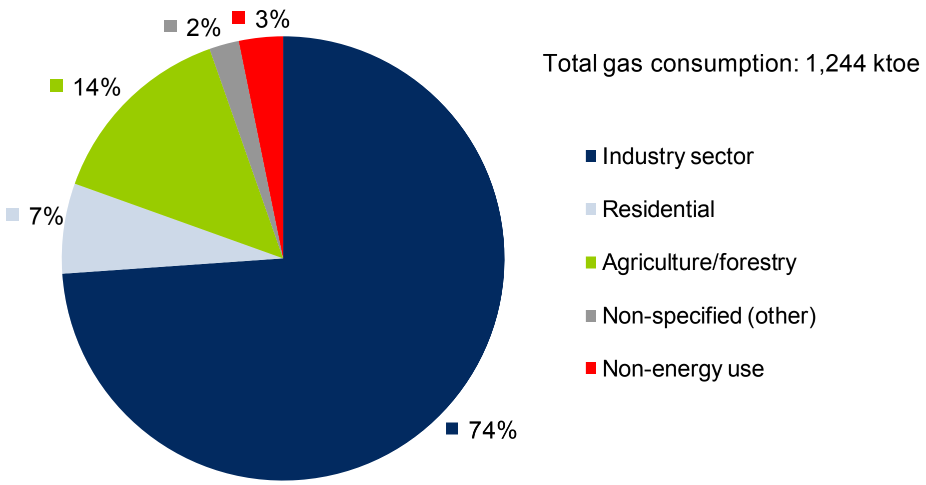
Total final consumption of heat in Serbia amounts to 985 ktoe (less than ten per cent of the total final consumption of energy). Most of this heat is absorbed by industrial processes, while the residential sector is the second largest consumer due to the use of district heating systems with a share of 37 per cent in the total final consumption of heat (see Figure 11.118).

Figure 11.116: Final consumption of electricity by sectors in 2007



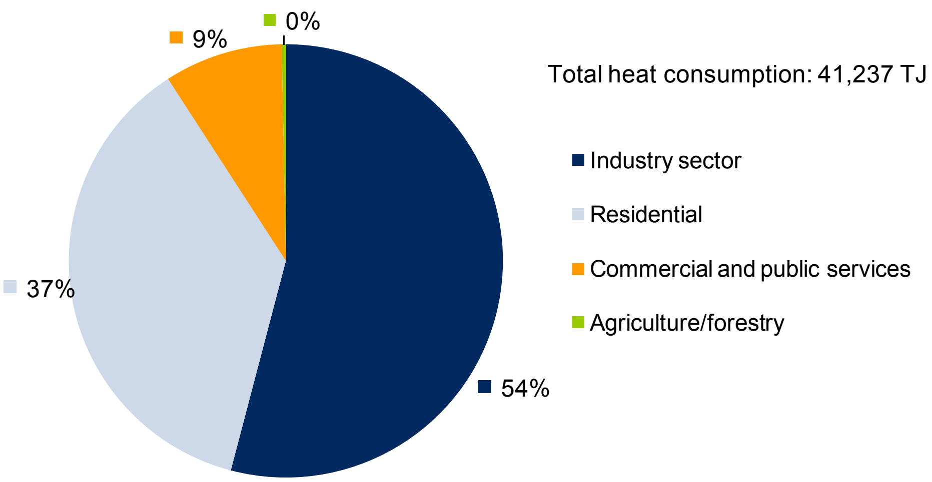
Source: IEA[5] (2009)

Figure 11.117: *Final consumption of gas by sectors in 2007*



Source: IEA[5] (2009)

Figure 11.118: *Final consumption of heat by sectors in 2007*



Source: IEA[5] (2009)

Energy markets

Electricity market

To meet the rising demand coming from the growing economy, electricity production needs to increase. Gas power plants are envisaged in relation to the planned new pipeline project "Southstream" with Gazprom, which would transfer natural gas from the Russian Federation, via Turkey, Bulgaria, Serbia, Croatia, and Slovenia, to northern Italy. As already mentioned, two lignite power plants with a capacity of 700 MW each and additional new CHP facilities in Novi Sad, Belgrad, and Kragujevac with a capacity of 400 MW each are being planned[22].

The major actor in the electricity market is the state-owned utility Electric Power Industry of Serbia (EPS), which owns all installed capacity in Serbia, but currently has no access to its assets in the territory of Kosovo[254]. Restructuring started in 2005 with a separation of the underground mining and other non-core activities undertaken by subsidiaries on the one hand and the establishment of two separate public entities respectively in charge of electricity production, distribution, and trade (Electric Power Industry of Serbia), and of the transmission system and market operation (Elektromreza Srbije) on the other hand[22].

The Electric Power Industry of Serbia is a vertically organized utility comprising eleven departments. The number of employees has been drastically reduced from 58,662 in 2001 to less than 35,900 in 2006, including the employees from Kosovo and Metohija. EPS is the largest producer of lignite in the country, with a potential annual production of around 50 million tonnes and proven reserves of one per cent of the world total (2,616 Mtoe). It should be noted, however, that the coal mines in the territory of Kosovo are under the jurisdiction of Interim Administration Mission in Kosovo (UNMIK) and therefore not accessible to EPS at present. The coal basins of Kolubara, Kostolac as well as Kosovo and Metohija are in the direct vicinity of thermal power plants. Supply and sales of electric power to almost 3.3 million customers on the territory of Serbia (without Kosovo and Metohija) are carried out in the scope of the electric power distribution activities of EPS[22].

EPS has a monopolistic position in electricity production because of a low electricity price of 45 EUR/MWh in 2007. Big industrial companies still consider that at this price it is more advantageous for them to purchase electricity from EPS than to produce their own electricity. EPS is about to undergo a privatization process, but at present it can be excluded that EPS will be privatized within the next four to five years[253]. Nevertheless, large investment projects for new thermal capacities that EPS is currently tendering will most likely open the entrance of private capital into the electricity sector[254].

The unbundling of the Electricity Grid of Serbia from EPS into the electricity transmission and system operator EMS, and the unbundling of Transnafta, the pipeline operator from the Petroleum Industry of Serbia (NIS) have been completed in 2005 while both companies remain government-owned. The natural gas utility that was traditionally focused on transmission and import activities is now actively expanding into natural gas retailing[254].

Electricity tariffs

The methodology for determining the price of electricity is prescribed by the Serbian Energy Agency. The Electric Power Industry of Serbia calculates the price according to the methodology and the Agency thereafter scrutinizes whether EPS applied the methodology correctly. Finally the settled prices are approved by the government[22].

In 2001, EPS introduced a three-tier block tariff system on energy prices for household consumers with the aim to offer incentives for efficient use, to discourage from electricity use for heating, and to guarantee the affordability of energy supply for poor people. This tariff system distinguishes three blocks with different consumption levels and with rising electricity prices per kWh from the lowest consumption level to the highest (see Table A 3.1.8). Until 2006, the lowest consumption level was set at 600 kWh/month and 70 per cent of the households fell in this tariff block. In 2006, the consumption level for the low consumption block was lowered to 350 kWh/month. The tariff system presented in Table A 3.1.8 was put into force in 2008 after being adopted by the Serbian government. The resulting average electricity price for final customers in 2007 was EUR 45 EUR/MWh (3699 RSD/MWh), amongst the lowest in Europe[255].

While electricity generation costs are in the range of EUR 30-35 EUR/MWh, the revenues from other tariff components are not sufficient to cover transmission and distribution costs. A realistic price would be 80 EUR/MWh. Due to this situation, the Electric Power Industry of Serbia is as at 31 December 2007 in debt of EUR 1.6 billion[255].

Gas market

The main player in the Serbian gas market is the Petroleum Industry of Serbia. Since restructuring in 2005, it is a Joint Stock Company for exploration, production, processing, distribution and trade of oil and oil derivatives, and for exploration and production of natural gas. It is organized into three branches[22]: NIS–NAFTAGAS (the branch for exploration and production of oil and natural gas), NIS–PETROL (the branch for processing and trade of oil and oil derivatives) and NIS–TNG (the branch for liquid gas production and trade).

The privatization of NIS is currently ongoing. A decision was passed on the selection of the Privatization Advisor for NIS, and a consortium with Merrill Lynch and Raiffeisen Investment was selected. In July 2006, the Government adopted the Privatization Strategy for NIS proposed by the consortium. The dynamics of its privatization and stakeholder shares will be governed by the Agreement between the Governments of Serbia and The Russian Federation on cooperation in the field of oil and gas, which was ratified by the National Assembly and published in the National Gazette no 83/2008, where Gazprom is reported to purchase 51 per cent of shares in NIS, under conditions agreed between the two governments[22].

Activities related to natural gas transport, storage, distribution, and trade are performed by Public Entity Srbijagas, which was established on 1 October 2005. Apart from Public Entity Srbijagas, there are around 30 natural gas distributors that are mainly located on the territory of Vojvodina[22].

Heating market

The heat market in Serbia is organized on the local level: in approximately 55 cities and municipalities, the heat supply is organized through district heating companies. District heat production derives mainly from gas, oil and coal. Cogeneration is very rarely used[22].

Heat price definition is in the jurisdiction of municipalities, but authorization from the government is needed for any price increase. Prices for district heating differ from municipality to municipality. District heating falls entirely under municipal jurisdiction, meaning that the local government decides not only on the price but also on the terms and conditions on heat delivery and acts as inspection service for the functioning of the district heating system. The billing of heat is still organized on floor area principle. The majority of municipalities practice different rates for different consumers. Consumption based billing is still scarce, due to the fact that only 40 per cent of the sub-stations are equipped with a meter, and has until now been practiced mostly as demonstration projects. However, it is expected that municipalities, especially those involved in internationally funded projects, will introduce consumption based-billing soon[22].

Heating tariffs

District heating is considered a social service and municipalities are reluctant to raise the prices to cost covering levels. In 2007, the price of gas increased by 70 per cent, but the district heating price increase allowed was only 7.5 per cent, municipalities were to cover the difference[22].

In 2007, district heating prices were on average 0.35 EUR/m^2 per month, a level which still does not cover costs largely because of the low efficiency of the systems. Prices for households are lower than for social institutions and industry. Taking into account actual volumes of delivered energy, the price per kWh of heat is almost equal to the price of kWh of domestic electricity[254].

11.10.3. Current situation with respect to energy efficiency and future potential for energy savings and increase in efficiency

Energy intensity by consumption sector

The energy intensity indicators reveal that Serbia[xxii] is using 3.8 times more energy units to produce one dollar of GDP than the world average. Serbia's carbon intensity per GDP is 6.8 times the world average and 10.8 times OECD average[256].

Three industrial branches, iron and steel metallurgy, basic chemical products, and industry of construction materials consume approximately 50 per cent of total energy used in the industrial sector, although the Gross National Product from these branches is below 15 per cent. During the last ten years, the production activities in all branches of the Serbian industry declined while industrial energy intensity has increased[253].

Energy losses from electricity and gas grids

In 2006, losses on the Serbian electricity transmission and distribution grids were estimated at around 16 per cent of total production[257].

Electricity meters are read monthly and customers are billed monthly as well[254].

District heating

Losses in heat distribution account for around six per cent of total production. The main reason for these losses is outdated equipment[253].

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xxii Serbia, together with Bosnia and Herzegovina, is the only country of the project region where no Enerdata values are available.

According to the Energy Sector Development Strategy of the Republic of Serbia up to 2015, the capacities of heat sources in the industrial sector are estimated to be 6,300 MWth. The age range of installed boilers in industrial companies in Serbia is very unfavorable. According to a research inquiry carried out in 2006, there are approximately 1,800 steam and hot water boilers in industrial companies, of which 74 per cent are older than 20 years[254].

Other sources of inefficiency (industrial production, housing, other sectors)

Electricity use for heating purposes is widespread despite the availability of district heating, pointing out both insufficient heat supply through district heating companies or too low tariffs for electricity, encouraging inefficient consumption[254].

Estimated potential for energy savings by sector

At the municipal level, the main saving potentials are modernization of public buildings and street lighting: lighting bulbs replacement would bring 30 per cent of energy savings.

The effects of measures like reconstruction, modernization, and replacement of energy sources in use in the industrial sector have been evaluated to be approximately 20 per cent of total final energy consumption in the Serbian industrial sector. The introduction of a consequent energy management in industrial companies could add to another ten-15 per cent of decrease in the final energy consumption in this sector. There is high potential in the following energy systems in industrial companies[254]:

- Improvement of steam and condensate return system (condensate contains 20-30 per cent of steam energy, and the average rate of condensate return in Serbian industrial companies is 25-50 per cent);
- Improvement of compressed air systems (efficiency of compressed air system is on the level of 15 per cent, and the largest energy losses are with waste heat which is not used in Serbian industrial companies);
- Using the waste heat from production processes and auxiliaries (refrigeration, ventilation, and air conditioning);
- Rationalization or improvement of technological processes (introduction of energy efficiency equipment);
- Improvement of energy efficiency in electrical equipment and usage of waste materials.

It should be noted, that a reliable estimation of above mentioned potentials is not possible due to lack of data reflecting the present state in the Serbian industry. The cumulative effects of all mentioned measures and potentials in the industrial energy sources can be roughly estimated to be 35 per cent[254].

ESCOs and other initiatives in energy efficiency

Energy Service Companies do not exist in Serbia, mainly because there is no support mechanism in place for these companies' activity. The legal framework for running such companies is also missing, but work has been done by the German technical cooperation agency (GTZ) to determine the existing legal obstacles to the establishment of such companies in Serbia. Development has started, legislation and some capacity are in place, but further legal and capacity advancement are still necessary in order to fully enable the development of third party financing schemes[22].

11.10.4. Current situation with respect to renewable energy sources and future deployment potential

Deployment of renewable energy sources

Renewable energy sources make up about 11 per cent of the total primary energy supply of Serbia. In electricity generation, the share of renewables amounts to 27 per cent nearly entirely based on (large) hydro power.

Combustible renewables and waste (comprising biomass, animal products, municipal, and industrial waste) play an important role in the residential sector where they make up more than 25 per cent of the final primary energy consumed, presumable for heating purposes in rural areas[5].

Estimated potential for renewable energy sources

The Energy Sector Development Strategy by 2015 recognizes that the most significant renewable energy source in Serbia is currently hydropower. The Strategy particularly emphasizes the importance of new renewable energy sources utilization for decentralized heat production (by biomass combustion and capture of solar radiation) as well as for decentralized power production (by constructing small hydropower plants with an installed capacity of up to ten MW), in order to meet the needs of local consumers and deliver surplus power to the local network within the Serbian power system[254].

According to the Implementation Programme of the Energy Sector Development Strategy of the Republic of Serbia by 2015 for the period of 2007 to 2012, the energy potential of new renewable energy sources is estimated to be about 3.8 million toe, as shown in Table 11.31. About 2.4 million toe of this potential derives from biomass utilization (1 million toe from wood biomass and 1.4 million toe from agricultural biomass). The estimated potential from small hydro power plants is 0.4 million toe (449 MW) based on 856 locations. 90 per cent of these locations have an estimated capacity of less than one MW. The energy potential of the existing geothermal springs in Serbia is nearly 0.2 million toe; however further exploration is needed since the real potential from geothermal springs is considered to be five times higher. The wind potential is estimated to be at 0.2 million toe; however proper measurements and analyses are required to assess the real wind potential. Although the prerequisites of solar energy are favorable in Serbia, the high costs of solar radiation collectors and accompanying equipment will constrain solar energy mainly to heating purposes[254].

Table 11.31: Estimated potential for renewable energy sources in Serbia

Renewable energy source	Energy potential
Biomass	2.4 million toe
(of which wood biomass)	(1.0 million toe)
(of which agricultural biomass)	(1.4 million toe)
Small hydro	0.4 million toe
Geothermal	0.2 million toe
Wind	0.2 million toe
Solar	0.6 million toe

Source: Ministry of Mining and Energy of the Republic of Serbia[254] (2009)

The Ministry of Mining and Energy is currently in the initial preparatory phase for the utilization of biofuels in the transport sector. Upon finalization of the analysis on possibilities for biofuels utilization in the Serbian transport sector, the indicative targets will be set as well as the most adequate support mechanisms[254].

Projects and initiatives in renewable energy sources

So far, there are just very few independent project developers in Serbia. One example is W&W Energy, a joint venture of Serbian, Bulgarian, and Portuguese investment partners, W&W Finances, develops and operates renewable energy power plants (mainly small hydro)[258].

11.10.5. Institutional, regulatory and policy framework for energy efficiency and renewable energy sources

Policymakers in the energy sector

Institutional policymakers

The main governmental institution in charge of energy policy and energy security is the Ministry of Mining and Energy. The Ministry is responsible for the general energy sector and the renewable energy sources, power, oil and gas, and mining and geology sector in particular. Among the tasks of the Ministry is the preparation of laws and other legal documents that are presented to the government and parliament for information or approval[22]. The Serbian Ministry of Mining and

Energy has about 30 employees which work specifically on policy and regulation; however, only one person is responsible for renewable energy sources and for energy efficiency[253].

The second main policymaker in Serbia is the Serbian Energy Agency, which was officially established in June 2005. In accordance with the Energy Law, the Energy Agency of the Republic of Serbia is as a regulatory body dedicated to the promotion of the energy market development based on the principles of non-discrimination and effective competition, monitoring the implementation of regulations and energy systems operation codes, adjusting the activities of energy entities in ensuring the regular supply of energy and services to consumers and their protection and equal position as well as other activities stipulated by this law. The main activities of the agency comprise the specification of the methodology and the subsequent adoption of tariff systems for pricing electricity and natural gas for tariff consumers. Additionally it is responsible for the issuance of licenses for conducting energy activities in Serbia, the approval of grid codes, and the determination of the eligible consumer status[22].

In 2002, the Serbian Government established the Serbian Energy Efficiency Agency (SEEA), which is solely dedicated to energy efficiency. SEEA has currently 12 employees[259] and is supported by five Regional Energy Efficiency Centers, which are independent units at Serbian universities, linked together in the Serbian Energy Efficiency Network. Their tasks are the development of energy efficiency projects, transfer of innovative technologies, consulting to industry and households as well as organization of education and trainings. Other duties of SEEA include drafting proposals for incentive measures aimed at enhancing energy efficiency in the drafting of the Energy Development Strategy, drafting and proposing programmes and measures for stimulating rational and efficient energy use and drafting proposals for implementing energy efficiency, renewable energy sources exploitation and environmental protection. The Agency develops projects on its own initiative as well as serving as an advisory role and provider of expertise[259].

Regulatory and administrative institutions at the regional and local level

The 200 municipalities in Serbia, of which 124 are located in Central Serbia, 46 in the autonomous province of Vojvodina and 30 in Kosovo, which is administered by UNMIK, are the basic entities of local autonomy in Serbia. Serbian municipalities, which have an average of 50,000 inhabitants, are the largest in Europe, both by territory and number of citizens, and are thus able to distribute the income from the country budget into the most relevant projects[260]. Nevertheless, it is currently unknown if any of the Serbian municipalities has financed any renewable energy or energy efficiency projects.

The Law on Local Self Government in Serbia, adopted in 2002, delegated tasks to the local government and also established a new local government structure. The legislative and executive powers are strictly divided between the local assembly and the president of the municipality, or the mayor in the cities, who are directly elected by the citizens[261].

The law also reduced the supervisory role of the central authorities and increased the protection of the municipalities from unlawful actions of the central government[261].

Energy policy and regulatory framework

The Serbian Energy Law (No. 84/2004, Official Gazette of the Republic of Serbia) was adopted in 2004. This Law regulates the generation, transmission, distribution and supply of electricity, the organization and functioning of the electricity market, the transmission, distribution, storage, trade and supply of petroleum products and gas, and the production and distribution of heat. The main objectives of the Energy Law are inter alia the provision of a safe, qualitative and reliable supply of energy and energy sources, the stimulation of market competition, the provision of conditions for promoting energy efficiency in carrying out energy activities and energy consumption, as well as stimulating the use of renewable energy sources and combined heat power generation[22].

In addition to this legal basis, Serbia has developed an Energy Sector Development Strategy by 2015, whose objectives are the technological modernization of the existing energy facilities, the increase of energy efficiency in the production and usage of energy, as well as the use of new renewable energy sources and the construction of new energy infrastructure facilities[22].

In January 2007 the government of the Republic of Serbia adopted the Implementation Programme of the Energy Sector Development Strategy of the Republic of Serbia by 2015 for the period 2007-2012. The Programme identifies barriers to increasing efficiency in energy consumption and to widely using renewable energy, recommending regulatory, policy, institutional, organizational and technical measures to overcome these barriers. It foresees the development of national regulations to establish favorable conditions for Energy Services Companies' operation and the introduction of an energy passport system in buildings. The Programme is now under implementation[22].

Policy and regulation on energy efficiency

There is no existing Energy Efficiency Law, although substantive energy efficiency provisions are set by the Energy Law while its amendments will bring additional provisions, such as the establishment of the Energy Efficiency Fund, which is regarded as a necessary tool to increasing energy efficiency and stimulating rational energy use. Legal framework for the Fund's establishment should be created and respective secondary legislation scheduled for adoption in 2009.

A Law on the rational use of energy is currently being prepared and should be ready by the end of 2009. The law addresses all energy sectors and will launch a fund (Serbian Energy Efficiency Fund (SEEF)), which will provide capital grants for projects concerning energy efficiency and renewable energy sources. This fund will be financed by additional taxation of electricity and fuels. The law will introduce compulsory energy audits, thus preparing ground for the development of activities from Energy Services Companies[253].

Policy and regulation on renewable energy sources

Legislation regarding renewable energy sources is mainly provided through the following decrees and is focusing on privileged power producers[22]:

- Decree on criteria and conditions for obtaining a status of a privileged power producer and criteria for assessing their fulfillment (OJ 72/09);
- Amendments to the Implementation Programme of the Energy Sector Development Strategy of the Republic of Serbia by 2015 for the period 2007-2012;
- Decree on Incentive Measures for Electricity Generation Using Renewable Energy Sources and for Combined Heat and Power Generation.

Additionally, the National Strategy on sustainable development provides guidelines for the development of renewable energy sources.

International commitments

EU Regulation

Serbia is a contracting party within the Energy Community. The Energy Community Treaty establishing the Energy Community was signed on 25 October 2005, in Athens by the European Community and then nine Contracting Parties from South East Europe. Following ratification, the Treaty entered into force on 1 July 2006. It aims at a broader adoption of the EU *acquis communautaire* as well as to the creation of the regional energy markets and their incorporation into a single Paneuropean energy market as a main goal.

Kyoto Protocol

The Law on the ratification of the Kyoto Protocol to the United Nations Framework Convention on Climate Change was adopted by the Serbian Parliament in September 2007 (National Gazette 88/07). Serbia is a Non-Annex B country and a Non Annex I country of the United Nations Framework Convention on Climate Change, meaning that it has no binding targets for the reduction of CO_2 emissions and is eligible for Clean Development Mechanism projects.

The newly formed Designated National Authorities and the possibilities to apply for CDM projects is seen as a positive sign by the private sector to invest in renewable energy sources projects, where biomass, wind, thermal, and small hydro projects present good opportunities. However, no project under the Clean Development Mechanism has been developed so far, mainly due to low energy prices and high cost of capital. Furthermore, the current strong international recommendations for Serbia to become an Annex B country in the future is posing uncertainties regarding future development possibilities of CDM projects and therefore project developers are reluctant to take any risks before the situation is clarified[253].

Other international commitments

The key documents applicable at the international level are the Energy Community Treaty, the Energy Charter Treaty and Protocol on Energy Efficiency and Related Environmental Aspects.

Although Serbia signed the Energy Charter as of 4 July 2001, its accession for the Energy Charter Treaty and the Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects is still pending. Currently Serbia holds the status of an observer within the Energy Charter Conference[14].

Furthermore Serbia is one of the founders of the International Renewable Energy Agency (IRENA).

11.10.6. Economic incentives and financing schemes for energy efficiency and renewable energy projects

General investment climate in the country

The Republic of Serbia has an Investment and Export Promotion Agency (SIEPA), which was founded in 2001. The agency is a governmental organization dedicated to effectively helping foreign investors and buyers, while raising Serbia's profile among international business decision makers. SIEPA's mission is on one hand to support foreign companies seeking to set up a business in Serbia and on the other to support Serbian companies when doing business worldwide[262].

SIEPA offers a broad range of pre-investment services, such as macroeconomic data and operation cost profiles, as well as investment set-up services, including assistance with company establishment and matchmaking with joint venture partners, and post-investment services such as assistance in dealing with national and local government agencies.

The Ministry of Economy has also started several initiatives to attract foreign investors, i.e. subsidies for the creation of new jobs, very low taxes on profit (ten per cent), and a free trade agreement with the Russian Federation[253].

According to the Heritage Foundation, the Serbian law provides for national treatment of foreign capital, additionally, investments are not being screened. Most of the Serbian sectors are open to foreign investment. While the Heritage Foundation states that recent reforms have improved the investment climate, it criticizes however, that complex regulations and investment-related rules, as well as red tape and corruption are still an impediment in Serbia. Payments and transfer are subject to restrictions, while most capital transactions are subject to controls[263].

According to Transparency International, Serbia is not perceived as having significantly improved its anti-corruption stance and was therefore awarded with a Corruption Perceptions Index score of 3.4, placing it fifth best within the project region[53].

Incentives for energy efficiency

At the moment there are no incentive mechanisms in place for energy efficiency or wider use of renewable energy sources.

Incentives for renewable energy sources

The Energy Law (OJ 84/04) entitled privileged power and heat producers, i.e. producers who use renewable energy sources, waste or combined heat and power technologies, with subsidies, tax and custom relieves, and incentive measures. However, these provisions have not been sufficient so far to introduce proper incentive mechanism schemes. Thus, even though a Decree "on conditions for granting the status of a privileged producer and eligibility criteria" has been adopted (OJ 72/09), the necessary schemes can only come into place after the adoption of the Decree on feed-in tariffs for privileged power producers and CHP, which is drafted, and of the programmes for the implementation of the Energy Sector Development Strategy 2006 to 2012 and amendments of the Energy Law, which are currently under preparation[254]. Currently the Ministry of Mining and Energy is analysing incentives used in the European Union and feed-in tariffs are subject to approval[22].

At the time there is no support scheme in place, but a draft model (Decree on feed-in tariffs for privileged power producers and CHP) has been developed in compliance with the obligations from the Energy Community Treaty and approval is expected by the end of 2009. The feed-in tariff for small hydro power plants is expected to be around 80 EUR/MWh. Furthermore, an initiative for a simplified authorization procedure for plants with an installed capacity below one MW is intended[253].

Financing mechanisms for energy efficiency and renewable energy projects

National financing schemes

As stated in the UNECE Assessment Mission in Serbia in 2008, the financing needs for energy efficiency and renewable energy sources in the country are highly above available resources. A few grants and soft loans are available and a few more are being put in place but no equity financing of energy efficiency and renewable energy sources projects has been conducted until now[22].

However, there are some financing facilities suitable for energy efficiency and renewable energy sources that are active in Serbia:

- Fund for Environmental Protection and Energy Efficiency: Drawing its resources from pollution taxes and a little government budget input, the fund started operations in 2005. It has disbursed grants until now, but will be introducing revolving and soft loans schemes. The Fund seems to face capacity barriers: according to the United Nations Development Programme, only EUR three million have been disbursed out of EUR 15 million. The Norwegian Government has been providing capacity building for this Fund. The Fund did not receive any requests for financing energy efficiency and renewable energy sources projects so far;
- National Investment Programme (NIP): Established to finance mainly public sector projects of national interest, this fund is now managed by a special ministry created for it. Resources come from on-going privatizations and from the State budget. Financing is provided usually as a grant, sometimes also on a revolving basis. The priority sector for the next few years will be infrastructures. Energy efficiency projects submitted by the Ministry of Mining and Energy and by the Serbian Energy Efficiency Agency have been refused until now. The Programme allocated a mere 1.2 per cent of total funds to environmental protection in 2006 to 2007. Nevertheless the NIP will support the spas of Ljig, Kursumlija, Vranjska, Josanicka, Mataruska, and Veliko Laole with EUR 2.8 million for the drilling of exploration wells for the utilization of geothermal energy[254];
- Additionally, the governmental Energy Efficiency Fund will be created by the end of 2009. The working modalities of the Fund have been elaborated by the Serbian Energy Efficiency Agency and included in amendments to the Energy Law. The Fund is expected to become operational after adoption of the amendments, tentatively by the end of 2009. The Fund will be operational for ten years and should each year receive about EUR 20 million from taxes on energy consumption, state budget, international institutions, and interest rates. About 20 per cent will be disbursed as grants, 50 per cent as zero interest rate or soft loans and 30 per cent in co-financing. Disbursements will be made into both public and private sectors on activities such as studies, training courses, awareness activities, and projects.

International financing schemes

The following international financing schemes are active in Serbia:

- In 2007, the EBRD signed a project financing up to EUR 25 million of the Private Equity Fund dedicated to invest in energy efficiency and renewable energy sources projects in Central and South-Eastern Europe. The Fund invests in Central Europe, the Baltics, and south-eastern Europe including Bulgaria, Serbia, Croatia, the former Yugoslav Republic of Macedonia, and Ukraine. The Fund invests in projects that qualify as power projects that contribute to specific EU/Kyoto targets, and have predictable and legally binding long-term off-take agreements. Projects have known technologies and business models, exhibit scales large enough to be attractive for trade sale, and are managed by experienced developers, engineers and project managers. The Fund may also target strategic and proprietary infrastructure technologies and operations related to renewable energy. Regarding the structure, the Fund invests and co-invests in projects where equity returns can be enhanced by optimal degrees of debt using various financing structures[22];

- In March 2009, the EBRD launched a credit facility to finance energy efficiency and renewable energy projects by private companies in Serbia. Under the new framework, the EBRD will make loans to participating banks, which will then provide credits to private firms. The first loan of EUR ten million was signed with Banca Intesa Belgrade and is part of the EU/EBRD Western Balkans Sustainable Energy Credit Line Facility, which is a wider joint programme of the EBRD and the European Commission to provide up to EUR 60 million in loans to banks involved in lending for energy efficiency and renewable energy projects in Serbia, Bosnia and Herzegovina, the former Yugoslav Republic of Macedonia, and Montenegro. Promoting renewable energy projects and improving energy efficiency in Serbian businesses will help to mitigate the impact of climate change. The facility is complemented by EUR 13.5 million of EU grant funding from the Instrument for Pre-Accession Assistance, which will be used for incentives to kick-start investments in energy efficiency and renewable energy projects. Technical assistance to support end-borrowers to prepare eligible projects will be funded by the EBRD Western Balkans Multi-donor Fund, which has approved a EUR 2.5 million grant for this purpose. Banca Intesa Belgrad, which received a loan of EUR ten million by the EBRD, will approve a total of EUR 30 million for infrastructure projects, worth up to EUR 2.5 million each, with interest rates lower than six per cent and a repayment period of seven years[254];
- In 2007, the World Bank approved a loan of USD 28 million to support the on-going Energy Efficiency Project, which originally received USD eight million from the World Bank. The loan aims at enabling the Serbian Government to complete the original scope of the project, i.e. energy efficiency improvements in three social care buildings, eight schools and six hospitals, and to scale up the energy efficiency improvements to include other buildings as well, such as seven additional social care buildings, 20 schools, and 11 hospitals[264];
- The state-owned Transmission System Operator Electricity Networks of Serbia (EMS) received loans of EUR 60 million from the EBRD and EUR 59 million from the European Investment Bank (EIB) to strengthen its transmission network and connection to Bosnia and Herzegovina, while the European Agency for Reconstruction (EAR) provided EUR 21 million for the development of the NIS-Skopje 400kV line to improve the connection with the former Yugoslav Republic of Macedonia[254];
- The German Kreditanstalt für Wiederaufbau created a EUR 50 million refinancing line, called the Balkan Energy Efficiency Initiative. Eligible partners are financial institutions in Albania, Bosnia and Herzegovina, Kosovo, the former Yugoslav Republic of Macedonia, Montenegro, and Serbia. The refinancing line will enable partner organizations to provide loans for micro, small and medium sized companies of up to EUR 250,000, while energy efficiency loans for the housing sector are limited up to 25,000 EUR. The loans will be provided for a period of seven to ten years with a grace period up to three years.

Commercial financing schemes

With exception of the Raiffeisen Bank, which offered a lower interest rate for a specific brand of isolating windows (2-3 per cent instead of the market's 7-8 per cent), no special financing schemes for energy efficiency have been established by commercial banks in Serbia[22].

Other support mechanisms

Through a special fund budget provided by the European Agency for Reconstruction (EAR), the Serbian Energy Efficiency Agency (SEEA) was able to implement two demonstration projects as well as four feasibility studies, which are listed in Table 11.32.

Table 11.32: Projects of the Serbian Energy Efficiency Agency financed by European Agency for Reconstruction

Project Type	Project Description
Demonstration project	Replacement of two fuel oil boilers with biomass boilers and reconstruction of the boiler house in the elementary school in the village of Katici
Demonstration project	Construction of small hydro power plant at Gruza Lake (80 kW) with the municipality of Kragujevac as beneficiary
Feasibility study	Preliminary design of a small hydro power plant at the lake Celije
Feasibility study	Preliminary design for utilization of biomass in centralized heating systems in Negotin
Feasibility study	Preliminary design for geothermal energy utilization in the spa Bujanovac
Feasibility study	Preliminary design for solar energy utilization for heating in a hospital of the spa Rusanda

Source: Ministry of Mining and Energy of the Republic of Serbia[254] (2009)

11.10.7. Barriers to the implementation of energy efficiency and renewable energy projects

Box 10: Summary of barriers to the implementation of energy efficiency and renewable energy projects in Serbia

Legal, institutional and administrative barriers

1. Authorization procedures for renewable energy projects are complicated and cumbersome.
2. Land ownership issues are complicated and can hinder the project planning due to long appeal periods.
3. Dedicated laws supporting energy efficiency and renewable energy sources are still under development.
4. Most of the topographical maps of the country are outdated and lead to technical problems and delays in project realization.

Economic and financial barriers

5. The absence of public funding dedicated to energy efficiency and renewable energy projects constitutes a strong barrier.
6. Electricity and heat prices are very low and below profitability values.
7. There are no financial incentives in place for energy efficiency.
8. A feed-in tariff for support of electricity generated from renewable energy sources is currently not in place.
9. A significant barrier to independent developers is posed by the high cost of capital in case of funding by commercial banks

Lack of awareness, human capacities and professional skills

10. Lack of qualified human resources appears to be a major barrier throughout the entire public administration in Serbia.
11. In the private sector technical skills are available; however, there is a reported lack of experience in the preparation of bankable projects to be submitted to funding institutions.
12. Commercial financial institutions are mostly not involved in activities related to energy efficiency and renewable energy sources and do not consider these subjects as possible business lines.

Legal, institutional and administrative barriers

The Serbian Government appears to have a strong commitment towards the development of energy efficiency and renewable energy sources, as indicated by the priorities in the National Energy Strategy and by a number of policy activities, including the creation of a National Agency for Energy Efficiency. However, dedicated laws supporting energy efficiency and renewable energy sources are still under development and therefore the necessary timeframe for final approval, entry in force and practical implementation must be taken into account before tangible benefits can be evaluated.

Furthermore, there is a lack of secondary legislation and implementation procedures on energy efficiency that needs to be addressed in order to allow policy reforms to be successfully implemented:

- A network of energy managers or similar professionals for energy auditing and identification of potential projects at the municipal level would facilitate the initialization of bankable projects; additionally, an intermediate regional structure between the national government and the municipalities, actively cooperating with both sides, would help overcome the current gap in coordination between the administrations at the municipal and the national level;
- There are currently no building and labeling standards regarding energy efficiency in Serbia, as well as no obligation to conduct energy audits for large energy consumers; these issues should, however, be addressed in the Law on the Rational Use of Energy currently under development. The provision for the setup of a consumption database, including the results obtained from the planned energy audits, would constitute a reliable information base for project developers and support the monitoring of progress in energy efficiency;
- There is no legal framework for ESCO activities and another significant obstacle is posed by the fact that ESCO projects cannot be implemented in public-owned buildings whose energy costs are charged to the municipalities.

Several obstacles could also significantly hinder the development of renewable energy projects, if not addressed by the regulator in the development of secondary legislation or operative procedures:

- Authorization procedures for renewable energy projects are complicated and cumbersome; an initiative for a simplified procedure of electricity plants with an installed capacity below one MW is planned in the next policy revision;
- Additionally, the current Serbian Water Law does not distinguish between large hydro and small hydro plants; therefore independent project developers are submitted to the same obligations as large investors;
- Land ownership issues are complicated and can hinder the project planning due to long appeal periods;
- Energy companies are obliged to connect renewable energy plants to the electricity grid, but the costs for grid connection must be borne by the power producer;
- Most of the topographical maps of the country are outdated and lead to technical problems and delays in project realization.

Economic and financial barriers

From the economic point of view, the primary barrier to successful project realization is the absence of monetary incentives, linked with the low energy tariffs and the unavailability of project financing mechanisms:

- A feed-in tariff for support of electricity generated from renewable energy sources is currently not in place; however, a draft model is currently under development (in compliance with the obligations from the Energy Community Treaty) and approval is expected in 2009. For energy efficiency, there are no financial incentives in place and it is unclear if the current draft model for the feed-in tariff would cover also the support for cogeneration or for heating from renewable energy sources;
- Electricity and heat prices are very low and below profitability values: the average electricity price for final customers is among the lowest in Europe and the present tiered tariff system bears the risk of cross-subsidies between customer categories. Inefficiencies in the energy markets, which are characterized by monopolistic structure and strong state intervention, do not offer any incentive to independent market participants to enter the Serbian energy market and to align the current tariffs to price levels of neighbouring countries with similar production costs;
- A significant barrier to independent developers is posed by the high cost of capital in case of funding by commercial banks and at the same time the absence of public funding dedicated to energy efficiency and renewable energy projects. Furthermore, there are no possibilities to receive start-up capital for independent project developers, since the banks are not willing or very reluctant to provide financing without adequate collaterals.

Lack of awareness, human capacities and professional skills

Lack of qualified human resources appears to be a major barrier throughout the entire public administration in Serbia: at the Ministry for Mining and Energy only one professional is responsible for energy efficiency policy, while four professionals are responsible for renewable energy, and the same consideration applies to the municipalities, especially small ones (over 100 of the 200 Serbian municipalities have less than 40,000 inhabitants). In this context, the intention of the Serbian Government to cut back more than 8,000 jobs in the public administration by 2010 does not leave much hope for an improvement of the present situation. In the private sector technical skills are available; however, there is a reported lack of experience in the preparation of bankable projects to be submitted to funding institutions. Furthermore, there is a general lack of engineering and financial competences in the energy sector, affecting more hardly the small, independent companies, which are not able to provide attractive salaries and employment conditions to high-skilled professionals.

A general lack of awareness on energy efficiency and renewable energy sources can also be perceived among the different project stakeholders:

- Public funds such as the Environmental Protection and Energy Efficiency Fund, which has not yet been established, or the National Investment Programme have so far provided no funding to energy efficiency and renewable energy projects;
- Private companies do not consider energy efficiency a relevant issue, since their highest priority at the moment is to meet international quality standards to support the export of goods and products and they see investments in the extension of production capacity as more beneficial than investments in the rehabilitation of existing assets;
- Commercial financial institutions, with the exception of Raiffeisen Bank, which has a specific credit line for a specific brand of isolating windows, and Banca Intesa Belgrad, which in March 2009 received a EUR ten million loan from the EBRD, are not involved in any activity related to energy efficiency and renewable energy sources and do not consider these subjects as possible business lines, which could be proposed successfully to their current customers base.

11.11. *The former Yugoslav Republic of Macedonia*

11.11.1. Overview of economic situation

General demographic data

The former Yugoslav Republic of Macedonia has a population of 2.02 million and a surface area of 25,713 km^2. The population density of the country is thus 78.6 inhabitants per km^2. The capital is Skopje, with 467,000 inhabitants, thus hosting over 23 per cent of the country population. Other cities include Bitola, Kumanovo, Prilep, Tetovo, Ohrid, Veles, Štip, Kočani, Gostivar, and Strumica. The population growth of the former Yugoslav Republic of Macedonia has been positive since 1999, but gradually declining from 0.44 per cent in 1999 to 0.03 per cent in 2007 due the constant decline of births[265].

Current political situation and outlook

The former Yugoslav Republic of Macedonia declared its independence from the Federal Republic of Yugoslavia in 1991 and was recognized as an independent state by the United Nations in 1993 under the provisional name "the former Yugoslav Republic of Macedonia". The name dispute that followed with Greece hasn't been solved yet.

The former Yugoslav Republic of Macedonia is a parliamentary democracy. The most recent parliamentary elections were held on 1 June 2008, after the Assembly of the former Yugoslav Republic of Macedonia voted to dissolve itself on 12 April 2008. A coalition government led by the Internal Macedonian Revolutionary Organization and the Democratic Party of Macedonian National Unity, was approved by parliament in July 2008. As new Prime Minister Nikola Gruevski was elected by Parliament. The last presidential elections were held on 22 March and 5 April 2009, resulting in the replacement of the incumbent President Branko Crvenkovski, by Gjorge Ivanov[266].

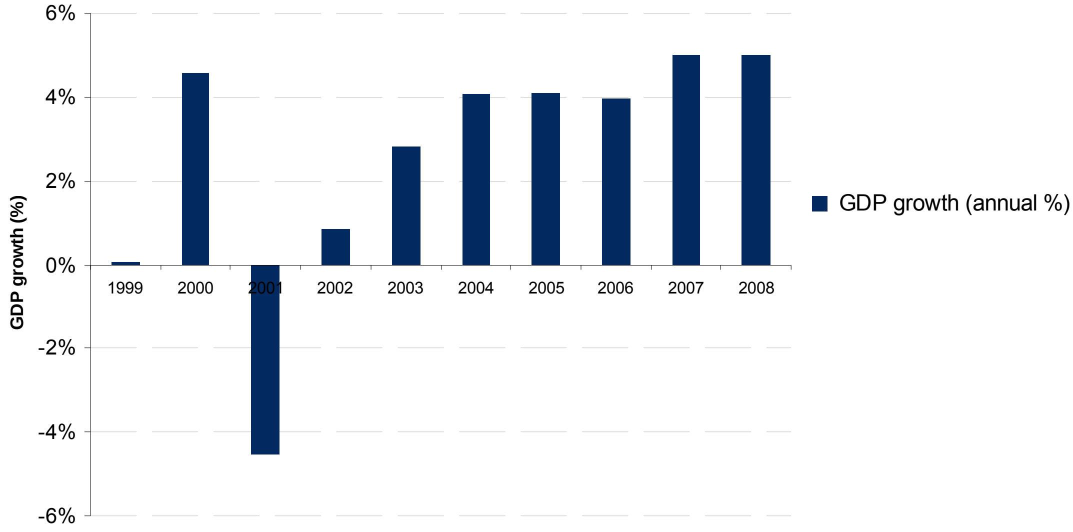
The next elections are planned for 2012 (parliamentary) and 2014 (presidential).

The municipalities of the former Yugoslav Republic of Macedonia are first-order administrative divisions. In August 2004, the former Yugoslav Republic of Macedonia was reorganized into 84 municipalities, of which ten constitute the City of Skopje, which is a distinct unit of local self-government and the country's capital.

Gross Domestic Product

The former Yugoslav Republic of Macedonia has come a long way in its transition from a centrally planned to a market economy even though reform efforts have been frequently interrupted by political instability, as witnessed in 2001 when ethnic tensions in the country led to a brief armed conflict[267]. Since 2002, economic growth has increased (see Figure 11.119) structural reforms have been accelerated, and macroeconomic stability in the country has steadily increased. The Private sector is growing, contributing an important share of 65 per cent in the GDP. Fiscal decentralization has begun to be implemented which has created opportunities for greater local government autonomy and control of local infrastructure investments[268].

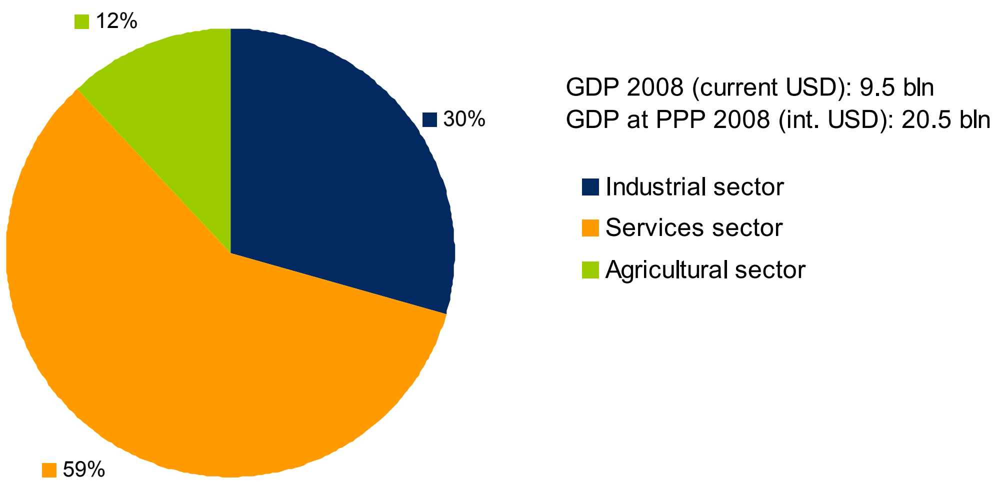
Figure 11.119: *Real GDP growth of the former Yugoslav Republic of Macedonia*



Source: World Bank[265] (2009)

The repartition of the GDP in 2008 can be seen in Figure 11.120. Agriculture plays a strong role in the Macedonian state economy, with a contribution to the GDP of 12 per cent. The industrial sector, with a share of 30 per cent, is mostly focused on the following sub-sectors: food processing, beverages, textiles, chemicals, iron, steel, cement, energy, and pharmaceuticals[265].

Figure 11.120: *Repartition of the Gross Domestic Product in 2008*



Source: World Bank[265] (2009)

11.11.2. Energy sector and development of energy markets

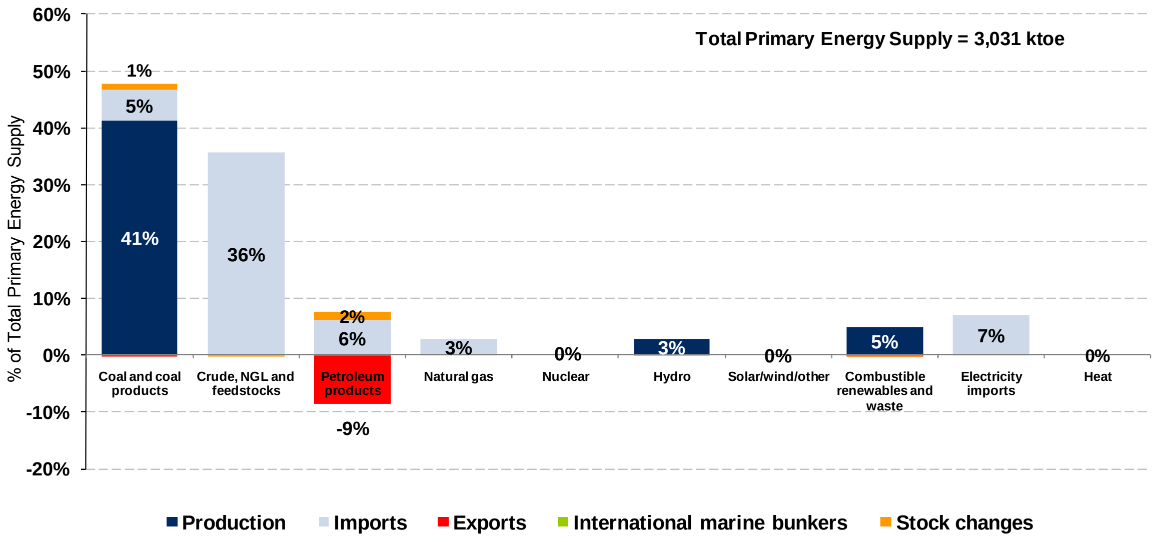
Energy supply

The energy import dependency of the former Yugoslav Republic of Macedonia is high, in the range of 48 per cent, and has been increasing during the last years[5]. There are major domestic energy resources of lignite coal, while local biomass and hydropower also contribute to a lesser extent to the country's primary energy supply. The former Yugoslav Republic of Macedonia's total primary energy supply in 2007 amounted to 3,031 ktoe.

All crude oil is supplied by import and is transported from Thessaloniki (Greece) to the refinery in Skopje through an oil pipeline with a capacity of 2.5 million tonnes per year. Gas is imported from the Russian Federation via pipeline through Ukraine, the Republic of Moldova, Romania, and Bulgaria. The main transmission gas pipeline is around 98 km long, stretching from the border with Bulgaria to Skopje. The capacity of this gas pipeline is 800 million m^3, of which currently only 8-15 per cent is used[269]. Worth noting is also the increasing electricity import: from 1,662 GWh or 20.5

per cent from total electricity needs in 2005 to 2,491 GWh or 27 per cent in 2007[268]. The electricity transmission system of the former Yugoslav Republic of Macedonia is connected with the electric systems of Albania, Bulgaria, Greece, and Serbia; the main routes for electricity imports are from Serbia and Bulgaria[270].

Figure 11.121: *Energy balance of the former Yugoslav Republic of Macedonia by primary energy sources in 2007*



Source: IEA[5] (2009)

The primary energy production and imports of the former Yugoslav Republic of Macedonia amount to 3,228 ktoe and are dominated by coal and crude oil, with shares of 43 per cent and 33 per cent respectively. Around eight per cent of the energy supply is based on renewable energy sources: hydro energy, fuelwood, and geothermal energy (see Figure 11.122).

In 2007, electricity generation in the former Yugoslav Republic of Macedonia amounted to 6,729 GWh, mostly dominated by coal (78 per cent) and large hydropower (15 per cent), as can be seen in Figure 11.123. The total installed capacity for electricity generation in the former Yugoslav Republic of Macedonia is 1,524 MW, 1,010 MW of which is made of large lignite fuelled thermal power plants with a generation of around 5,000 GWh per year.

The total installed capacity for production of electricity from hydro power is 504 MW from seven big hydro power plants and 36 MW from 22 small hydro power plants.

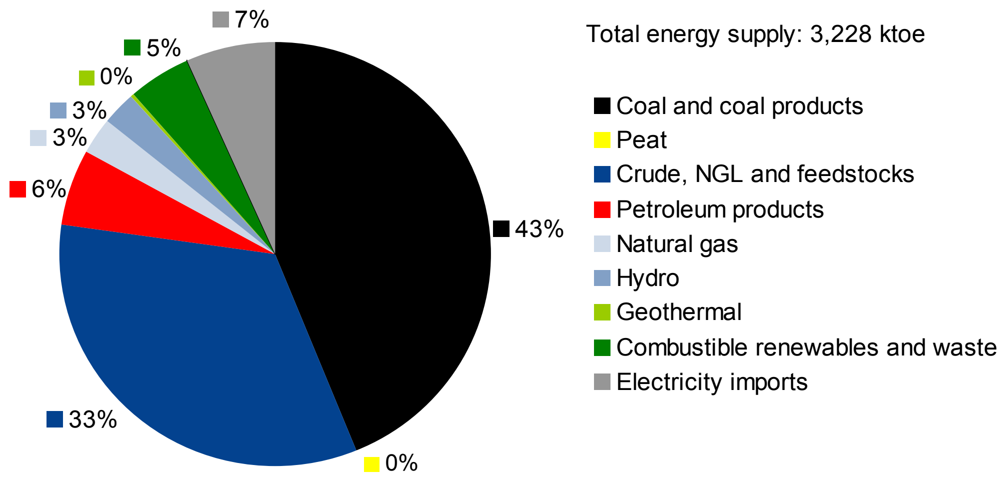
The current technological status of the thermal and hydro power plants can be regarded as obsolete[271]. However, according to the main power generation company in the former Yugoslav Republic of Macedonia, AD ELEM, six hydro power plants and the biggest coal power plant in Bitola (675 MW) are going to be modernized with the assistance of the Kreditanstalt für Wiederaufbau. Especially turbines, steam boilers and the generators will be modernized, while the systems will be partly automated. The total renovation costs are estimated at EUR 40 million[272].

Two new combined heat and gas power plants are being built. The bigger one of these two (220 MW) is under development by Toplifikacija, the Macedonian district heating operator who will own 20 per cent of the power plant, and a Russian investor (80 per cent). The gas supplies have already been secured via the gas pipeline coming from Bulgaria. At present only 8-15 per cent (60-120 million m^3/year) of the gas pipeline capacity of 800 million m^3 is being used. The required additional gas supplies for the 220 MW combined heat and power plant amount to 250-400 million m^3, which will be procured from the Russian Federation. In the long-term the current pipeline capacity of 800 million m^3, will be not sufficient for the supply of additional cogeneration power plants. However, by increasing the pressure from 40 to 60 bar, the capacity can be increased by 40-50 per cent [269]. The second cogeneration power plant with a capacity of 30 MW has been built in Skopje by the Macedonian company Cogel, whose majority owner is the Institute of Mining of the former Yugoslav Republic of Macedonia. The heat from these two power plants could be used to supply up to 90 per cent of the needs of the Skopje district heating system and thereby replacing the current heat power plants based on heavy fuel[273].

Additionally, the new Energy Strategy of the former Yugoslav Republic of Macedonia, which is currently being elaborated (see also page 291), envisages three new coal power plants of each 300 MW capacity, 600 MW new capacities by two large gas power plants and a few small gas power plants, and 800 MW from hydro power plants by 2030[273].

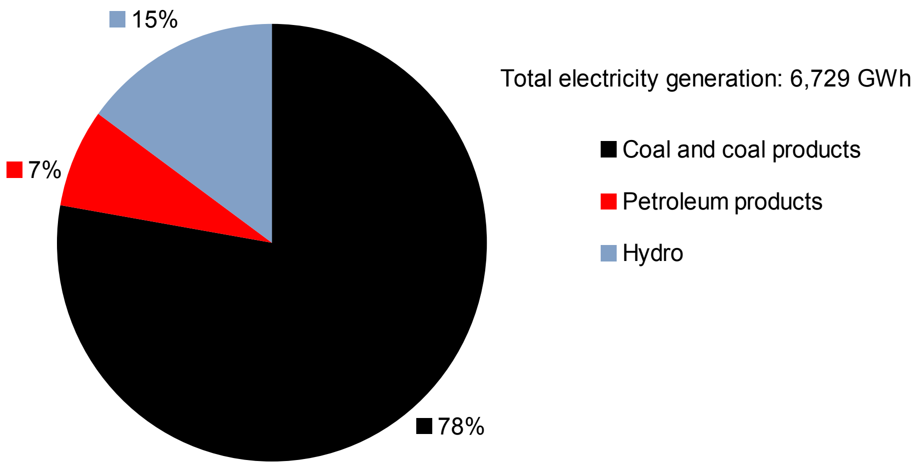
Heat production in the former Yugoslav Republic of Macedonia amounts to 5,345 TJ, mainly produced by oil (60 per cent) and gas (34 per cent), as shown in Figure 11.124. District heating systems are powered by heavy oil (more or less 75 per cent), natural gas and to a lesser extent by lignite, while coal represents the biggest source of heat for process purposes in the industry. Electricity is widely used for residential heating in the former Yugoslav Republic of Macedonia, particularly in urban areas. District heating is largely confined to Skopje with 487 MW of hot water generation capacity and 26 MW of steam capacity mainly produced from oil and gas[271].

Figure 11.122: Supply of primary energy by sources in 2007



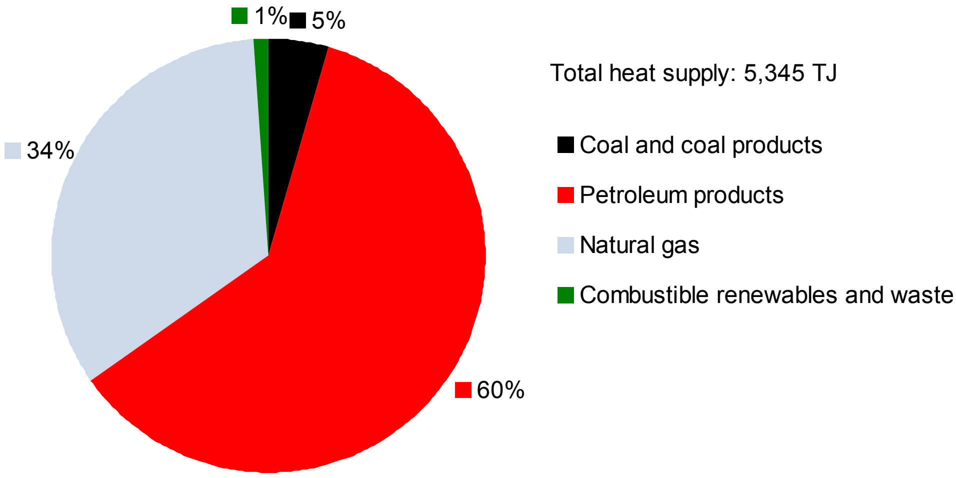
Source: IEA[5] (2009)

Figure 11.123: Electricity generation by sources in 2007



Source: IEA[5] (2009)

Figure 11.124: *Supply of heat by sources in 2007*



Source: IEA[5] (2009)

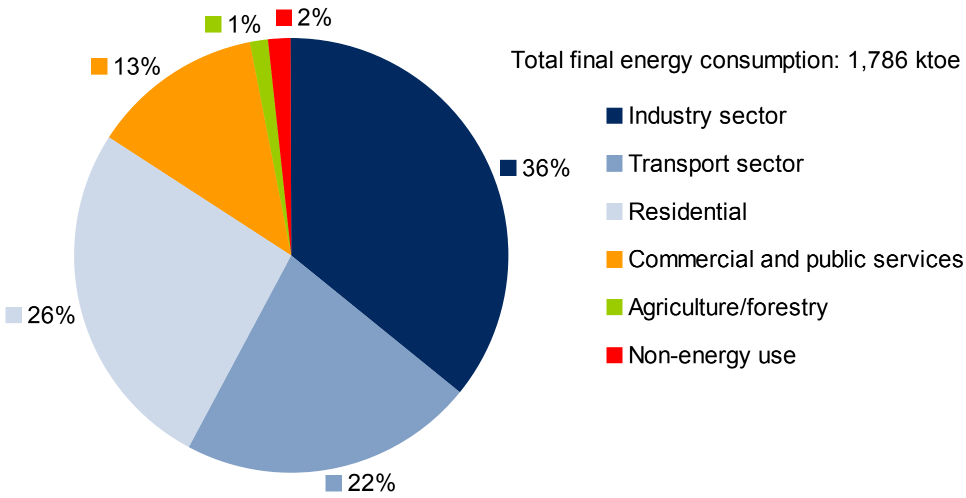
Energy demand

The industry and the residential sectors are the largest consumers of primary energy sources, representing jointly 62 per cent of the total consumption (see Figure 11.125). Within the industry sector, metallurgy accounts for 60 per cent of the sectors' energy needs. This includes consumption of a quarter of the total electricity supply in the country. The iron and steel industry has a significant importance for the economy of the country due to its high growth rates (its growth rate in 2005 was 33.4 per cent compared to 2004) and is a major exporter.

Commercial and public services represent only 13 per cent of this consumption although they account for 59 per cent of the GDP.

The two per cent of non-energy use derive from the production of chemicals and refinery products, reflecting a moderate development of these branches[5].

Figure 11.125: *Total final energy consumption by sectors in 2007*



Source: IEA[5] (2009)

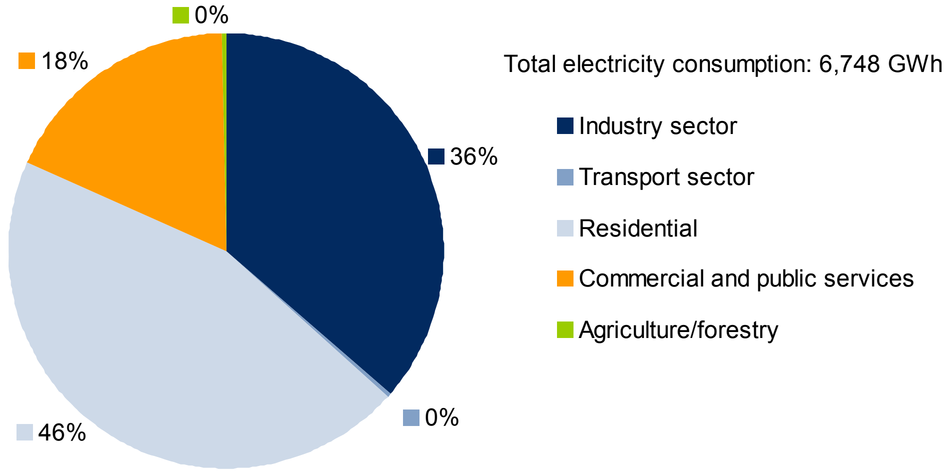
A strong proportion of electricity consumption derives from the residential sector (46 per cent) for which electricity is the main energy source (due to low prices compared to heat), and from the industrial sector (36 per cent). The tertiary sector consumption accounts for only 18 per cent.

In the industrial sector, the most energy intensive companies consume almost one third of the total electricity in the country. The largest consumers are SILMAK (production of ferrosilicon) FE-NI Industry (production of nickel) and MAKSTIL-Duferco (production of iron and steel), which annually consume more electricity than is produced by all hydro power plants in the country[22].

Gas use is not very widespread in the domestic sector. Almost all gas (97 per cent) in the former Yugoslav Republic of Macedonia is used for industrial applications as can be seen in Figure 11.127.

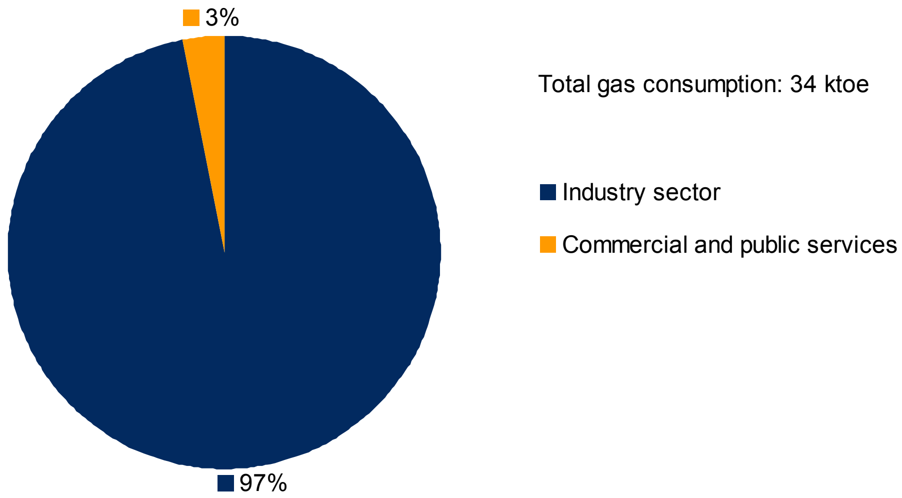
The industry sector, mainly focused on metallurgy, is a major consumer of heat (48 per cent), while the residential, commercial, and services sectors, partially connected (less than nine per cent of the households) to district heating networks in urban areas account for the remaining 52 per cent of heat consumption in the former Yugoslav Republic of Macedonia (see Figure 11.128)[22].

Figure 11.126: Final consumption of electricity by sectors in 2007



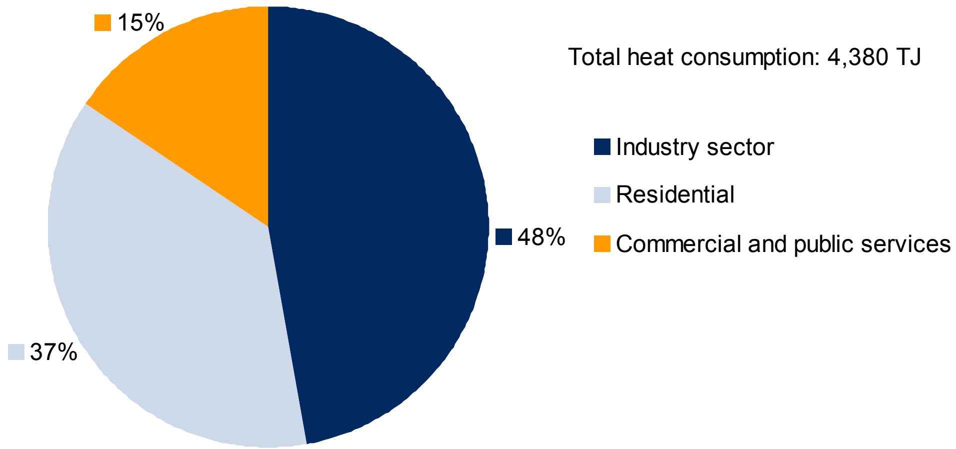
Source: IEA[5] (2009)

Figure 11.127: Final consumption of gas by sectors in 2007



Source: IEA[5] (2009)

Figure 11.128: *Final consumption of heat by sectors in 2007*



Source: IEA[5] (2009)

Energy markets

Electricity market

The restructuring of the electricity sector started in 2004 by unbundling the former vertically integrated state-owned power company ESM (Elektrostopanstvo na Makedonija) into four major companies, two generation, one distribution and one transmission company. The power generation (AD ELEM, TEC Negotino) and transmission (AD MEPSO) companies remain state-owned; originally, the authorities proceeded with the sale of a 100 per cent stake in the one-plant generation company TEC Negotino, but later on decided to cancel the sale and keep the plant under state ownership[268].

In contrast, the distribution company ESM is 90 per cent owned by EVN AG (an Austrian power distribution utility); ESM is the single electricity distribution and supply company in the former Yugoslav Republic of Macedonia, supplying electricity to households, industry and budgetary organizations in 28 distribution districts. ESM also owns and operates 11 small hydro power plants[268].

Additionally, a few independent power producers, some of them owned by foreign investors, are operating in the former Yugoslav Republic of Macedonia[271].

The electricity market is going to be fully liberalized at the earliest by 2015. Large consumers are already expected to purchase their electricity in the liberalized wholesale market (in practice, from imports, since there is no national wholesale market in the former Yugoslav Republic of Macedonia). Seven large industries, which are connected to the high voltage grid and which have a total consumption of approximately 1,000 GWh annually (representing about 15 per cent of the total final consumption), fall into this category. Currently they are buying their electricity from regional traders, who are operating in Bulgaria, Serbia, and Bosnia and Herzegovina. Since they purchase their electricity on the open market, they have to pay market prices[273]. This is a serious problem for the companies, as imported electricity is more expensive than national electricity, which is supplied at regulated, below-market prices. This policy may appear contradictory with the macroeconomic priority of these sectors; at the same time it is a measure to encourage energy saving behavior and optimization of energy consumption[268].

Electricity tariffs

The Energy Regulatory Commission (ERC) is responsible for the price regulation and adopts methodologies for setting the prices of electricity, gas, geothermal energy, central heating and oil. Only coal prices are liberalized. The energy pricing policy is based on a list of principles, such as protecting consumers against monopolistic prices and ensuring non-discriminatory treatment.

A major step in the process of market regulation and a gradual liberalization was the adoption of a new methodology for price setting of electricity by ERC. Since January 2005, the Rulebook on the Method and Conditions for Regulating Electricity Prices determines the method for establishment, approval, and control of regulated prices. For generation and transmission of electricity for tariff customers a revenue-cap method is applied. According to this method, ERC determines regulated maximum revenue that the companies are allowed to earn annually through collection of charges for their regulated activities. It enables covering all costs and ensures a level of regulated return of capital[268]. For electricity distribution a hybrid method, i.e. a revenue- and price-cap method, is applied[268].

At present only the electricity tariffs of AD ELEM are regulated, while other independent producers can sell their energy on the open market. It has to be noted however, that currently AD ELEM is the sole electricity generator in the former Yugoslav Republic of Macedonia[268].

The present tariff structure differentiates costs of services by voltage levels (110kV, 35kV, 10kV and 0.4kV), by consumer types (industrial, commercial, household, and municipality street lighting) by time of day, and by demand characteristics (active power, reactive power, maximum demand charges)[271].

Although electricity prices have strongly increased since the late 1990ies (+50 per cent), they are still low compared to the project region. The average price for households is 40 EUR/MWh. Prices are set at 42 to 52 EUR/MWh for large customers, at 55.5 EUR/MWh for public lighting and at 57 to 88 EUR/MWh for non households 0.4 kV customers[268]. According to the Academy of Science and Arts the average electricity bill for a Macedonian family is EUR 20 per month[273].

Gas market

GA-MA JSC is the Macedonian company for the transport of natural gas. It is 50 per cent owned by the government and 50 per cent by MAKPETROL. MAKPETROL is the former state-owned oil and gas company; since 1998 it is a totally private joint-stock company. MAKPETROL is the biggest company in the former Yugoslav Republic of Macedonia for distribution and trade of oil products oil derivates and for gas distribution. The company owns 120 petrol stations and 12 storage tanks for oil derivatives. It makes over 60 per cent of the oil derivatives turnover in the former Yugoslav Republic of Macedonia and practically has a monopolistic position on the oil and gas services market[268].

Gas tariffs

Prices for transport, distribution, and supply of natural gas are regulated by the Energy Regulatory Commission by applying an incentive-based methodology combined with a price cap method. The Rulebook on the Method and Conditions for Regulating Prices for Transport, Distribution and Supply of Natural Gas has been published in 2005, followed by the tariff system for transport of natural gas and the tariff system for selling natural gas to tariff customers. The total charge that tariff customers directly connected to the natural gas transmission system pay consists of two components: the selling price for natural gas and the price for transportation service and operation of the natural gas transmission system. In 2009, gas supplied to customers directly connected to the distribution system was set at EUR 0.36/m^3. The applied methodology enables covering all costs and ensures a level of regulated return of capital[268].

Heating market

The district heating company Toplifikacija AD successfully completed the process of privatization in 1999 as a joint stock company and since 2001 is listed at the Macedonian Stock Exchange. The company is combining production, distribution, and supply of heat. In the forthcoming period the district heating company plans to expand its activities to combined heat and power production and distribution of natural gas[268].

Toplifikacija AD – Skopje activities cover the broader area of the capital city of Skopje. It operates three heating plants and provides heat and hot water to about 60,000 mainly residential (65 per cent) and commercial customers (30 per cent). The installed hot water and steam generation capacity amount to 487 MW and 26 MW, respectively[268].

The district heating company Skopje – Sever AD, which has a total installed hot water capacity of 46 MW supplies heating to the Northern part of the city of Skopje. The industrial zone of the city of Skopje is served by Energy Sector – ESM district heating system with a total installed hot water capacity of 32 MW.

In addition to the district heating systems in Skopje, there are two small district heating systems – one in the residential area of the city of Bitola (Toplifikacija-Bitola DOO with 26 MW hot water capacity), and one utility in the city of Makedonska Kamenica (PE Doming with 12 MW hot water capacity).

Heating tariffs

The Rulebook on the Method and Conditions for Regulating the Prices for Heating, adopted and published in February 2006, applies a revenue cap method. The tariffs vary among the four selected regions due to different fuels used for producing the heat[270].

Due to the high share of imported petroleum products in commercial heat generation, the price of heat in the former Yugoslav Republic of Macedonia is almost as high as the price of electricity for the same energy value (around 40 EUR/MWh in December 2006) for households equipped with heat meters. Customers non-equipped with meters pay an even higher price calculated on a square meter basis. The service sector pays a rate more than three times higher than households[274].

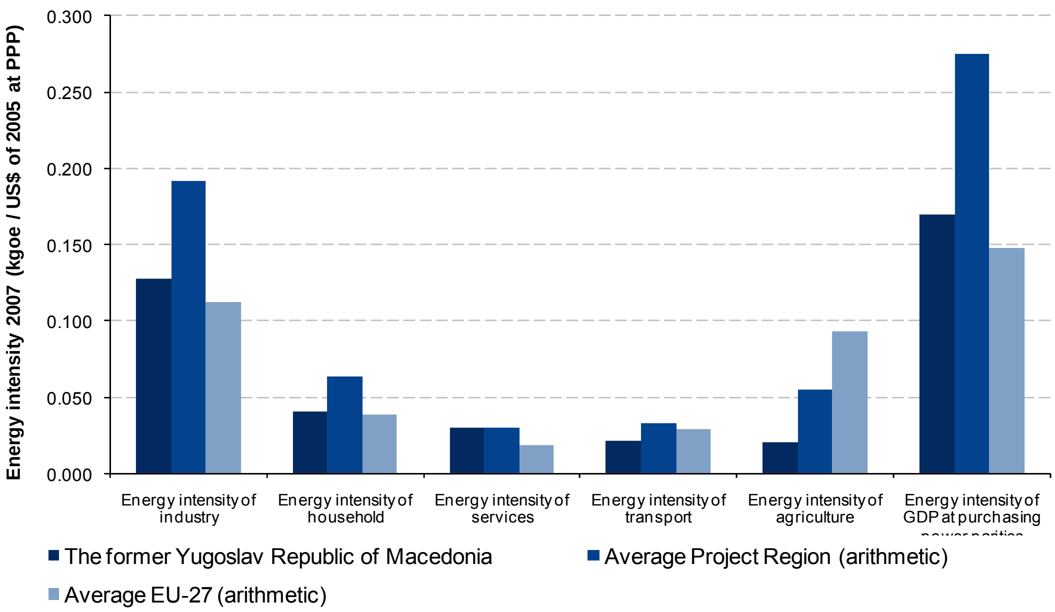
According to the Academy of Science and Arts the average heating bill for a 60m^2 flat is 25 EUR per month. The district heating bill is based on the entire building and then split among the apartments[273].

11.11.3. Current situation with respect to energy efficiency and future potential for energy savings and increase in efficiency

Energy intensity by consumption sector

The energy intensity of the GDP at purchasing power parities for the former Yugoslav Republic of Macedonia in 2007 is slightly higher than the EU-27 average and considerably lower than the project region average (see Figure 11.129)[6].

Figure 11.129: Primary energy intensity at Purchasing Power Parity in 2007



Source: Enerdata[6] (2007)

The energy intensity of the industrial sector in 2007 is slightly higher than the EU-27 average and significantly below the project region average (see Figure 11.129) and decreased by 14 per cent since 1997 (see Figure 11.130). The structure of the sector is largely dominated by traditional industries such as textiles, clothing, and steel industry. The number of small- and medium-sized enterprises is high and increasing (61,527 in 2004), but the share of this category of companies working with new technologies is small. Generally, the technological equipment of the sector is obsolete and the level of technological innovations is low. A large share of industrial energy use stems from heavy fuel oil, gas oil, and coal that are used to operate highly inefficient boilers and electricity generators, while 80 per cent of the industrial electricity consumption is dedicated to no less inefficient electric motors[268].

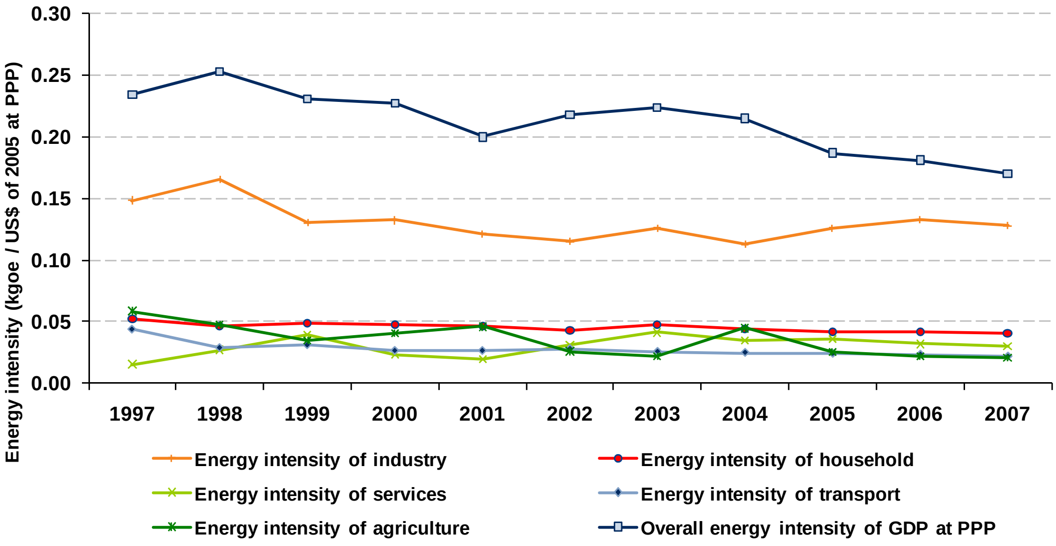
The energy intensity of households is on par with the EU-27 level and articulately lower than the project region average (see Figure 11.129) [6]. 88 per cent of the residences in the former Yugoslav Republic of Macedonia are heated (space and water) with electricity. The existing building stock in the former Yugoslav Republic of Macedonia is not energy efficient. In general, the level of thermal insulation of the buildings is poor. Old buildings which are constructed in traditional methods with thick bricks or stonewalls, can offer a rather acceptable comfort level. The main problem is encountered in new constructions of reinforced concrete, where the heat losses are excessive and the comfort level is low. A regulation for thermal insulation of buildings is in force since the 1980ies, but its actual implementation is limited. Building permits are received without any energy efficiency criteria[268].

The energy intensity level of the transport sector for 2007 is below the two reference values (see Figure 11.129)[6]. It decreased considerably since 1997 by 50 per cent (see Figure 11.130). Nevertheless, according to the EnCharter PEEREA report, the transport sector is an important element to the overall high energy intensity of the former Yugoslav Republic of Macedonia. Private cars represent 90 per cent of the national vehicle fleet. In addition to these, there are a considerable number of non-registered cars (estimated at about 40 per cent of total passenger cars in 2006). The average age of the vehicles is high – 15.5 years in 2003, and around half of them are older than 20 years. Respectively, a large number of the cars are obsolete and fuel-inefficient. Railway is underdeveloped in the former Yugoslav Republic of Macedonia. The railway network is about 925 km in single track lines. Its incompletedness and relatively small scale explain the small share of railways in the modal shift of the country[268].

The energy intensity of the agricultural sector is particularly lower than the two reference values (see Figure 11.129) and decreased by almost 65 per cent in the past decade (see Figure 11.130).

In contrast to all other sectors, the service sector witnessed an increase of almost 100 per cent of its energy intensity levels since 1997 (see Figure 11.130). Accordingly the energy intensity level for 2007 is considerably higher than the EU-27 average and on par with the project region average (see Figure 11.130) [6].

Figure 11.130: *Primary energy intensity in the former Yugoslav Republic of Macedonia by sector at Purchasing Power Parity*



Source: Enerdata[6] (2007)

Energy losses from electricity and gas grids

According to Enerdata, in 2007 losses on the former Yugoslav Republic of Macedonia electricity transmission and distribution systems were estimated at around 29 per cent of the total electricity production[275], providing ample room for improvements. However, according to the Energy Agency of the Republic of Macedonia the distribution losses amounted to 23 per cent[270].

Of the losses, 56 per cent derive from technical losses and 44 per cent from commercial and non-technical losses[270]. The cause of the technical losses lies in the outdated grid infrastructure, where no maintenance investments have been undertaken in recent years. This issue has led to a legal dispute between the Austrian EVN, who purchased the majority of the Distribution System Operator ESM in 2005, and the Macedonian Government. The Macedonian Government requested from the regulatory agency to withdraw EVN's distribution license since it accuses EVN not to have honored some of the requirements in the purchasing contract for the shares of ESM. One accusation from the government is that EVN does not supply some of the customers (it cut the power in some villages during winter) and has so far not invested the promised USD 150-200 million into the low voltage grid[270]. According to other sources, the origin of this dispute is the claim by ELEM that a debt of over EUR 90 million, resulting by non-payments of customers in the period before the takeover, should be transferred to EVN. EVN is refusing to pay this debt and is currently taking legal action at local and international level[269].

In accordance with EU standards, metering for electricity customers is obligatory for the industrial as well as residential sector[271]. Most of the meters in use are conventional, while remotely read meters are sparsely used, as well. In case of not-payment of electricity bills, customers can be disconnected from the grid. EVN is currently replacing the power meters with the help of a loan of EUR 100 million. The meters will be owned by EVN in the future. At present the meters, which have an average age of about 25-30 years, are owned by the customers[269].

Since residential customers are not connected to the gas grid, only the industrial sector is equipped with conventional meters. Similarly to the electricity sector, industrial customers can be disconnected from the grid in case of non-payment of gas bills[271].

District heating grid

The main district heating system in Skopje has a high degree of automation. Since 2002 equipment for distant control and monitoring of parameters of the heating station has been installed. Further plans include improving the efficiency of fuel burning and waste heat utilization[268].

The main source of inefficiency of the Skopje main district heating system is its 180 km long and very old distribution network that leads to substantial heat losses, which amount to 14 per cent. Renewal of the pipelines' insulation and other measures are foreseen to tackle this issue[268].

In the heat sector, the equipment for the temperature regulation at a second level (the first level is situated at the heating plant) and heat meters are installed within the heating substations. However, there is no equipment for individual metering and control of heat consumption in collective buildings and the bills are calculated on the basis of square meters of floor area[271].

Other sources of inefficiency

According to the Energy Agency of the Republic of Macedonia no detailed studies that highlight the sources of energy inefficiency in the industrial, housing or transport sectors are available[271]. Some main sources of inefficiency are mentioned in the paragraph "Energy intensity by consumption sector" on page 285.

Estimated potential for energy savings by sector

Public and commercial buildings have similar energy characteristics as the residential ones and high energy efficiency potential. The analyses used as a background for the development of the Energy Efficiency Strategy of the former Yugoslav Republic of Macedonia indicate that priority targets for energy efficiency projects at institutional buildings include upgrades in the heating system and building envelope as well as the installation of efficient lighting systems. It is estimated that these measures could be implemented at over half of the former Yugoslav Republic of Macedonia's 1,324 primary and secondary schools. In the country's estimated 40 general hospitals, key measures involve improvements in heating and steam systems as well as capturing potential energy savings in the operation of sanitary water systems. Priority targets for commercial projects include lighting systems, heating, and hot water[268].

Another target area is street lighting, which accounts for over 25 per cent of total electricity costs in many cities. Over 86 per cent of the total street lighting systems are equipped with inefficient lamps. On one hand, allocation of greater financial responsibilities to municipalities may stimulate initiatives for the introduction of energy efficiency measures to decrease municipal expenditures. On the other, privatization has started in the social sector of the economy and in public administration. A portion of non-core activities in health, education, and administration has been carved out from the state entities and they have been subcontracted to private sector entities, which typically have a higher motivation in profitable business operations than state-businesses[268].

ESCOs and other initiatives in energy efficiency

There are only two business organizations which operate with business models similar to those of energy services companies (ESCOs) in the former Yugoslav Republic of Macedonia. Both are strongly related to Toplifikacija, the private-owned district heating company in Skopje.

The first one is Toplifikacija Engineering, which was established in 2007 with the objective to provide engineering services to the mother company Toplifikacija, as well as to external clients. It has to be noted, that Toplifikacija Engineering is not operating as a pure ESCO company. Its areas of business include design and documentation of central and district heating systems and high-voltage alternating current systems, as well as energy efficiency projects and the trade of high-voltage alternating current equipment. Toplifikacija decided to offer energy efficiency services through their engineering company, and the first "ESCO-type" project started at the end of 2008, based on an energy saving programme for a hotel. The related loan was provided by the Macedonian Bank for Development Promotion[268].

Recently, Toplifikacija Engineering decided to found, jointly with AD ELEM, the public electricity generation company, a pure ESCO named ET ESCO. ET ESCO is not yet operational and will be mainly focused on public buildings in order to increase the awareness of energy usage. The initiating agent of the cooperation is Toplifikacija. It approached AD ELEM, since AD ELEM is a state-owned company, which is a prerequisite for being eligible to profit from the Global Environment Facility/World Bank Sustainable Energy Project. The credit line from the World Bank will amount to USD 5.5 million, while the grant component amounts to USD 0.8 million. USD 3.4 million is given as guarantee from the Macedonian Bank for Development Promotion. Before approaching AD ELEM, Toplifikacija was planning to enter a partnership with the state-owned transmission company MEPSO. This idea was, however, abandoned due to lack of progress with the negotiations[272].

It is envisaged that ET ESCO will be operating on an energy performance contracting business scheme. Initially the first projects developed by ET ESCO will be with public companies, while in a second stage, when ET ESCO will be already fully operational, also private persons and companies will be approached. For this second stage additional loans from private commercial banks will be required. The technical installations will be carried out by Toplifikacija, while ET ESCO will assume responsibility for the energy audits[272].

Another company worth mentioning is ESCO-Fonko, which bears the name of an ESCO company, but is not (yet) working based on an ESCO business model. The company is mainly focused on the production of geothermal heating pumps. However, there are plans to install geothermal pumps in public schools with the support of the Dutch Government under an ESCO business scheme. The total investment is estimated at EUR 300 million[276].

11.11.4. Current situation with respect to renewable energy sources and future deployment potential

Deployment of renewable energy sources

Around eight per cent of the primary energy supply in the former Yugoslav Republic of Macedonia is based on renewable energy sources: hydro energy, fuelwood, and geothermal energy (the latter currently accounts for one per cent of the heat produced in the country)[5].

In the residential sector alone, combustible renewables and waste account for 29 per cent of the energy consumption. 34 per cent of the residential space heating is provided by wood only and 17 per cent is provided by a combination of wood and electricity[268].

Solar energy is being used at a symbolic level for domestic water heating, although with Solar Tubes, the former Yugoslav Republic of Macedonia has a company that produces significant amounts of solar collectors and solar boilers for hot water heating[277].

Estimated potential for renewable energy sources

The former Yugoslav Republic of Macedonia has promising local resources of renewable energy[268]:

- A significant potential for construction of small hydro-power plants (with installed capacity of less than five MW in size) has been identified located at roughly 400 sites throughout the country. The sites could cover over ten per cent of the country's current electricity needs. Furthermore, AD ELEM identified further 44 potential sites with a total capacity of 174 MW and annual possible energy production of 645 GWh. For these sites, studies of some level of detail are available. The government considers the construction of small hydro-power plants as one of the targets of great importance for the country. An international call for tender was held in 2006 to 2007 for granting water concession for electricity generation from 60 small hydro-power plants according to a DBOT model (Design, Build, Operate, Transfer). According to the Academy of Sciency and Arts the first agreements have already been finalized[273]; however, the development of the projects has experienced several delays for administrative reasons;
- The former Yugoslav Republic of Macedonia is quite rich in geothermal sources suitable for different uses except for the production of electricity and there are possibilities for increasing the exploitation of existing and new geothermal sources. The biggest part of geothermal occurrences is connected with the Vardar tectonic unit. There are seven main geothermal fields in the former Yugoslav Republic of Macedonia with 18 localities with thermal waters, and there are more than 50 springs and wells where thermal water appears. The biggest amount of thermal water can be found up to the altitude of 400 m above the sea level. About 15 geothermal projects have been developed in the former Yugoslav Republic of Macedonia during the 1970ies and 1980ies. Some of them are still in operation but others are abandoned or work below the designed capacities;
- The geographical position and climate in the former Yugoslav Republic of Macedonia offer a very good perspective to intensify the use of solar collectors for heating. The total annual solar radiation varies from a minimum of 1,250 kWh/m^2 in the Northern part of the country to a maximum of 1,530 kWh/m^2 in the South Western part which leads to an average annual solar radiation of 1,385 kWh/m^2. The climate characteristics – high intensity of solar radiation and its sunshine duration, temperature, and air humidity, provide favorable conditions for the successful development of solar energy. The continental climate with hot and dry summers makes the former Yugoslav Republic of Macedonia a country with higher potential for the utilization of solar energy than the average European countries;
- The total forestall area in the former Yugoslav Republic of Macedonia is 955,300 ha, i.e. 37 per cent of the territory of the country. The estimate of the annual woodcutting mass is about 1.3 million m^3, with a firewood share of 80-85 per cent. In addition, there is relatively high potential in the country for utilizing biogas from animal manure for energy generation purposes, as well as growing crops for production of biofuel;
- The decision for including the wind energy in the portfolio of the national electricity producer (ELEM) was made in June 2004. 15 possible locations with sufficient energy potential for construction of wind power plants with foreseen installed capacity 25 MW to 33 MW have been identified. A Monitoring Programme of the Wind Potential in the former Yugoslav Republic of Macedonia is in implementation with a grant from the Norwegian Government. The programme will be performed in several phases. In the first phase, four locations are included where measuring stations with 30-50 m height are installed, and those are: Bogoslovec (Sveti Nikole), Sasavarlija (Stip), Ravanec (Bogdanci), and Flora (Kozuf). It has to be noted however, that the maximum new capacity that the current grid can accommodate is limited at 150 MW[278]. The total expected output from wind energy is expected to be 2,000 GWh annually[278].

Projects and initiatives in renewable energy sources

Apart from the large hydro power plants, which are owned by the state-company AD ELEM, the market for renewable energy sources is currently being developed by several independent project developers; however, no renewable power plants from independent producers are yet operational[271].

One wind project which is in an advanced development phase and very close to commissioning is developed by Nova Energija doo, a project developer with financial support from the investors Re-Energy from Austria and NES Holding from Hungary[279]. The wind park will be located in the South of the former Yugoslav Republic of Macedonia and will have an installed capacity of 50 MW. The wind mills will be connected to a 110 kV distribution line of EVN. The overall investment is EUR 65 million. It is planned that the power plant will be operational by 2010.

Furthermore, in April 2009 the first photovoltaic power plant in the former Yugoslav Republic of Macedonia has been commissioned by the independent developer SiETO, which also built the first fully energy independent ECO house in 2006. The photovoltaic plant has a capacity of 10.2 kW and SiETO is currently applying for the solar feed-in tariff[280].

11.11.5. Institutional, regulatory and policy framework for energy efficiency and renewable energy sources

Policymakers in the energy sector

Institutional policymakers

The ministry in charge of energy policymaking in the former Yugoslav Republic of Macedonia is the Ministry of Economy. The Ministry has 12 departments; one of them is the Energy Department. Its main functions include inter alia the implementation of state energy policies through programmes and measures, as well as the development of laws and sub-laws on energy. The Energy Department is also in charge of data collection on energy production and use, and the preparation of public reports. An obligation of the Department is to implement energy-related European Directives into Macedonian laws[268].

The main governmental agencies in charge of energy policy making in the former Yugoslav Republic of Macedonia are listed below.

- The Energy Agency of the Republic of Macedonia was established in December 2005 in order to support the activities of the Ministry of Economy in the implementation of the energy policy. It is responsible for professional technical support on data management, strategy analysis, policy and project assessment, and implementation coordination. The formal determination of the Energy Agency is set with the Law on Establishment of an Energy Agency of the Republic of Macedonia, adopted in July 2005 and the Energy Law of 2006. The Management Board of the Agency has been appointed and involves the Ministry of Economy, the Ministry of Finance and non-governmental representatives, nominated by the Ministry of Economy. The Agency is independent in its work and financially accountable to the Ministry of Economy. Currently, the Agency has a Director and around ten employees. Specific activities of the Agency will be aimed towards the preparation of mid-term and long-term strategies and development plans, the preparation and coordination of energy reforms, proposals and evaluations of studies and projects on the energy sectors, energy efficiency and renewable energy sources, as well as preparation and coordination of the implementation of investment projects[268];
- The Energy Regulatory Commission (ERC) was established in June 2003 (with amendment of the 1997 Energy Law). The new Energy Law from 2006 provides the legal framework for the operation of ERC. The ERC is a regulatory body which is fully independent from the interests of the energy industry and the governmental bodies. The main competences of the Energy Regulatory Commission are to ensure: safe, secure, continual and quality energy supply to the final consumers; protection of environment and nature; protection of consumers; promotion and protection of a competitive energy market based upon the principles of objectivity, transparency and non-discrimination. Pursuant to the Energy Law, ERC is authorized to regulate energy activities related to electricity, natural gas, oil and oil derivatives, thermal and geothermal energy. Its major activities include the establishment of

tariff systems and prices, the development of authorization procedures (licenses for generation, distribution, supply and eventually other services within the energy industry), the development/verification of Grid Codes and Market Codes and dispute settlement and customer protection[268]. The activities of ERC are auto-financed through the collection of fees for issued licenses and a fee from the license holders. The fee from license holders are approved by the Parliament as a per cent of the overall revenue of the companies, performing energy activities on the domestic market – this percent cannot exceed 0.1 per cent of the total income of the companies (approved at 0.051 per cent for 2007)[268].

Non-institutional policymakers

The Research Center for Energy, Informatics and Materials (ICEIM-MANU) of the Macedonian Academy of Sciences and Arts, which has been established on 28 February 1986, had a leading role in the development of the Macedonian Energy Strategy for 2030. In general, the role of the Center is to initiate and coordinate the national research programmes and to perform high-level research in particular fields. Within ICEIM four divisions are acting: Energy, Environment, Neuroinformatics, and Materials[273].

Regulatory and administrative institutions at the regional and local level

The 84 municipalities of the former Yugoslav Republic of Macedonia have benefited from an increased number of functions since 2002. The aim has been to restrain the power of the central government and build the capacities of local self-governance to act as a counter balance of the central authorities. Thus, with the beginning of the decentralization process, the burden of everyday municipal competencies has been taken off the central government. The Macedonian municipalities were made autonomous within the law to regulate and perform activities of public interest and local significance. It also promoted the principle of subsidiaries, or the rights of municipalities to perform within their regional jurisdictions those activities of public interest, not specified as under the competencies of the central authorities[281].

Nevertheless, the municipalities are likely to face financial problems, since the highest quality revenue sources are the economic activity related taxes which are only available to the central government. Also, due to the lack of effective communication between the central and local authorities, distribution of revenues and funds for the local self-governments is often seen as problematic[281].

The Energy Law from 2006 obliges municipalities and the city of Skopje to elaborate and implement five-year local energy efficiency programmes and action plans for their implementation[282].

Energy policy and regulatory framework

The new Energy Law from 2006 is the framework for energy regulation in the former Yugoslav Republic of Macedonia. It defines following priorities: harmonization with EU legislation, establishment of market conditions, further development of the energy systems by construction of new energy generating facilities and multiple connections to the energy systems of the neighbouring countries, increase of energy efficiency, development of renewable energy resources in the country, and introduction of adequate environmental standards and measures.

As already indicated by the Energy Law from 1997, the former Yugoslav Republic of Macedonia had to develop an Energy Development Strategy for a period of at least 20 years and a five-year programme for its implementation. The Energy Development Strategy is intended to define the long-term objectives and strategic priorities for the development of the energy sector, to propose incentives for investment in renewable energy facilities, incentives for energy efficiency enhancement, and methods for ensuring environmental protection.

Currently a new energy strategy has been elaborated by the Research Center for Energy, Informatics and Materials of the Macedonian Academy for Science and Arts (ICEIM-MANU). This Strategy for Energy Development in the Republic of Macedonia for the Period 2008-2020 with a vision to 2030, has already been approved by the Ministry of Economy and needs final approval by the Macedonian Government. The timeframe of the strategy is until 2030. The main pillars of the strategy are the construction of new thermal and hydro power plants, the analysis of nuclear power plants and of natural gas supply and the improvement of energy efficiency by 30 per cent in 2020 compared to the base year 2006[273]. According to the strategy, the main energy efficiency measures on the production side will be the construction of cogeneration power plants. On the demand side, new energy efficiency measures in the industrial sector are envisaged. Up to 2020 the production of electricity should be in line with the demand for electricity. After 2020 the former Yugoslav Republic of Macedonia could become an exporter of electricity[273].

Based on the new energy strategy, which should be approved by June 2009, a National Action Plan will be prepared[273].

Policy and regulation on energy efficiency

The former Yugoslav Republic of Macedonia has no specific Energy Efficiency Law, but provisions for energy efficiency have been included in the Energy Law. The new Energy Law of 2006, clearly targets energy efficiency by including a special chapter, where the current national policy and activities for improvement of energy efficiency are elaborated. The law contains provisions about the development of a strategy for improvement of energy efficiency for a period of ten years and a five-year programme for the implementation of the strategy. The Energy Law obliges municipalities to elaborate and implement five-years Local Energy Efficiency Programmes and Action Plans for their implementation. The council of municipalities will receive these action plans, while the government will control these action plans based on legal documents[270]. The law includes provisions for energy efficiency in the construction of new and reconstruction of existing facilities, including energy audits and buildings certificates. It is envisaged that by 1 January 2010, energy audits will be mandatory[272] in new buildings with a square footage above 1,000 m^2. The law also calls for applying technical specifications and standards for efficient use of fossil fuels on new motor vehicles, facilities for generation of electricity, heat and other energy intensive industrial capacities that are sold and/or imported on the territory of the former Yugoslav Republic of Macedonia.

The secondary legislation needed to assure the implementation of the Energy Law as far as the activities in the energy efficiency field are concerned includes[268]:

- The Rulebook for energy efficiency labeling of household appliances, which was adopted in July 2007. It transposes the respective EU legislation in this area and closely defines the energy efficiency criteria which have to be met by household appliances. The Rulebook will be in effect as of 1 January 2010, after securing the institutions needed for the implementation of the prescribed activities;
- The Rulebook for energy efficiency of new buildings and reconstruction of existing ones. In 2008, the EU Directive 2002/91/EC on energy performance of buildings has been implemented and the energy efficiency criteria that have to be met by buildings have been closely defined.

As established by the Energy Law from 2006, the introduction of a building certificate system is planned and the technical specifications and standards for efficient exploitation of fossil fuels as well. These have to closely define the energy efficiency criteria which have to be met by motor vehicles, thermal plants, and energy intensive industries, and the control on their implementation[22].

An Energy Efficiency Strategy was adopted in 2004, accompanied by implementation plans and technical programme analyses. The programmes identified for implementation have the potential to realize cost-effective reductions in energy use representing approximately six per cent of the country's current energy use. The Energy Efficiency Strategy for 2020 has been adopted, but is currently being refreshed[282].

Policy and regulation on renewable energy sources

There is no dedicated law for renewable energy sources in the former Yugoslav Republic of Macedonia. However, a Draft Law on Renewable Energy is currently under development[22]. For the time being, the regulatory framework for renewable energy sources is set by the provisions relating to the Government's obligations to develop and implement a renewable energy strategy for a period of ten years included in the Energy Law of 2006. According to this provision, the Energy Agency of the Republic of Macedonia shall support the Ministry of Economy in the elaboration of the programme for the implementation of the strategy for renewable energy sources and the development of the rulebook on the exploitation of renewable energy sources. Under the Energy Law (Article 140), the Energy Agency of the Republic of Macedonia shall issue and maintain a national registry of guarantees of origin for electricity produced from renewable energy resources and from high-efficiency cogeneration facilities in the former Yugoslav Republic of Macedonia and guarantees of origin associated with imports of electricity issued by other authorized national bodies[268].

The local policy for renewable energy sources exploitation comprises geothermal energy, biomass, biogas, landfill gas, and solar energy. The local policy is established within a five-year local programme for renewable energy resources which has to be in accordance with the Strategy for Renewable Energy Sources. Upon the proposal of the Mayor, the programme shall be adopted by the Municipal Council or the Council of the city of Skopje. The Mayor shall prepare a plan for realization of the programme, as well as annual reports on the implementation of the plan and shall file it to the Municipal Council for approval. The plan and the report shall be submitted to the Ministry[268].

The National Strategy for Renewable Energy Sources is currently being developed, with a first draft to be presented by 2009. The strategy shall define the objectives for utilization of the renewable energy sources and the manners of achieving such objectives, especially the potential of the renewable energy sources, the feasibility potential of the renewable energy sources, the arranged scope and dynamics for introduction of electricity consumption from renewable energy sources in the electricity balance, the definition of transitional measures for support of the renewable energy sources utilization through preferential tariffs for privileged electricity producers, and other support measures[268].

International commitments and current status of implementation

EU Regulation

After 2004, when the Stabilization and Association Agreement between the European Union and the former Yugoslav Republic of Macedonia entered into force, the former Yugoslav Republic of Macedonia gradually moved towards meeting the EU requirements regarding the development of the energy sector. In December 2005, the former Yugoslav Republic of Macedonia received the status of an official EU candidate, although no decision was made about the date of opening accession negotiations.

Beside the reforms in the institutions and regulation of the markets with electricity and natural gas, the Stabilization and Association Agreement creates obligations for the former Yugoslav Republic of Macedonia in a period of one year to implement the provisions of Directives 2003/54/EC on the general relations within the internal electricity market and 2003/55/EC on the general relations within the internal gas market, and to create a framework for opening the market and all customers to be able to choose their supplier by 2015.

The first EU accession progress report, presented in November 2006, recognized progress achieved, but noted a slowdown in the pace of reforms in 2006, probably due to the elections in mid 2006 and since then, considerable progress has been achieved with the transposition of several energy related EU directives[268].

In 2006, the former Yugoslav Republic of Macedonia ratified the Energy Community Treaty, which commits the country to implement the relevant *acquis communautaire*, to develop an adequate regulatory framework and to liberalize its energy markets until 2015. The strategic priorities of the former Yugoslav Republic of Macedonia in the energy sector and provisions that transpose the *acquis communautaire* are incorporated in the new Energy Law, adopted by the Parliament in 2006.

Kyoto Protocol

The former Yugoslav Republic of Macedonia ratified the UNFCCC in 1997 as a non-Annex I Party to the Convention, and ratified the Kyoto Protocol in July 2004 as a Non-Annex B country. Climate change issues are incorporated in the Law on Environment, including details on preparation of inventories of greenhouse gas emissions and removals by sinks, as well as an action plan on measures and activities to abate increase of greenhouse gas emissions. The Ministry of Environment and Physical Planning is the designated National Focal Point to the UNFCCC, the key governmental body responsible for policy making with regard to the provisions of the UNFCCC. In January 2000, the Climate Change Project Office was set up within the Ministry. Furthermore, a National Climate Change Committee was established as an advisory body for policy-making related to climate change issues. The Ministry of Environment and Physical Planning was also nominated as the country's Designated National Authority for Clean Development Mechanisms.

According to Article 24 of the Law on Environment, CDM projects are accorded preferential status, i.e. prospective CDM project developers can apply for shorter Environmental Impact Assessment procedures (30 days instead of 270 days) via ordinance[270]. However, at the moment there are no realistic CDM projects in the former Yugoslav Republic of Macedonia. Some renewable CDM projects have been announced but no specifics are known. The only approved CDM project so far is the Cogel Severstal cogeneration power plant (30MW) owned by the Institute of Mining[270].

Other international commitments

The former Yugoslav Republic of Macedonia acceded to the Energy Charter Treaty in 1998. The Treaty contains far-reaching provisions on trade and investment liberalization within the energy sectors of 49 signatory states[14].

11.11.6. Economic incentives and financing schemes for energy efficiency and renewable energy projects

General investment climate in the country

The former Yugoslav Republic of Macedonia benefits from the presence of the Agency for Foreign Investments of the Republic of Macedonia, which is the primary government institution supporting foreign investment in the country. The main mission of the agency is to attract foreign investors into the former Yugoslav Republic of Macedonia and to support the expansion of the existing base of overseas companies in the country[283]. The government is providing several preferential incentives for prospective investors, such as a ten per cent flat tax[270]. Furthermore special tax incentives are offered for companies operating in the technological–industrial development zones (TIDZs). These include a ten-year corporate tax exemption and a 50 per cent reduction of the personal income tax rate (at five per cent) for the first five years. Every company is exempted from tax on retained earnings.

According to the Academy of Science the energy sector is considered as high priority for investments.

According to the Heritage Foundation[284], foreign and domestic investors receive equal treatment, and non-residents may invest in domestic firms. Despite steps to guarantee foreign investments, bureaucracy can be slow, inefficient, lacking in adequate resources, and subject to political pressures and corruption. Residents and non-residents may hold foreign exchange accounts subject to some approvals and restrictions, while payments and transfers face few controls and restrictions. Most capital and money market activities require government consent or registration. The currency is not convertible on international markets. Finally, foreign investors are permitted land-use rights but not land ownership.

Despite extensive reforms and external incentives in the framework of the European Union pre-accession process, the former Yugoslav Republic of Macedonia is not perceived as having significantly improved its anti-corruption stance and was therefore awarded with a score of 3.6 by Transparency International Corruption Perceptions Index, attributing the former Yugoslav Republic of Macedonia with the third best place within the project region[53].

Incentives for energy efficiency

There are no specific incentives for energy efficiency investments in the Former Yugoslav Republic of Macedonia.

Incentives for renewable energy sources

In February 2007, the Rulebook on the method and procedure for establishing and approving the use of feed-in tariffs for purchase of electricity produced from small hydropower plants was published by the Energy Regulatory Commission. However, the feed-in tariff is not yet operational[282], since it applies only to electricity produced by newly constructed run-of-river small hydropower plants, operated by legal entities (private persons are not allowed to qualify), which have qualified as privileged producers and to-date, no producer could qualify for this status since the entry in force of the Rulebook. Furthermore, the feed-in tariff system cannot become de facto operational without the adoption of a governmental act, regarding the total amount of installed capacity which will be attributed to the pool of preferential producers. This governmental act should enter into force by September 2009.

The feed-in tariffs are shown in Table 11.33 and Table 11.34. The privileged producer is obliged to apply the approved feed-in tariff for a period of 20 years. The electricity market operator is obliged to purchase the total quantity of electricity delivered by the privileged producer under the approved feed-in tariffs. The feed-in tariff for hydro-power is based on a four-tier system; the average price for the production of hydro-power was set at 58.8 EUR/MWh in 2007, corresponding to a price premium of 20 per cent on the average end-user tariff.

Table 11.33: Feed-in tariffs for the sale of electricity produced by small hydropower plants

Delivered quantity block	Monthly quantities of delivered electricity (kWh)	Annual quantities of delivered electricity (kWh)	Privileged tariff (EUR /MWh)
I	1-85,000	1-1,020,000	120
II	85,001-170,000	1,020,001-2,040,000	80
III	170,001-350,000	2,040,001-4,200,000	60
IV	350,001-700,000	4,200,001-8,400,000	50
V	> 700,001	> 8,400,001	45

Source: Energy Charter[268] (2007)

Table 11.34: Feed-in tariffs for the sale of electricity produced by renewable energy sources other than hydropower

Type	Installed capacity	Privileged tariff (EUR /MWh)
Wind	-	89
Biogas	≤500 kW	130
Biogas	>500 kW	110
Photovoltaic	≤50 kW	460
Photovoltaic	>50 kW	410

Source: Energy Charter[268] (2007)

Currently cogeneration power plants do not receive feed-in tariffs. A new Rulebook is currently in planning by the Energy Agency of the Republic of Macedonia and comprises a revision of this clause. Presumably the first preferential producer, who will benefit from the new feed-in tariff will be the newly established cogeneration power plant Cogel[270].

Financing mechanisms for energy efficiency and renewable energy projects

National financing mechanisms

On the national level, a credit line and guarantee scheme is active among the Macedonian Bank for Development Promotion and five local commercial banks: Komercijalna Banka, Uni Banka, NLB Tutunska Banka, IK Banka, and Ohridska Banka. This scheme is the first of its kind.

Although the creation of an Energy Efficiency Fund was envisaged by the Energy Law from 1997, such a fund has not been established so far.

International financing mechanisms

Over the last years, some funds have been proposed by international development organizations[22]:

- Together with the World Bank, the Macedonian Bank for Development Promotion opened a credit line of USD 6.2 million. Loans of USD five million have been set aside. Energy efficiency projects are being financed. Up to 60 per cent of the projects are financed by the Macedonian Bank for Development Promotion. Ten per cent of the project costs have to be financed by the applying companies, while 30 per cent come from participating banks. The maximum project size of renewable projects is USD four million. Recently, the Macedonian Bank for Development Promotion invested for the first time in an energy efficiency project concerning a solar house. It is the first of this kind in the former Yugoslav Republic of Macedonia. In the near future another two projects are going to be financed. The minimum threshold of energy efficiency projects is USD 200,000 and USD 500,000 for renewables[285]. For the evaluation of the projects, the Macedonian Bank for Development Promotion is getting assistance by the Energy Agency of the Republic of Macedonia. According to the Macedonian Bank for Development Promotion out of 50 projects only two projects have been developed in a bankable way. The annual interest rate issued by the Macedonian Bank for Development Promotion is currently 6.2 per cent;

- The European Bank for Reconstruction and Development issued two credit lines[286]. One credit line is called the EU/EBRD Western Balkans Sustainable Energy Credit Line Facility (WeBSECLF) and is endowed with up to EUR 60 million for providing loans to energy efficiency projects and small renewable energy projects implemented by private entities in the Western Balkans and up to EUR 16 million for incentive payments and technical cooperation funds. The second fund, called the EBRD Western Balkans Sustainable Energy Direct Financing Facility (WeBSEDFF), is endowed with up to EUR 50 million for providing debt financing to renewable energy and industrial energy efficiency projects to small and medium-sized enterprises in the Western Balkans and up to EUR 11 million in incentive payments and technical cooperation funds. In March 2009 two consultants have been hired in order to make projects bankable via feasibility studies[286];
- SEAF Macedonia, which is part of the global Small Enterprise Assistance Fund, has been active since 1998 in the former Yugoslav Republic of Macedonia and also provides funds, though it is not primarily focused on energy efficiency and renewables. The investments are made primarily through equity participations, often combined with quasi-equity financial instruments and subordinated debt. SEAF usually invests in locally registered, private companies, where SEAF Funds traditionally have taken the minority position. The total fund size is USD 13 million, of which USD 10.4 million have been utilized so far. Investors of the fund include SEAF, the EBRD, the International Finance Corporation and Deutsche Investitions- und Entwicklungsgesellschaft (DEG). The average investment is about USD one to two million. So far SEAF Macedonia has just made one investment in the energy efficiency sector, i.e. by acquiring a stake in ESCO Fonko[287];
- The United States Agency for International Development in the former Yugoslav Republic of Macedonia offers two credit lines of USD nine million and USD ten million to two local banks for energy efficiency projects and the provision of a 50 per cent credit guarantee;
- The Austrian Development Agency grants loans for projects regarding efficient use of geothermal energy, and use of solar thermal energy (EUR 1.12 million);
- Switzerland, through the Staatssekretariat für Wirtschaft (SECO), has helped financing the realisation of the Energy Efficient Distribution Project (CHF 1.21 million).

Commercial financing mechanisms

As described by the Heritage Foundation, the former Yugoslav Republic of Macedonia's commercial banking sector is not fully developed, but it is growing as the country encourages private-sector development and foreign investment. The foreign presence in the financial system is substantial, accounting for about 60 per cent of total bank assets. Despite gradual efforts to strengthen the financial sector, it remains relatively weak. The banking sector is highly concentrated, and the three largest banks account for about 70 percent of all deposits and loans. Capital markets are underdeveloped and unable to provide a full range of credit alternatives for businesses[284], while the cost of financing and difficulties in assessing credit risks of potential borrowers remain high[268].

Other support mechanisms

In 2006, the World Bank announced the creation of the Sustainable Energy Project of the former Yugoslav Republic of Macedonia, with the aim to develop a sustainable market for energy efficiency and renewable energy sources by supporting the development of an enabling framework, institutional capacity, and necessary financing mechanisms. The project will include three components: (a) market framework which has the following sub-components: (1) capacity building, strategic/legislative/institutional, which will comprise technical assistance focused on supporting the Government in designing and implementing policy and secondary legislation on the inclusion of renewable energy sources in the electricity sector, and will also include support to the Macedonian Electric Power System Operator (MEPSO), the Energy Regulatory Agency, and government departments with regard to streamlining of permitting processes; (2) capacity building, technical/advisory, which will focus on project development and project investment support; and (3) monitoring, information dissemination, and administration; (b) support to utility-based Energy Service Company, which will support the development and startup of ESCO, under the umbrella of MEPSO; and (c) sustainable energy financing facility, which will be a financing facility consisting of a loan guarantee facility and a loan facility, on a co-financing basis with commercial institutions and the Macedonian Bank for Development Promotion (MBDP)[288].

11.11.7. Barriers to the implementation of energy efficiency and renewable energy projects

Box 11: Summary of barriers to the implementation of energy efficiency and renewable energy projects in the former Yugoslav Republic of Macedonia

Legal, institutional and administrative barriers

1. There is no dedicated governmental agency for energy efficiency and renewable energy sources.
2. Much of the dedicated regulatory framework is still under development and the policy implementation as well as the development of secondary legislation may still take some time.
3. The Strategy for Energy Development in the Republic of Macedonia for the Period 2008 to 2020 with a vision to 2030, does not include renewable energy sources among the top priorities.
4. Public tenders and other administrative procedures for project realization appear to be not only complicated, but also non-transparent and of uncertain outcome.

Economic and financial barriers

5. The tariffs for energy for regulated customers are extremely low.
6. At present, there are no incentives for energy efficiency in place.
7. The feed-in tariff for electricity produced from renewable energy sources is not yet operational since the governmental act necessary for activation of the fund is still outstanding.

Lack of awareness, human capacities and professional skills

8. The private sector faces a lack of skills to set up bankable project proposals.
9. Banks and other national financing institutions lack technical expertise and experience in financing energy efficiency and renewable energy projects.

Legal, institutional and administrative barriers

The former Yugoslav Republic of Macedonia is undertaking a strong effort to develop policies for the development of energy efficiency and renewable energy sources, motivated by the target of full compliance with EU regulation and by the necessity to reduce its high dependency on energy imports. However, much of the dedicated regulatory framework is still under development and the policy implementation as well as the development of secondary legislation, and the definition of the operative procedures may still take some time:

- There are no dedicated laws for energy efficiency and renewable energy sources; draft version of these regulations are currently under development;
- There is no dedicated governmental agency for energy efficiency and renewable energy sources, nor is there a network of regional agencies to support on-field implementation at the local level;
- The feed-in tariff for electricity produced from renewable energy sources is defined since 2007 but not yet operational since the governmental act necessary for activation of the fund is still outstanding. Furthermore, the requirements for eligibility as preferential producer appear to be excessively restrictive (e.g. private persons are not eligible for feed-in tariff);
- The Energy Strategy is currently under revision; however, the envisaged increase of electricity production capacity until 2030 (900 MW coal, 600 MW gas and 800 MW large hydro power plants, roughly 1.5 times the current installed capacity) appears to be very optimistic and of uncertain realization. It is also regrettable that no renewable energy sources (apart from large hydro) appear in the targets of the draft energy strategy;

- Public tenders and other administrative procedures for project realization appear to be not only complicated, but also non-transparent and of uncertain outcome: the small hydro projects that won the public tenders of 2006 to 2007 could never be realized for administrative delays and even for Macedonian project developers there is no clarity about which entity should be addressed for enquiries or clarifications;
- The legal framework for Clean Development Mechanism projects has not been yet established and subsequently no CDM project could be realized so far;
- At the municipal level additional barriers are posed by the fact that there is no clarity about who is going to monitor the implementation of the foreseen municipal energy efficiency action plans, there are no requirements for professional profiles inside the municipal administration who should prepare and implement these action plans and finally the municipal administrations cannot take loans or own land (at present, public land belongs to the Macedonian government). The incomplete administrative decentralization, meant to provide the municipalities with higher competences, will only provide benefits once it is entirely implemented and adequate administrative structures and competences have been setup.

The last points that should be addressed among institutional barriers are the strong influence of political interests in administrative procedures with relation to private business and the political instability and uncertainty over election phases.

Economic and financial barriers

The economic and financial barriers to the development of energy efficiency and renewable energy projects in the former Yugoslav Republic of Macedonia are mainly related to the absence of economic incentives, to the low energy prices and lack of equity for project developers:

- At present, there are no incentives for energy efficiency and for renewable energy sources; the incentive mechanism (feed-in tariff) is developed but not operational. The only incentive currently available is a VAT-exemption for equipment for solar heat production and photovoltaic cells. The Energy Efficiency Fund, envisaged by the Energy Law in 1997, has not been set up yet;
- The tariffs for energy for regulated customers are extremely low (the household electricity tariffs are the lowest in the region); at the same time the market structure is inefficient, being only partially liberalized with no perspective of full liberalization progress until 2015, and does not provide incentives for further market development: the few eligible customers that must purchase energy on the wholesale market pay much higher prices than the regulated customers (however, it must be noted that this provision provides an excellent incentive for these customers to increase their energy efficiency);
- Finally, interviews with bank representatives pointed out the lack of creditworthy project development companies, referring on one side to the lack of equity of project development companies and subsequently their inability to provide adequate collaterals, and at the same time the lack of a reliable track of records proving both technical and entrepreneurial know-how and expertise.

Lack of awareness, human capacities and professional skills

Regarding human capacities, awareness for the relevance of energy efficiency and renewable energy sources and the availability of professional skills for the preparation of bankable projects in the former Yugoslav Republic of Macedonia, a build-up of capacities and awareness is necessary in all sectors:

- In the Ministry of Economy and in the Agency for Energy, where there is no dedicated team or organization for energy efficiency and/or renewable energy sources;
- In the municipalities, which face the challenge of increased autonomy and new obligations and processes regarding energy efficiency, without having neither the necessary professional profiles nor a sufficient information background (i.e. reliable data on energy consumption and usage) in order to implement the action plans or the requirements from the energy audits;

- In the private sector, there is urgent need of build-up of professional figures, who will be able to perform the energy audits which should be compulsory as of 2010 and to advise the companies and asset owners on which measures to implement as a consequence of the energy audits. This implies not only the technical skill to identify the projects but also sufficient financial skills to evaluate the economic profitability of the projects and to setup a financing concept to be submitted to banks or other financing institutions;
- Finally, banks and other national financing institutions lack technical expertise and experience in financing energy efficiency and renewable energy projects.

11.12. Ukraine

11.12.1. Overview of economic situation

General demographic data

Ukraine extends over a surface of over 603,700 km^2. In 2008, the country registered a population of 46 million, 2.6 million (less than six per cent) of which are living in the capital Kiev (Kyiv). The population density of Ukraine is 76.2 inhabitants per km^2. The industrial regions in the east and southeast are the most heavily populated, and about 67 per cent of the population lives in urban areas. Ukraine is experiencing a decline in its population, which has ranged between 1.01 per cent in 2000 and 0.6 per cent in 2007, with declining birth rates and declining life expectancy being the main reasons[289]. Since 2005 the migration balance is positive in Ukraine, i.e. more people immigrate to Ukraine than emigrate[289].

Current political situation and outlook

Ukraine is a republic with a mixed semi-parliamentary and semi-presidential system[xxiii]. The President is elected by popular vote for a five-year term and is the formal head of state[290].

At the time of preparation of the report, preliminary results of the second round of the Presidential elections on 7 February 2010 showed that Viktor Yanukovych won the run-off vote by a narrow margin against Yuliya Tymoshenko. The last parliamentary elections were held in September 2007, which resulted in the following outcome: the largest faction in the Verkhovna Rada (parliament) is the Party of Regions. The second-largest group is the Yuliya Tymoshenko Bloc, followed by Our Ukraine-People's Self-Defence. The other two smaller parties represented in the parliament are the Communist Party of Ukraine and the Lytvyn Bloc. Based on these results a coalition cabinet was appointed in December 2007 with Yuliya Tymoshenko as the Prime Minister. The next scheduled parliamentary election is in September 2012.[22]

An Association Agreement between the European Union and Ukraine is under negotiation since September 2008. The country is a potential candidate for future enlargement of the European Union.

Ukraine is subdivided into twenty-four oblasts (provinces) and the autonomous Republic of Crimea. Additionally, the cities of Kiev and Sevastopol both have a special legal status. The 24 oblasts and Crimea are subdivided into 490 raions (districts), or second-level administrative units. Urban areas (cities) can either be subordinated to the state (as in the case of Kiev and Sevastopol), the oblast or raion administrations, depending on their population and socio-economic importance. In total, Ukraine has 457 cities, 176 of them are labeled oblast-class, 279 smaller raion-class cities, and two special legal status cities[291].

Gross Domestic Product

Shortly after the independence of Ukraine from the former Soviet Union was ratified in December 1991, the Ukrainian Government liberalized most prices for products and goods and erected a legal framework for privatization, but widespread resistance to reforms within the Government and the legislature soon stalled reform efforts and led to some backtracking. The economic output of the country had by 1999 fallen to less than 40 per cent of the 1991 level[292].

Ukraine's dependence on the Russian Federation for energy supplies and the lack of significant structural reforms have made the Ukrainian economy vulnerable to external shocks. Ukraine depends on imports to meet about three-fourths of its annual oil and natural gas requirements[292].

Ukraine experienced a solid recovery since the 1998 to 99 financial crisis, with annual growth averaging above seven per cent between 2000 and 2007 (see Figure 11.131), fuelled by high global prices for steel – Ukraine's top export product – and by strong domestic consumption, spurred by rising pensions and wages. The drop in steel prices and Ukraine's exposure to the

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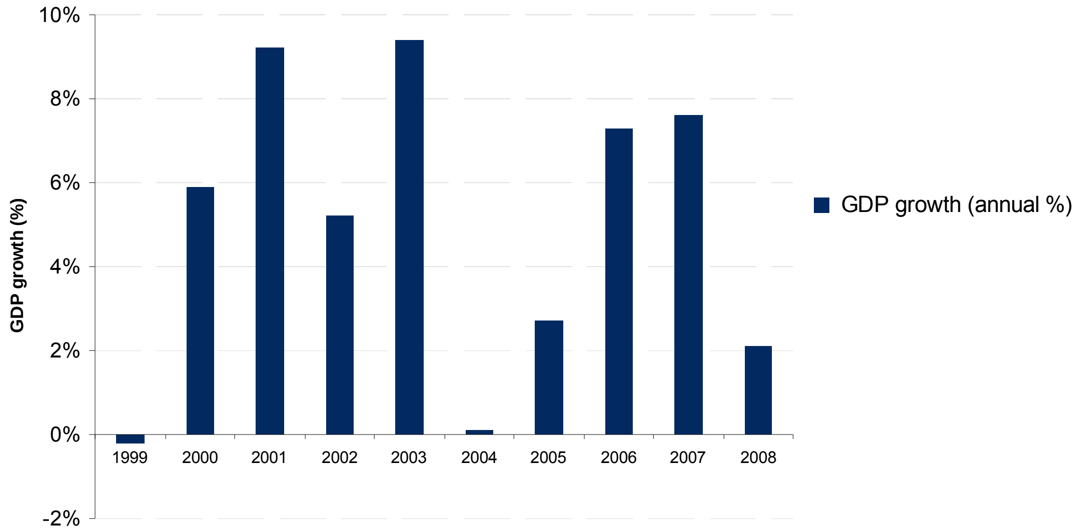
xxiii The semi-presidential system, also known as the presidential-parliamentary system, or premier-presidential system, is a system of government in which a president and a prime minister are both active participants in the day-to-day administration of the state.

global financial crisis due to aggressive foreign borrowing has lowered growth in 2008 and the economy probably will contract in 2009[292].

Ukraine reached an agreement with the International Monetary Fund for a USD16.5 billion standby arrangement in November 2008 to deal with the economic crisis. However, political turmoil in Ukraine as well as deteriorating external conditions is likely to hamper efforts for economic recovery[292]. Since the fourth quarter 2008, the industrial production decreased significantly by 25 per cent. The biggest decline compared to the fourth quarter 2007, was observed in the mining and metallurgical industry (45 per cent), the chemical industry (33 per cent) and the machine-building industry (29 per cent)[293].

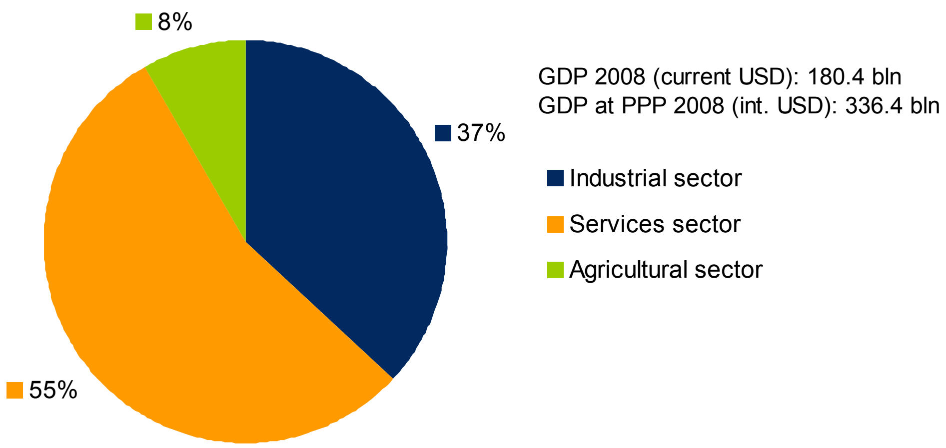
Figure 11.131: *Real GDP growth of Ukraine*



Source: World Bank[292] (2007)

The repartition of the GDP in 2008 can be seen in Figure 11.132. The industrial sector plays a strong role in the national economy, with a share of 37 per cent of the GDP, and is mostly focused on the following sub-sectors: coal, ferrous and nonferrous metals, machinery and transport equipment, chemicals, food processing, especially sugar[292].

Figure 11.132: *Repartition of the Gross Domestic Product in 2008*



Source: World Bank[292] (2009)

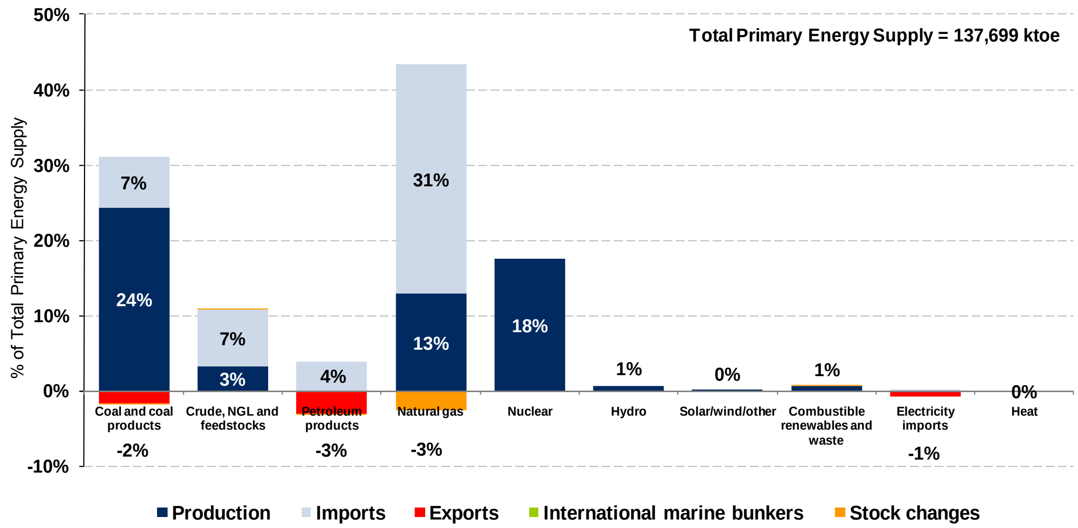
11.12.2. Energy sector and development of energy markets

Energy supply

Despite having significant resources of coal and gas, Ukraine is a net importer of energy with an energy dependency of 43 per cent (see Figure 11.133). Its total primary energy supply in 2007 amounted to 137,699 ktoe. Gas imports amounted to 42,000 ktoe, which represented 75 per cent of the total national gas supply in 2007. Crude oil imports represented 69 per cent of the total national crude oil supply with 10,299 ktoe. Overall 55,816 ktoe of fossil fuels were produced in the country in 2007, while additional 66,950 ktoe were imported and 6,549 ktoe were exported[5].

In order to reduce Ukraine's dependence on external oil and gas supplies, the government is planning to increase the consumption of domestic coal. The share of coal as primary supply for thermal power plants should be increased by 150 per cent by 2030, while the use of gas should be reduced by 50 per cent. This trend is currently supported by the European Bank for Reconstruction and Development, which provided loans for the reconstruction and modernization of block four of the Starobeshevskaya electric power plant. Additionally, the construction of new nuclear power plants, as well as the development of renewable energy sources are under consideration[293].

Figure 11.133: Energy balance of Ukraine by primary energy sources in 2007



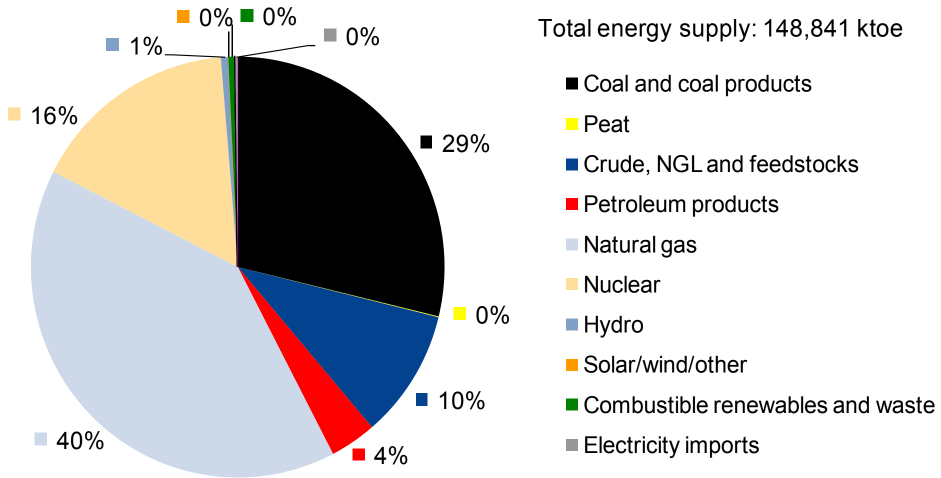
Source: IEA[5] (2009)

Natural gas is the main source of primary energy in Ukraine (39 per cent of the total energy production and imports), pointing out the strong dependency from Russian imports. Ukraine is also a major coal producer with aging and gassy mines (29 per cent). The country also has a nuclear production of 92.5 TWh based on the output of 15 nuclear power units[293], which represents 16 per cent of the total energy supply, as shown in Figure 11.134.

The dominant source of electricity generation in Ukraine is nuclear power with a share of 48 per cent of the total electricity generation. Additional sources of electricity generation are coal (34 per cent) and gas (13 per cent), while hydro power plants account for a share of five per cent, as shown in Figure 11.135. According to the Agency for Rational Energy Use and Ecology (ARENA-ECO) the transmission capacity is currently constrained by congestion. The Ministry of Fuel and Energy issued a loan for the construction of additional transmission lines[293].

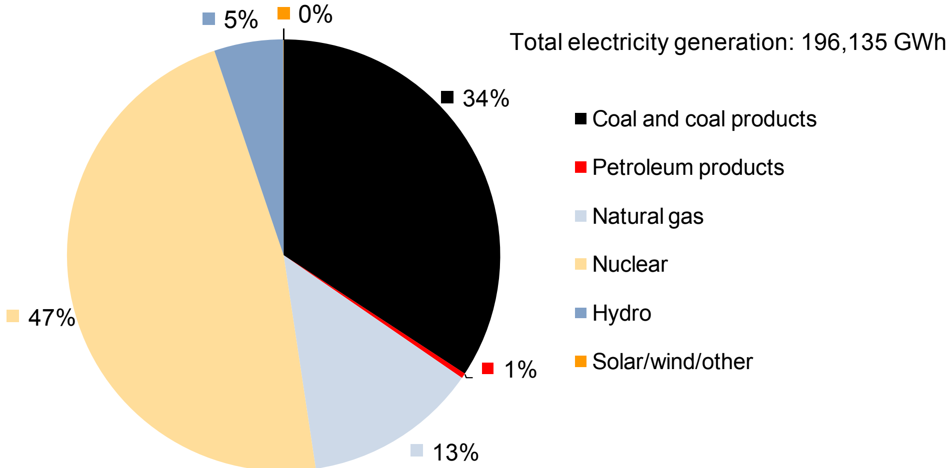
The total installed capacity of electric power plants in Ukraine amounts to 52 GW, of which 27.1 GW (52.1 per cent) are based on gas thermal power plants, while the share of combined heat and power plant, which are operating in deteriorating conditions and require urgent upgrade or replacement[294], and other thermal plants is 6.27 GW (12.1 per cent). Nuclear power plants have an installed capacity of 13.83 GW (26.6 per cent), hydro power plants 4.73 GW (9.1 per cent), and waste power plants 0.074 GW (0.1 per cent). The predominant heat supply source in Ukraine is gas with a share of 97 per cent, while the remaining 3 per cent are provided by coal (see Figure 11.136).

Figure 11.134: *Supply of primary energy by sources in 2007*



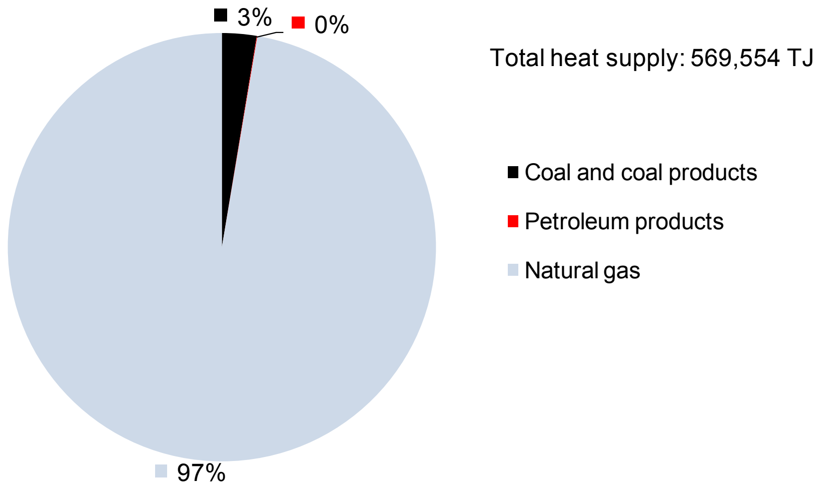
Source: IEA[5] (2009)

Figure 11.135: *Electricity generation by sources in 2007*



Source: IEA[5] (2009)

Figure 11.136: *Supply of heat by sources in 2007*

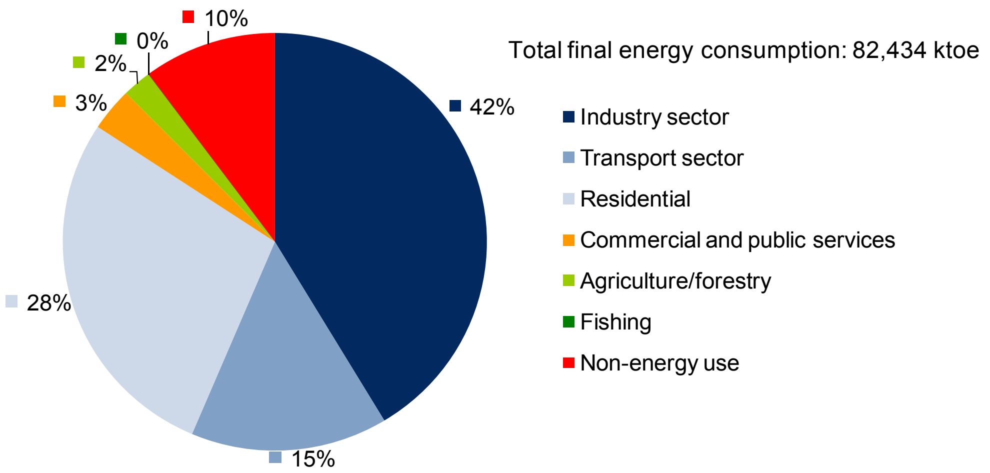


Source: IEA[5] (2009)

Energy demand

The industry and residential sectors are the largest primary energy consumers with 42 per cent and 28 per cent respectively, as shown in Figure 11.137. While the services sector accounts for 55 per cent of the GDP of the country, it consumes only three per cent of the overall primary energy. The share of ten per cent classified as non-energy use derives from the use of petroleum products, especially the use of chemical conversion processes, as well as the non-energy use of coal and gas[5].

Figure 11.137: Total final energy consumption by sectors in 2007



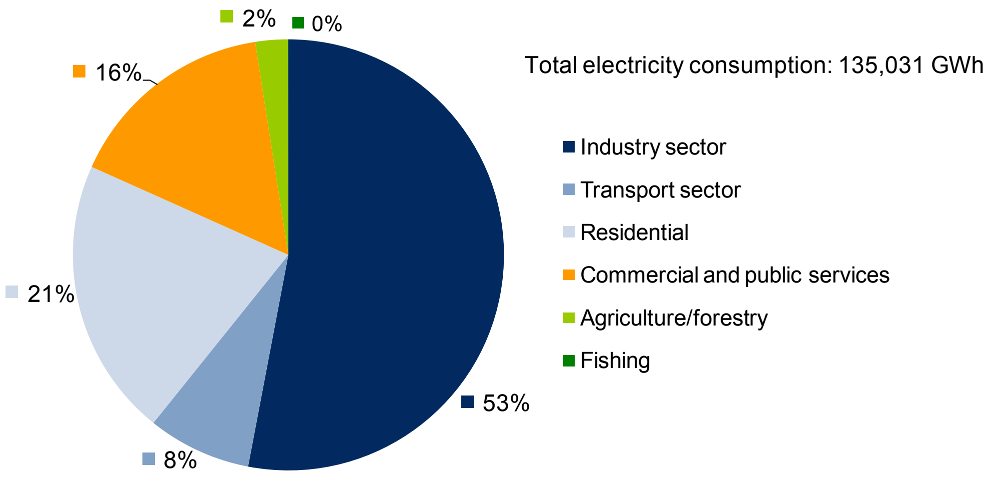
Source: IEA[5] (2009)

As shown in Figure 11.138, 53 per cent of the electricity generation is consumed by the industry sector, while the residential and services sectors account for 21 per cent and 16 per cent respectively.

The residential sector is responsible for 40 per cent of the gas consumption in Ukraine (see Figure 11.139), followed by the industry sector (33 per cent), and a minor part of non-energy use (16 per cent).

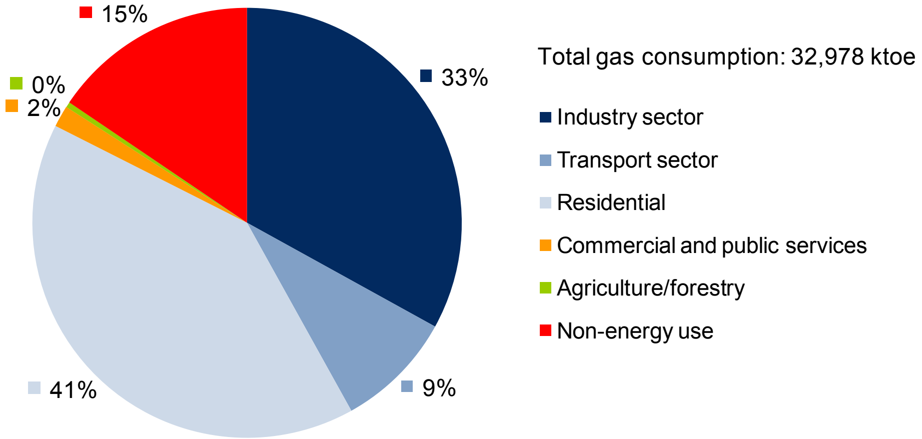
Heat demand is entirely covered by the industrial (54 per cent) and the residential (46 per cent) sectors, as shown in Figure 11.140.

Figure 11.138: Final consumption of electricity by sectors in 2007



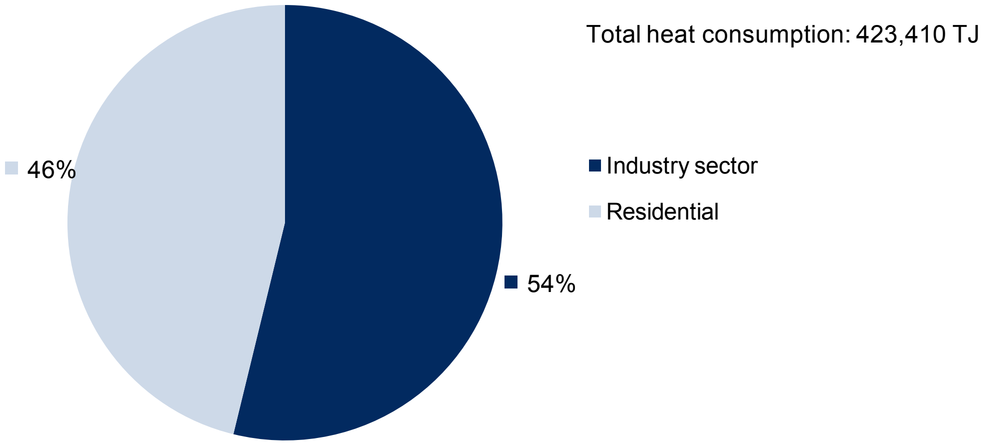
Source: IEA[5] (2009)

Figure 11.139: *Final consumption of gas by sectors in 2007*



Source: IEA[5] (2009)

Figure 11.140: *Final consumption of heat by sectors in 2007*



Source: IEA[5] (2009)

Energy markets

Electricity market

The Ukrainian market for electricity generation is divided into three groups of producers:

- The state-owned company Ukrhydroenergo owns the 11 hydro power plants in the country;
- The four nuclear power plants in the country are owned by the state-owned company Energoatom;
- Five regional generation companies, known as "gencos", own the thermal power plants in the country. Originally there were four regional gencos: Zakhidenergo, Centrenergo, Dniproenergo and Donbasenergo. These companies managed 14 large thermal power stations. A new genco, Skhidenergo, emerged out of a debt restructuring process through which Donbasenergo transferred three (4,000 MW) of its five power plants to settle unpaid claims. While Skhidenergo is privately held, the Energy Company of Ukraine owns the majority of shares in the other companies. The state owns 51 per cent of the shares of the biggest "genco", OJSC Dniproenergo, which has a total capacity of 8,185 MW. The remaining 44 per cent are held by the Fuel-Energy Company Donbas, which is the largest private investor in the energy sector in Ukraine, and at the same time also owner of Skhidenergo[294].

The Ukrainian wholesale market is operated since 1997 by the state company Energorynok, which serves as a single buyer towards the electricity producers and then resells the electricity to distribution companies and large customers[22]. The state generation companies Energoatom and Ukrhydroenergo have a market share in the wholesale market of 60-65 per cent, leaving only 35-40 per cent of the generation market available for independent power producers.

There is an electricity (distribution) company in each of Ukraine's 24 regions, plus one in both the cities of Kyiv and Sevastopol and the autonomous Republic of Crimea. Among these 27 regional distribution companies, there is a mix of state and private ownership. The distribution companies, called oblenergos, also own small cogeneration assets, mainly to produce heat for district heating. Kyivenergo is somewhat unique in that it is a vertically integrated joint stock utility, which both generates and distributes power and heat to the capital, Kyiv[294].

The Ukrainian market is only liberalized regarding the generation of electricity but not the distribution to final customers[293]. According to the National Electricity Regulation Commission of Ukraine (NERC), the full liberalization of the electricity market for all final customers is expected for 2013[295].

By 2013 a balancing market should be established in Ukraine. It is envisaged to establish a market-coupling system that would link Ukraine with the Russian Federation and the Republic of Moldova[295].

Electricity tariffs

The National Electricity Regulation Commission regulates the natural monopolies in the electricity and oil-gas complex and exercises the pricing and tariff policies.

The electricity wholesale market price is the weighted average cost of electricity generated by heat-only, nuclear, hydro, and cogeneration power plants and reached 30 EUR/MWh (200 UAH/MWh) in 2006[296]. According to NERC the approved prices are just valid for one month based on a special resolution of the commission[295]. Based on the energy production costs from different sources and on the current fuel prices, the average wholesale market price is formed at the end of each month. The tariffs are formed based on the production costs, but also include a profit margin for the electricity producers (ten per cent of the production costs). The final prices are differentiated between two customer categories: the first one includes big customers which are connected directly to the high-voltage transmission grid, while the second category applies to customers connected to the low-voltage distribution grid. The final household tariffs are cross-subsidized by the tariffs for industrial consumers[295].

Concerning the retail market, suppliers set their prices on their own, taking into account the distribution and transmission tariffs set by NERC on a cost-plus basis. NERC also reviews investment proposals of each regional distribution companies (oblenergo). Since September 2005, NERC defines a unified distribution tariff for the whole country. Retail prices for non-household consumers vary depending on voltage classes and averaged 53.1 USD/MWh in 2007[22]. The composition of the tariffs for customers connected to the grid with a voltage of up to 35 kV can be seen in Table A 3.1.10

Gas market

The Ukrainian Ministry of Fuel and Energy was authorized to administer the Government's corporate rights in the National Joint Stock Company Naftogas Ukrainy. Naftogas Ukrainy processes gas, oil, and condensate at five gas-processing plants that make part of the company, producing motor fuel and other oil products. The company owns a network of filling stations. More than 97 per cent of oil and gas in Ukraine is extracted by the enterprises of the company. The company includes three subsidiary companies (Ukrgasvydobuvannya, Ukrtransgas, and Gas Ukrainy), three subsidiary enterprises (Ukrnaftogaskomplekt, VZP Naftogas, and Naukanaftogas), two government-owned joint stock entities (Chornomornaftogas, Ukrspetstransgas), and two open joint stock companies (Ukrnafta and Ukrtransnafta) whose controlling blocks of shares are held by Naftogas Ukrainy. Additionally Gas-Teplo, a subsidiary of Naftogas Ukrainy, supplies gas to district heating companies[294].

Ukraine privatized the largest part of local gas distribution companies in 1998. Currently 42 Ukrainian distribution companies operate distribution networks and supply gas to final consumers. However, these companies do not own the gas distribution pipelines, but just the gas transmitted through them, though newly constructed pipelines can be privately owned. Independent suppliers (in particular, local and wholesale traders, which are not controlled by Naftogas Ukrainy) supplied about 4-5 per cent gas to final consumers, mainly industrial consumers in 2008.

Independent traders supply gas to industrial companies at non-regulated prices based on a license issued by the National Electricity Regulation Commission. By the end of 2001 over 1,000 companies obtained licenses for independent gas supply[294].

Gas tariffs

Wholesale natural gas prices in Ukraine are determined by the National Electricity Regulation Commission with subsidies to the population. Prices vary for the population, the administration, heat supply companies, and industrial companies and depend on the consumption profile and the existence of meters. Retail prices for companies have been liberalized in 2007, while NERC has progressively raised the regulated tariffs for the population. In 2005, prices for households[296] (including VAT) varied between 35-40 USD/1000 m^3.

Heating market

The heat sector in Ukraine is dominated by district heating. The total length of the pipelines is 45,000 km, and the total capacity of the network is 200,000 MWth. Currently 88 per cent of Ukraine's population are supplied by district heating systems and 76 per cent by hot water supply. 40 per cent of all heat energy resources consumed by the Ukrainian district heating sector are used to supply multi-apartment buildings.

In Ukraine, the municipalities are the owners of the heat supply stations and the network. However, there are some deviations. Some facilities, for instance in Kharkov, are partly owned by the state government and the municipality, while the operation of the network is performed by a private company, who leases the network[297].

Lack of metering, low collections combined with the consistent failure on behalf of the state and municipal entities to transfer the committed subsidies to the utility enterprises created significant debts. All government efforts to restructure debt or make tariff modifications have only partially solved the problem. As a result, not only can the district heating companies not perform basic maintenance and renovations or pay for the consumed gas since they are on the verge of bankruptcy, but also face massive accidents (for example, the heat supply of the city of Alchevsk collapsed in the cold winter of 2006)[298]. However, with support of the World Bank in the range of USD 180 million, the district heating system in Kiev is presently being modernized[297].

Heating tariffs

According to the Law of Ukraine On Heat Supply of 2 June 2005 (No. 2633-IV) the local authorities establish, for their corresponding territory, according to the procedure and within the limits specified by the legislation, the tariffs for heat supplied by the communal enterprises and organizations, except for tariffs for heat generated at the facilities with combined generation of electricity and heat. Heat tariffs are established by the heat supply companies considering the economically justified forecasted costs, defined based on the state norms of the resource consumption, feasibility calculations and cost estimates, tax and charge (mandatory payments) rates, and prices in the planned period. Heat tariffs include the financial expenses associated with the main activities (direct material expenses for energy, labor etc. variable general production costs and fixed distributed production costs, and fixed retained general production costs) as well as operational costs (administrative expenses, heat delivery costs, and other operational costs). In addition, the tariffs include the costs for creation of the reserve capital used for the capital investments as well as profitability index of the production[22].

According to the Interbranch Association of Development Heat Supply Systems Ukrteplo-komunenergo, the tariffs are usually cost-covering, but are subject to cross-subsidies. If the tariffs of private operators are not cost-covering, which might be possible since the presented tariffs are subject to public hearings, the municipalities have to cover the difference, which they are usually willing to do for political motivations. In order to tackle this issue, it is planned to create a national heating commission[297].

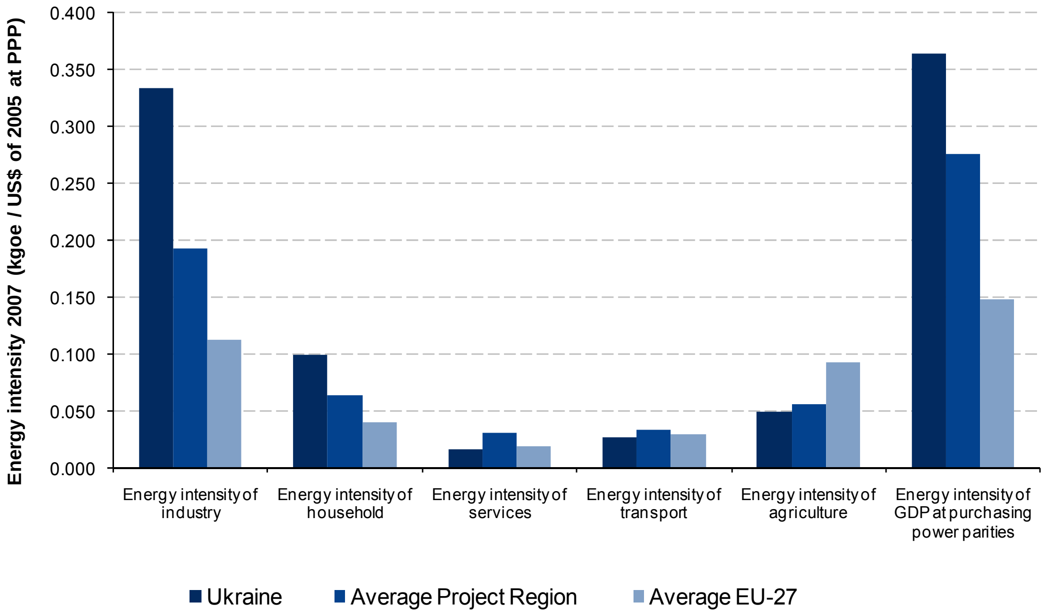
Heat tariffs are established for three customer categories – residential customers, budget institutions, and other customers. The enterprises use two-tier heat tariffs, approved according to the established procedure. Heat tariffs differ for various regions in the country[22].

11.12.3. Current situation with respect to energy efficiency and future potential for energy savings and increase in efficiency

Energy intensity

The energy intensity of the GDP at Purchasing Power Parities for Ukraine in 2007 is three times higher than the EU-27 average and one third higher than the project region average (see Figure 11.141)[6].These values are based on official GDP values. It has to be noted, however, that the level of the shadow economy is in the range of 40 per cent and not being considered when calculating the energy intensity levels. Therefore it can be speculated that the actual energy intensity levels could be lower than officially reported[294].

Figure 11.141: Primary energy intensity at Purchasing Power Parity in 2007



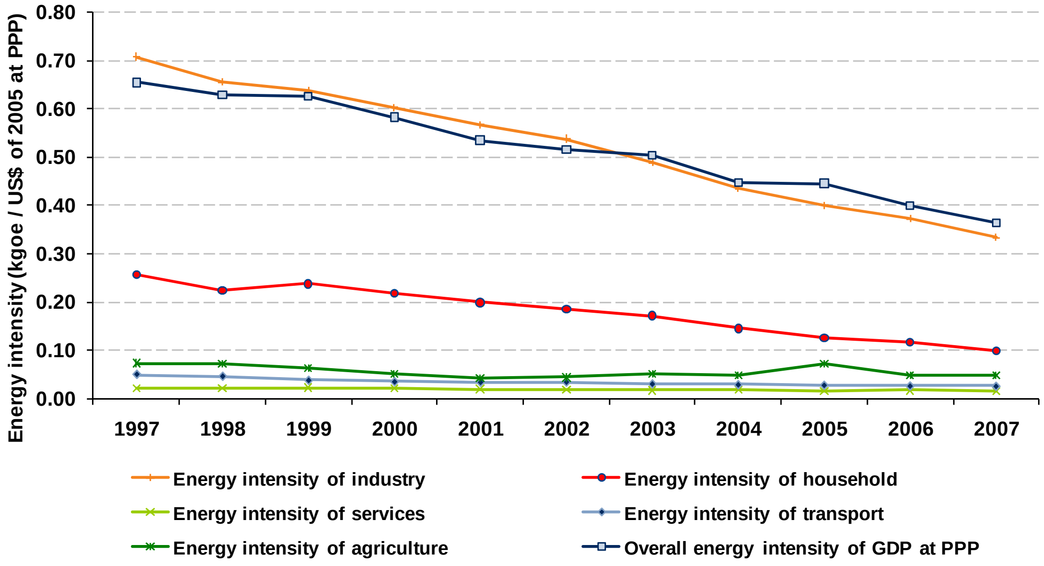
Source: Enerdata[6] (2007)

Although the energy intensity has been decreasing in recent years (45 per cent since 1997, see Figure 11.142), Ukraine is still one of the least energy-efficient countries in the world. Factors that have contributed (and still contribute) to the high energy intensity include slow restructuring of energy-intensive industries and inadequate reforms of the heat and power sectors. The most important factors are low tariffs in the heat and power sectors and the prevailing cross-subsidization of households by industrial consumers. Generation facilities converting primary energy into heat and power have low efficiency rates, and technical and commercial losses in the transmission and distribution networks are high[22].

Especially the industrial and residential sectors have a relatively high energy intensity compared to the two reference values (see Figure 11.142). Nevertheless, both sectors witnessed a significant decrease in their energy intensity levels (53 per cent and 62 per cent) in the past decade (see Figure 11.142).

The picture looks differently for the transport, services, and agriculture sectors. All three sectors have lower energy intensity levels for 2007 than the two reference values (see Figure 11.141) and experienced a significant drop since 1997 (see Figure 11.142).

Figure 11.142: *Primary energy intensity in Ukraine by sector at Purchasing Power Parity*



Source: Enerdata[6] (2007)

Energy losses from electricity and gas grids

Electricity losses in Ukraine accounted for 15 per cent of the total generation in 2006[299]. The sources of electricity losses in power grids can be traced back to loading losses in the power transmission line (PTL), losses through wire crowns of the PTL, auxiliary losses, and finally compensating instrument losses (capacitor bank, synchronous condenser, and static thyristor condensers)[294].

Practically all consumers are equipped with electricity meters. As a rule, meter readings are performed onsite. In some cases remote readings are performed and automated energy consumption systems are used. Local authorities play an important role, since they can determine whether customers can be disconnected from supply. In the past, they have often tried to delay disconnections for social reasons, which contributed to growing debt in the electricity sector. According to the National Electricity Regulation Commission of Ukraine the non-payment rate in Ukraine reached 3 per cent in 2001, but the current economical crisis is expected to increase this value[295].

The gas losses in the gas transmission network are approximately 1.1 per cent. Key sources of gas losses in the network can be attributed to gas leakages through fittings (valves, joints, flanges) and flares, as well as gas emissions caused by technical failures[294].

Over 12 million apartments are connected to the gas grid in Ukraine, equipped with more than 6.3 million gas meters. Over 600,000 new gas meters are installed in the Ukrainian residential buildings annually. It is possible to disconnect customers who do not pay their bills from the gas grid by turning off the faucet and sealing. The installation of gas meters is strongly supported by the tariffs system in Ukraine. Prices for households equipped with a gas meter are around ten per cent lower than for households without a meter[294].

District heating grid

District heating distribution networks in Ukraine are outdated, sometimes poorly insulated, and losses are significant. Multi-story residential buildings consume approximately 40 per cent of the country's heat energy resources. It is estimated that fuel consumption in the heat sector could be reduced by up to 30 per cent simply by improving equipment such as boilers, pipes, pumps, and valves. Further energy savings might be obtained through appropriate design of plants and effective metering of heat consumption in the household sector[22].

Only 4-5 per cent of residential buildings but practically all of the public buildings are equipped with heat metering devices. In the industrial sector this figure amounts to 35-50 per cent. An increasing number of private consumers have hot water meters installed in their flats[298].

Currently it is not possible to disconnect customers from the heat distribution grid, who do not pay their heating bills[294].

Other sources of inefficiency

Residential and public facilities continue to operate out-of-date and deteriorated energy intensive equipment. A significant part of small- and medium-sized boilers are based on construction plans with a low efficiency factor and are older than 20 years[294].

In the industrial sector, the key source of inefficiency is the extreme deterioration of production assets, coupled with low upgrade rates. Insufficient implementation of modern technologies is a further cause of inefficiency. Finally, the absence of monitoring devices and respective automated systems has to be mentioned as sources of inefficiency in the industrial sector[294].

The main reason for energy inefficiency in the power generation sector can be attributed to the continuing deterioration of the technological and auxiliary equipment, the low quality and high ash content of coal, non-optimal modes of electricity production and distribution, as well as insufficient financing for capital investments[294].

The sources of inefficiency in the transport sector can be traced back to the high deterioration of the existing hauling stock, the non-optimal modes of cargo and passenger traffic, as well as the low quality of the road network[294].

Estimated potential for energy savings by sector

The estimated energy saving potential for the industrial, residential, transport, and power generation sector are shown in Table 11.35 and are based on the Energy Strategy of Ukraine to 2030.

Table 11.35: Estimated potential for energy savings by sector

Sector	Energy saving potential		
	Fuel (Mtce)	Power (GWh)	Heat (million Gcal)
Industrial	71.16	54.19	139.92
Power generation	18.50	6.8	1.4
Residential	15.12	14.68	63.62
Transport	17.24	1.24	0.73

Source: Energy Strategy of Ukraine to 2030

ESCOs and other initiatives in energy efficiency

Several Energy Service Companies (ESCOs) are operating in Ukraine, among them UkrESCO (Kyiv), ESCO-Rivne (Rivne), ESCO-Zakhid (Ivano-Frankivsk), Kherson-ESCO (Kherson) and Energy Alliance. UkrESCO and Energy Alliance have been created with support of international financial institutions. The EBRD provided a loan of USD 20 million to support the creation of the UkrESCO in 1998. In 2005 the EBRD provided UkrESCO a second loan of USD 30 million to enable UkrESCO's business expansion. Additionally in 2003, the EBRD provided a loan of USD ten million for the establishment of a new private sector Energy Service Company, known as the Energy Alliance. The Bank's loan was used by the Energy Alliance to finance the purchase of co-generation equipment[300].

UkrESCO, which was created in 1998 as the first ESCO in Ukraine, has been implementing energy saving projects as 'turn key" at small and medium enterprises of Ukraine. UkrESCO has successfully implemented 24 energy saving projects in various Ukrainian enterprises[301]. The projects cost usually range between USD 200,000 and five million. The project payback period is 1-4 years, the commodity credit term is up to four years. Project examples are listed in Table 11.36.

Table 11.36: Project examples of UkrESCO

Project category	Project description
Cogeneration stations	Cogeneration station construction at State Joint Stock Company “TITAN”: The electric power, generated by the steam turbine station, and waste steam are used for technological needs of the plant and cover the part of electrical load.
Compressed air systems	Modernization of the compressed air generation and distribution system at the company OJSC "Gastomel Glassworks": The project was realized in two stages. The first stage comprised the creation of a new compression station on the basis of three screw compressors. The second stage comprised the reconstruction of a compressed air plant system. These implemented measures allowed to decrease the energy consumption, to improve the air quality and to reduce the maintenance and operation costs.
Heat supply systems	Boiler plant replacement at OJSC “Poultry Plant Kievska”: The boiler plant installed at the poultry plant consists of two boilers with a capacity of 1300 kW each. The implementation of this measure allowed to reduce the heat consumption, as well as to minimize the heat losses.
Cold supply systems	Modernization of the cooling system at OJSC "Vinnitsa Meat Processing Plant": The refrigeration chambers and production premises of MPB, which should be reconstructed, were transferred to the autonomous cold supply. The chambers and premises are equipped with energy saving autonomous split systems, energy efficient air conditioners, refrigerating chambers, ice generators and other required energy efficient refrigerating equipment, providing the specified technological parameters for meat products processing and storing.
Equipment modernisation	Reconstruction of leather-dyeing lines at CJSC „Voznesensk Tannery Plant „VOZKO”: Reconstruction of leather-dyeing lines is implemented with replacement of existing dryers in the processing workshop with new, modern tunnel gas dryers with catalytic panels. The new equipment provides the gas consumption reduction for the goods drying in the dyeing lines. The energy saving is achieved due to direct gas combustion in catalytic panels of gas dryers.

Source: UkrESCO[301] (2009)

The activities of ESCOs in Ukraine are considered to be reasonably successful although it is not clear whether they will be able to remain viable without the support from grants, preferred loans, and budget[22].

However, according to the Interbranch Association of Development Heat Supply Systems Ukrteplokomunenergo, most of the above mentioned ESCOs are not working based on energy performance contracts, but act more like consultancies[297].

11.12.4. Current situation with respect to renewable energy sources and future deployment potential

Deployment of renewable energy sources

Currently, Ukraine has the lowest share of renewable energy sources among the project region, with only 1.3 per cent of primary energy supply (based on hydro), five per cent of electricity generation (based mainly on hydro) and 0 per cent of heat production.

The most developed renewable energy sources for electricity production in the country are wind turbines (total installed capacity of 90 MW[302]) and small hydropower plants (total installed capacity about 105 MW).

The country has considerable geothermal resources that are used primarily for heat supply. Total installed capacity of thermal systems is 13 MWth. Plans are in place to increase the thermal water utilization up to 250 MWth by 2010. There are prospects for binary geothermal plants using existing wells at abandoned oil and gas fields[22].

The production of equipment for renewable energy sources is supported in Ukraine and there are several manufacturers providing national equipment for the deployment of renewable energy sources. ESTA Ltd. for instance is a Ukrainian company producing wind blades amongst other products from composite materials.

Biofuels are mostly used in boilers for hot water supply and as gasoline additives in the transport sector[294].

Estimated potential for renewable energy sources

Ukraine has potential for solar energy, particularly in Crimea and in the Southern area of the country. Water heating with solar energy is getting particular emphasis. The potential for small hydropower projects is estimated at about 330 MW, of which 220 MW are located on the Tisa River in Western Ukraine.

The biomass potential is estimated at four million toe and includes livestock manure, straw, and timber waste. There is some interest in the use of livestock manure for biogas power generation as well as straw and wood combustion for district heating plants and combined heat and power facilities. Some Ukrainian companies have begun production of rapeseed oil and its export to European biodiesel producers. There are plans to build biodiesel production plants with participation of foreign investors[22].

Mid-term potential for wind generation is estimated at 5,000 MW, with the Crimean Peninsula the most promising area for installation of wind farms[22].

In this situation, the national target of a share of ten per cent of electricity production from renewable energy sources by 2010 would imply an additional production of 6,000 GWh yearly and appears very optimistic.

Projects and initiatives in renewable energy sources

Some small hydro power plants as well as wind power plants in the Crimea region operate without being subordinated to the Ministry of Fuel and Energy of Ukraine[294].

11.12.5. Institutional, regulatory and policy framework for energy efficiency and renewable energy sources

Policymakers in the energy sector

Institutional policymakers

The ministries in charge of energy policy in Ukraine are listed below[303].

- The Ministry of Fuel and Energy of Ukraine (Minpalyvenergo) develops short-, medium- and long-term forecasts for economic and social development of the fuel and energy complex and exercises control over purposeful, economic, and effective use of allocated budgetary funds for fuel and energy complex enterprises.
- The Ministry of Environmental Protection is responsible for energy efficiency aspects and the sale of emission reduction units according to the Kyoto Protocol.
- The Ministries of Economy, Finance, Coal Industry, Industry Policy, Regional Development and Building, Housing and Communal Services, Transport and Communications, Agrarian Policy and Education and Science are also involved in the energy policy of Ukraine to a certain degree, though to a lesser extent than the two aforementioned ministries.

Other governmental institutions involved in energy policy in Ukraine are[22] listed below.

- The National Electricity Regulation Commission of Ukraine (NERC) is the state regulatory body in the electricity sector. One of the main tasks of NERC is providing the pricing and tariff policy in the power sector. The general principles of establishing energy tariffs are determined by Article 17 of the Law On Electricity Sector" of 1997.
- The National Agency of Ukraine for the Effective Use of Energy Sources (NAER) is a specially authorized central executive institution in issues of ensuring the implementation of the state policy in the area of efficient use of energy resources and energy saving.

Non-institutional policymakers

The non-institutional policymakers active in Ukraine are listed below:

- The National Academy of Sciences of Ukraine is the highest state-supported research organization. Especially its Institute of Electrodynamics, the Institute of General Energy, the Institute of Engineering Thermophysics, the Gas Institute, the Institute of Renewable Energy and the Coal Energy Technology Institute are active in the fields of energy efficiency and renewable energy sources.
- The Agency for Rational Energy Use and Ecology (ARENA-ECO) is a leading Ukrainian non-profit research and project development organization providing services aimed at the improvement of fuel and energy efficiency and environmental protection.

- The Interbranch Association of Development Heat Supply Systems Ukrteplokomunenergo comprises 56 members, which are district heating companies in Ukraine that cover half the heat supply market in Ukraine. The main activities of the Association are related to legislative activities, such as regulatory acts[297].

Regulatory and administrative institutions at the regional and local level

Individual boards and divisions responsible for the energy efficiency and energy saving area operate within the structure of regional state administrations (24) and the government of the Autonomous Republic of Crimea, as well as in the cities of Kyiv and Sevastopol. The main responsibilities of these offices are: analyzing the status and the tendencies of the regions' energy development, working out regional energy saving programmes, drawing energy balances of their regions, ensuring the development and implementation of organizational-administrative and regulatory acts in energy saving, as well the development and implementation of economic mechanisms for providing incentives for rational use of fuel and energy resources[294].

Energy policy and regulatory framework

Ukraine has a complex legal framework for the energy sector. The main legislation includes the Law on Electricity Sector (1997), the Law on Heat Supply (2005), and the Law on Combined Heat and Power Production (Cogeneration) and Utilization of Energy Waste Potential (2005). The laws are supplemented by a number of government resolutions, presidential decrees, by-laws, regulations, norms, standards, and methodological guidelines[22].

Currently, the Ukrainian Government is preparing a Draft Law On Specifics of Privatization in Electrical Energy Industry. The preparation of the draft law includes a working group, which consists of all concerned parties, i.e. ministries and departments, consulting companies, and the NJSC Energy Company of Ukraine. The government is interested in selling all its power plants, excluding the nuclear power plants and the electricity transmission lines[293].

On the electricity distribution side, the government privatized six distribution companies in two privatization rounds; the first round was criticized because of the lack of transparent criteria for bidders; the second round brought in two international investors (AES and the Slovak/Dutch company VS Energy). The remaining distribution companies are partially privatized, with a mix of free floating shares, state owned shares, and shares owned by other major shareholders.

The main energy policy document is the Energy Strategy of Ukraine for the period until 2030 (2005), which is efficient in combination with the Comprehensive State Energy Conservation Programme till 2010. The Strategy focuses on traditional energy sectors (natural gas, oil, nuclear and coal). One of its goals is reducing country's energy dependence, in particular on natural gas imports.

Policy and regulation on energy efficiency

In addition to the policy makers for the general energy sector, there is a dedicated institution responsible for energy efficiency, the National Agency for Efficient Use of Energy Resources. It has been established at the end of 2005 after the State Committee on Energy Saving has been abolished and is responsible for development and implementation of the national policy in the area of energy efficiency, energy conservation, and development of alternative energy sources. Furthermore, the Agency monitors the efficiency of the use of energy resources by means of state inspectors. The inspections are carried out all over Ukraine and the revenues from applied penalties are used to finance the State Energy Conservation Fund, which is managed by the Agency. Currently up to 100 employees are working for the National Agency for Efficient Use of Energy Resources[293].

The Law on Energy Saving (1994) provides for a system of institutional and regulatory measures and incentives for energy saving. The Law on Energy Saving will be replaced by the current Draft Law On Efficient Use of Fuel and Energy Resources, which has been developed by the Cabinet of Ministers of Ukraine by 2 April 2009. The new law will combine market mechanisms with state regulation elements based on the experience in pursuing energy efficiency policy of the European Union[293].

The main policy document in the area of energy saving remains the Comprehensive State Programme of Energy Saving of Ukraine (1997). Issues related to energy saving and energy efficiency in housing and communal sector are reflected in the State Programme of Reform and Development of the Housing and Communal Sector for 2004–2010 (2004)[22].

On 19 November 2008, the Concept of the State Target Economic Energy Efficiency Programme for 2010-2015 has been approved by order of the Cabinet of Ministers of Ukraine. However, the funding of this concept still needs to be organized[293]. The concepts envisages inter alia the creation of a legislative framework, the provision of economic incentives to promote energy saving activities, the creation of a state system for monitoring and controlling the efficient use of fuel and energy sources; in this context, the development of the Draft Law On Efficient Use of Fuel and Energy Resources introducing a market-based approach represents a first implementation step.

The Energy Strategy of Ukraine to 2030 envisages the ambitious target of reduction of energy intensity by 50 per cent until 2030[294]. However, since no implementation plan is available, it is not clear how this target is supposed to be achieved.

Policy and regulation on renewable energy sources

The responsible institutional entity for the development and implementation of the national policy on renewable energy sources is the National Agency for Efficient Use of Energy Resources.

Several laws and policy documents have been adopted to promote the use of renewable energy sources, as shown in Table 11.37.

Table 11.37: Laws and policy documents on renewable energy sources

Publication	Name of the legislation
14.01.2000 No. 1391-XIV	On Alternative Types of Liquid and Gaseous Fuel
20.02.2003 No. 555-IV	On Alternative Energy Sources
31.12.1997 Resolution No. 1505 (modified in 2005)	Programme of State Support of Development of Alternative and Renewable Energy Sources and Small Hydropower and Thermal Power
22.12.06 No. 1774	Programme of Development of Diesel Biofuel Production for the period until 2010
2007	On Further Development of Wind Power in Ukraine

Source: Energy Strategy of Ukraine to 2030

The Draft Law On Efficient Use of Fuel and Energy Resources of 2 April 2009 mentioned in the previous section envisages also the creation of incentives for the use of alternative energy sources[294].

The goal of increasing the share of alternative energy sources in fuel and energy balance to 19 per cent until 2030 is stated in the Energy Strategy of Ukraine to 2030; however, similarly to the energy efficiency target, it is not clear how it should be achieved[22].

International commitments and current status of implementation

EU Regulation

The Ukraine-EU Action Plan, which stresses EU commitments to support Ukraine, was approved in February 2005 for a three year period. Based on the Ukraine-EU Action Plan, a Technical Assistance and Information Exchange Instrument (TAIEX) programme has been set up, under which two workshops were conducted for Ukrainian state officials, i.e. “Financial Instruments Available for Encouraging Energy Efficiency and Renewable Energy in Ukraine” (9 July 2007) and “Political Issues and Practical Details of Improving Standards of Energy Efficiency in Ukrainian Buildings to the EU Current Standards” (17 July 2007). It is stipulated that in 2009 Ukraine and the EU shall develop a new joint instrument, in the form of Directives, Action Plans or Road Map, which will take into account issues regarding the deployment of renewable energy sources and the implementation of measures aimed at solving the global climate change problem[294].

Kyoto Protocol

Ukraine signed the United Nations Framework Convention on Climate Change in June 1992, the Parliament ratified it in October 1996, and Ukraine became a Annex I Party to it in August 1997. Furthermore, Ukraine ratified the Kyoto Protocol as an Annex B country in 2004 and is eligible for development of Joint Implementation projects. Due to the fact that Ukraine’s reduction target for greenhouse gas emissions is 0 per cent compared to 1990 levels, the country has considerable potential for benefiting from the Kyoto Protocol : the country can sell large amounts of unused assigned emission rights (with an annual revenue estimated at USD 740 million to USD 2.9 billion from 2008 to 2012)[294], since reduction of emissions can be achieved at a relatively low cost and sold as further emission rights abroad.

So far, the total number of registered Joint Implementation projects is 81 and the number of issued letters of support is 74[22]. The World Bank participates in financing some Joint Implementation projects by buying about one million Emission Reduction Units for the Netherlands European Carbon Facility. The World Bank supports setting up a so-called Green Investment Scheme in Ukraine in addition to the JI mechanism and is ready to purchase Ukrainian Assigned Amount Units. The World Bank (possibly with other international carbon funds) intends to promote GHG emission reduction projects in Ukraine after 2012[22].

According to the Ministry of Environmental Protection, which is responsible for the sale of emission reduction units, there are currently up to 200 Joint Implementation Projects in the pipeline. Some projects have already been implemented, while the credits have been received from Japan. The National Agency for Environmental Investment is responsible for the issuing of Joint Implementation credits and letters. Memoranda of Understanding exist already with France, Spain, Norway, and Switzerland[303].

Other international commitments

Ukraine became a member of the Energy Charter in 1991 and signed the Energy Charter Treaty and its related Energy Charter Protocol on Energy Efficiency and Related Environmental Aspects in 1994. Both were ratified in 1998, requiring Ukraine to formulate energy efficiency strategies and policy aims, to establish appropriate regulatory frameworks, and to develop specific programmes for the promotion of efficient energy usage and the reduction of harmful environmental practices in the energy sector.

11.12.6. Economic incentives and financing schemes for energy efficiency and renewable energy projects

General investment climate in the country

Ukraine benefits from the presence of the Ukrainian Center for Foreign Investment Promotion (InvestUkraine), which was founded with the support of the Government of Ukraine in August 2005. InvestUkraine is an independent non-profit invest agency, which acts as a liaison between the government and prospective and active investors. The mission of InvestUkraine is to help the Ukrainian economy to become more productive and globally competitive by increasing the inflow of strategic foreign direct investments. In order to achieve this goal the agency provides professional services such as help with identifying and locating project sites, vendors, and services providers, and initiates the contact with potential investment partners and maintains an investment project database[304].

According to the Heritage Foundation[305], the Ukrainian laws provide equal treatment for foreign investors, but certain sectors are restricted or barred. Complex and burdensome regulations and corruption are the primary deterrents to investment. Additionally, contracts are not always upheld by the legal system. Resident and non-resident foreign exchange accounts are subject to restrictions and government approval in some cases. Payments and transfers are subject to various requirements and quantitative limits, while some capital transactions are subject to controls and licenses.

Ukraine is not perceived as having significantly improved its anti-corruption stance and was therefore awarded with a score of 2.5 by Transparency International Corruption Perceptions Index for 2008, placing it ninth from bottom among the project region countries[53].

Furthermore, according to the Economist Intelligence Unit the governmental leadership that took over in early 2005 oversaw the first transparent privatization and eliminated almost all sectoral tax burdens and started to bring the large shadow economy into the open[306]. Reducing the shadow economy in Ukraine, which is stipulated to be 40 per cent, will improve the overall investment climate, since the degree of shadow economy reflects the degree of disadvantage the economic and political conditions impose on private business initiatives.

Incentives for energy efficiency

According to the Law No. 760-V of Ukraine On Amendments to Some Ukrainian Laws on Encouraging Energy Efficiency Measures of 16 March 2007, energy efficiency equipment and materials are exempted from taxes if they are not available for purchase in Ukraine. Furthermore, the income of companies included in the state registry of enterprises, institutions, and organizations involved in the development, implementation and use of energy saving measures, and energy efficiency projects is only taxed at a maximum level of 50 per cent [294].

In March 2008, the Cabinet of Ministers adopted the Resolution on the Procedure of using the money allocated in the 2008 State Budget for the state support of the energy saving measures. This money is used for the offset of the interest rate for the loans attracted by entities for financing energy saving measures, including energy efficiency projects[22]. In 2008, the State Budget of Ukraine allocated UAH 13 million for energy saving measures, while in 2009 UAH 20 million were allocated[294].

Incentives for renewable energy sources

According to the Law On Amendments to Some Ukrainian Laws on Encouraging Energy Efficiency Measures of 16 March 2007, Ukraine is promoting the national market for renewable energy equipment through tax breaks on equipment that uses alternative and renewable energy sources and on equipment for the production of alternative fuel[22].

Furthermore the Law No. 601 On Amendments to Some Ukrainian Laws on Green Tariff Establishment of 25 September 2008 modified the Land Code by offering preferential purchase prices for publicly and communally owned land plots for the construction of power plants generating renewable energy[294].

A feed-in tariff has been established in Ukraine in 2008 for electricity from renewable energy sources and the wholesale market operator has the obligation to purchase this power based on the Law No. 601 On Amendments to Some Ukrainian Laws on Green Tariff Establishment of 25 September 2008.

The current feed-in tariffs have been published on 1 April 2009. These new tariffs will be covering only newly commissioned renewable energy sources, that is those put into operation after January 2009. The feed-in tariffs depend on the voltage level of the production unit and are based on retail prices multiplied by a premium coefficient, which will be gradually reduced with increasing age of the production plant in order to take asset depreciation into account. The feed-in tariff is defined in EUR and every year the exchange rate is adjusted, while the premium coefficient remains constant. Some changes in the tariffs may derive from technology advancement. Business entities generating electricity with the use of alternative energy sources will enjoy the feed-in tariffs until 1 January 2030[293].

The feed-in tariff coefficients are listed in Table 11.38. The coefficients apply to the actual wholesale price, which currently stands at 56 EUR/MWh (440 UAH/MWh)[295].

Table 11.38: Feed-in tariff coefficients in Ukraine

Renewable energy source	Installed capacity	Coefficient
Wind	<600 kW	1.2
Wind	600-2,000 kW	1.4
Wind	>2,000 kW	2.1
Biomass	-	2.3
Photovoltaic	-	4.8
Photovoltaic (mounted on roofs houses and buildings)	>100 kW	4.6
Photovoltaic (mounted on houses and buildings and installed on facades)	<100 kW on roofs and unlimited on facades	4.4
Small hydro	-	0.8

Source: Agency for Rational Energy Use and Ecology (ARENA-ECO)[293] (2009)

Financing mechanisms for energy efficiency and renewable energy projects

National financing mechanisms

Governmental sources of financing include the State (national) Budget and local budgets at all levels. In 2005-2006 the Government spent about UAH 800 million (approximately USD 160 million), including local budgets, to implement measures envisaged by the Comprehensive State Programme of Energy Saving of Ukraine and the Programme of State Support of Development of Alternative and Renewable Energy Sources and Small Hydropower and Thermal Power. In early 2008, the State Energy Conservation Fund was established as a budgetary fund for financing energy efficiency improvements. The main aim of this fund is to provide financing for energy saving projects via the facilitation of interest loan payments, mainly in the state sector. The money for the fund derives from penalties collected from companies that are not using energy efficiently[293].

International financing mechanisms

The following international financing mechanisms are available in Ukraine:

- The World Bank cooperates with Ukraine in the framework of several mechanisms, including Carbon Partnership Facility (with capitalization of USD five billion) with its two structural units: Carbon Assets Development Fund and Carbon Fund, as well as Climate Investment Funds (Strategic Climate Fund and Clean Technology Fund). Additionally the World Bank is currently setting up a credit line with sub-lending by financial intermediaries. Project criteria (as well as other thresholds) and project pipeline are in the process of elaboration. The project targets of the credit line are medium-large industrial and municipal energy efficiency projects. The financial mechanism that is currently considered is a credit line supported by two additional concessional instruments: 1) Partial Credit Guarantee from the Clean Technology Fund for municipal borrowers; 2) Green Investment Scheme - compensation for GHG emissions from AAU sales proceeds by the Government of Ukraine[307];
- The European Bank for Reconstruction and Development supports energy efficiency investments in Ukraine. It intends to implement the Ukraine Energy Efficiency Programme-2 (UKEEP-2) following the success of the already existing EUR 100 million UKEEP programme for energy efficiency and renewable energy projects in Ukraine (up to USD five million). Within Ukraine the EBRD works with four to five local banks. The applied interest rate of the EBRD is currently five per cent, which is the LIBOR rate plus three per cent[308]. EBRD is implementing the Sustainable Energy Initiative, which covers the areas of energy efficiency, renewable energy sources, and carbon financing. The total amount of EBRD investments in Ukraine is around USD one billion, of which up to 20-30 per cent are allocated for energy efficiency projects;
- The United States Agency for International Development approved financing (USD one million) for implementation of energy efficiency projects in the Ukrainian industrial sector. However, according to the Bank Forum Commerzbank Group, this financing has not been fruitful, since the requirements of USAID towards the applicants were too restrictive[308].

Commercial financing mechanisms

Ukrainian commercial banks have so far not established any special energy efficiency or renewable energy sources credit lines, but act more as intermediaries for international financing institutions such as the European Bank for Reconstruction and Development[308].

Other support mechanisms

Besides providing loans to Ukrainian companies, many international financing institutions, such as the EBRD, provide technical assistance in Ukraine.

11.12.7. Barriers to the implementation of energy efficiency and renewable energy projects

Box 12: Summary of barriers to the implementation of energy efficiency and renewable energy projects in Ukraine

Legal, institutional and administrative barriers

1. The legal framework for the energy sector in general and more in particular referring to energy efficiency and renewable energy sources is complex and partly fragmented, partly outdated.
2. The Ukrainian Energy Strategy until 2030 focuses on the need to reduce dependency on fuel imports; however, the proposed investments do not envisage significant increase of domestic energy consumption and enhanced deployment of renewable energy sources.
3. Ukrainian district heating systems face a situation of strong deterioration.

Economic and financial barriers

4. No funds have been assigned for the development of renewable energy sources.
5. Inefficient market structures and incomplete market opening, with regulated prices on the wholesale market and below-market tariffs for end customers, put at risk the profitability of projects.
6. Municipal administrations apply political tariffs to the supply of heat, thus generating debt and loss of profitability.
7. Access to credit resources is very difficult since banks are reluctant to provide loans for investments with a payback period of over one year.

Lack of awareness, human capacities and professional skills

8. The current deterioration of the district heating systems points out the lack of awareness and of human capacities for identification of bankable projects.
9. Awareness and understanding of the benefits of energy efficiency projects seem to be not very widespread, as shown by the limited demand for ESCO services.
10. The awareness level regarding business opportunities in the financing of energy efficiency and renewable energy projects is currently limited on the part of commercial banks.

Legal, institutional and administrative barriers

Institutional barriers for investments in energy efficiency and renewable energy projects in Ukraine arise not only from the energy sector itself, but also more generally from the economic environment in the country: the Ukrainian economy is very vulnerable to external shocks, due to its high dependency on imports from neighbouring countries (notably the Russian Federation) and its exporting business; this leads to a high exposure to fluctuations in international markets for commodities, as is currently seen by the hard impact of the financial crisis and the drop in steel prices. This situation is worsened by the extent of the so-called “shadow economy”, which is estimated to reach up to 40 per cent of the GDP. Both these considerations point out the urgent necessity of further policy reforms to ensure stabilization and sustainability of the national economy in order to create a durably attractive environment for private investments.

Specifically relating to the energy sector, the following barriers in the legal, institutional and administrative areas can be highlighted:

- The legal framework for the energy sector in general and more in particular referring to energy efficiency and renewable energy sources is complex and partly fragmented, partly outdated:
  - There is currently no dedicated legal framework for the development of renewable energy sources, apart from a collection of single regulatory acts and provisions;
  - The current Law on Energy Savings of 1994 as well as the Energy Efficiency Programme of 1997 are outdated; the new Energy Efficiency Programme of 2008 respectively the new draft law is still under development; furthermore, although the new Energy Efficiency Programme of 2008 foresees the introduction of financial incentives

and market mechanisms to support energy efficiency measures (to be further specified presumably in the draft law), it still lacks a funding concept that would ensure implementation of these measures;

- The Ukrainian Energy Strategy until 2030 correctly focuses on the need to reduce dependency on fuel imports; however, the proposed investments mainly focus on the further development of traditional fuels (coal, nuclear power) rather than on a significant increase of domestic energy consumption and enhanced deployment of renewable energy sources. The same strategy contains also targets to be reached for energy efficiency and renewable energy sources; however, these targets are rather ambitious (50 per cent reduction of energy intensity and share of 19 per cent of renewable energy sources among primary energy supply) and, in absence of an implementation plan, it is not clear how these targets are going to be reached;
- Apart from the responsible entity for implementation of the Kyoto Protocol within the Ministry of Environmental Protection, there is no dedicated agency or institution for the development of renewable energy sources: this task is assigned to the National Agency for Efficient Use of Energy Sources, which however, has her institutional priorities in the promotion of energy efficiency;
- The municipal administrations, which are responsible for the management and the pricing of district heating, apply political tariffs to the supply of heat, thus generating debt and loss of profitability. This adverse economic situation, which should be addressed by a reform programme of municipal administrations including privatization of district heating supply, leads to the current situation of strong deterioration of the Ukrainian district heating systems (with the exception of the municipality of Kyiv, where the district heating has been rehabilitated recently).

Economic and financial barriers

Several economic and financial barriers for energy efficiency and renewable energy investments could be identified in Ukraine; while most of them are common also to other countries in the project regions, a few are specific to the Ukrainian situation:

- The resolution of the Cabinet of Ministers of March 2008 allocated funds from the State Budget 2008 for the support of energy saving measures; however, it is not clear if this allocation of funds was an *una tantum* measure or whether there is going to be a yearly allocation of funds for this purposes. Furthermore, it is regrettable that no funds have been assigned for the development of renewable energy sources;
- There is a strong lack of transparency regarding financing volume and allocation criteria for the State Fund for Energy Conservation.

Other economic barriers, which are common to other countries, are:

- Inefficient market structures and incomplete market opening, with regulated prices on the wholesale market and below-market tariffs for end customers. The unfavorable price situation puts at risk the profitability of projects, as demonstrated by the experience of the operating ESCO, which would not be competitive without the financial backup of international assistance programmes, and by the experience of the USAID initiative, which failed in the attempt to establish more strict criteria for the financing of projects than the existing initiatives by the World Bank and the European Bank for Reconstruction and Development;
- A feed-in tariff for renewable energy sources is in place since 2008; however, the coefficients for calculation of prices have been published only in spring 2009 and therefore it will still take some time before this new incentive mechanism is fully effective;
- Access to credit resources due to banks' reluctance to provide loans for investments with a payback period of over one year and without adequate collaterals is very difficult; in general, no information regarding commercial financing for energy efficiency and renewable energy sources, except for several Carbon Funds, which are active in the dynamic market of Joint Implementation projects is available.

Lack of awareness, human capacities and professional skills

The current deterioration of the district heating systems points out not only the lack of financial resources of the Ukrainian municipal administrations but also the lack of awareness and of human capacities for identification of bankable projects: while technical capabilities and professional skills might be available, no expertise is so far available in the sector of project financing and profitability evaluation of projects.

Also in the private business sector, awareness and understanding of the benefits of energy efficiency projects seem to be not very widespread, as is shown by the limited demand for ESCO services. Incentives to increase the demand for ESCO services and a network of auditors for implementation of the measures indicated by energy audits would very likely drive the development of the market for energy efficiency measures more efficiently than the current penalty system.

Finally, the national commercial banking sector should gain an increased awareness on business opportunities in the financing of energy efficiency and the renewable energy projects, which at the moment is assumed to be very limited, since most activities have been so far financed by state funds or by international assistance programmes.

Chapter 12: Regional Summary from the Analysis of the Policy Framework

The identification of country-specific barriers to investments in energy efficiency and renewable energy projects which has been conducted in the previous chapters is an important step to develop recommendations for policy reforms which are based on the consideration of the country-specific political and economic environment. This is an essential success factor for the development and the implementation of policy reforms.

At the same time, a number of main barriers to successful financing of energy efficiency and renewable energy investments are common to the entire project region, even if at different levels, and need to be addressed in all participating countries. The present section provides a summarized overview of those barriers which appear to be common to the entire project region.

12.1. *Legal, institutional and administrative barriers*

Barriers at the institutional and administrative barriers can be manifold and very complex to be addressed because of the different administration and policy-making levels involved. The most frequently encountered barriers of this kind in the project region are:

- Complexity of the regulatory framework, which is often distributed over a range of laws, decrees, programmes and ordinances without a clear, coordinated structure, create a lack of transparency and hinder foreign investors from gathering the necessary information on regulatory framework conditions;
- In addition to the complexity of regulations comes regulatory instability, which may be caused either by a political instability in the country (such as frequent elections, changes of government and subsequent change of executive staff in the ministries) or by an excessive legislative fervor by policy makers, which may update and revise the current regulations very frequently. Both factors may lead to regulatory risks and to arbitrariness in administrative procedures that may prevent investors from becoming active in the project countries;
- Lack of secondary legislation and operational instructions, tools and procedures necessary to implement primary legislation or strategic programmes: labeling and construction standards, specifications for energy audits, penalties or sanctions for the non-observance of obligation to perform energy audits, and implement subsequent measures;
- Non-transparent regulations, language barriers, inefficient bureaucracy, and corruption limit the possibilities for foreign investors to enter and operate in the project countries;
- Complex and cumbersome authorization procedures for new projects, both for energy efficiency and renewable energy projects, involving frequently the duplication of documents and information and the involvement of many different administrative entities at the local, regional, and national level;
- Absence of dedicated procurement rules to support acquisition of energy-efficient equipment and the demand for energy services in the public administration;
- Absence or limited use of public tendering processes for projects; furthermore, the tendering processes are often characterized by lack of transparency and the certainty of project implementation after the tender;
- Lack of cooperation between different ministries and agencies involved in energy policy as well as between ministries and local administrations due to the lack of instructions and procedures on exchange of information and to the absence of dedicated agencies at the local level;
- Property issues in multi-resident building blocks, which may significantly limit the efficacy of energy efficiency investments.

12.2. *Economic and financial barriers*

Many economic barriers that hinder the financing and the realization of attractive projects come from inefficiencies in the structure of the energy markets:

- Excessive state intervention on price formation, artificially low tariffs for final customers, and cross-subsidies between customer segments hinder the establishment of a competitive market environment;
- Low energy tariffs limit the profitability of energy efficiency projects and do not offer any incentive for a change of behaviour on behalf of the customers. At the same time, while considering reforms of tariff and pricing policies, their impact on social weak categories must be considered, in order to avoid the spreading of fuel poverty. Furthermore, tariff policies must be considered in an integrated context, i.e. by considering the impact of tariff changes on the utilization of substitution fuels, in order to avoid triggering fuel competition, which may lead to enhanced energy inefficiency (e.g. when electricity is used to residential heating in presence of a district heating infrastructure);
- The presence of a state monopoly or the market domination by state-owned companies (which constitutes a de-facto monopoly even when the market is formally open) is hindering the entrance of independent operators, which have a direct interest in infrastructural improvement and may be able to implement best-practices and advanced technologies, into the energy markets;
- Environmental and economic efficacy of energy efficiency and renewable energy projects is hindered by obsolete and insufficient infrastructure for transport and distribution of energy (such as grid losses, lack of adequate grid connection, lack of metering), even if the business case for the project itself may be positive;
- At the same time, local utilities and distribution companies, who are facing serious profitability problems in face of insufficient payment rates and/or unprofitable regulated customer tariffs do not have adequate financial means for infrastructure improvement and are therefore reluctant to support or push forward even promising energy projects. Public ownership of the energy companies creates a conflict of interest between economic profitability of the company and the pursuing of political interests through favorable pricing policies and hinders the establishment of optimized and advanced asset management practices;
- A major barrier to the development of energy efficiency and renewable energy projects is the unavailability of public funds for financing of initiatives and programmes: premium tariffs for renewable energy sources are developed but often not operational and frequently they are of limited extent (e.g. they apply only to certain technologies or have restrictive requirements). Energy efficiency funds, if they are operational, have limited resources; no alternative incentive measures such as softened dedicated credit lines, tax exemptions or support schemes for third-party financing are in place;
- Local banks may, under certain circumstances, be inclined to finance energy efficiency and renewable energy projects; however, the interest rates applied to mid- or long-term loans and the severe requests for collaterals are a significant barrier for newly established, independent project developers.

12.3. *Lack of awareness, human capacities and professional skills*

The last cluster of barriers to investments concerns the lack of awareness, of human capacities, and of professional skills to identify, develop, finance, and realize energy efficiency and renewable energy projects. These barriers involve all stakeholders of the projects and require an extensive work of awareness-raising and capacity-building which may take several years before showing tangible benefits:

- Lack of political commitment to implement the necessary policy reforms: long-term programmes and energy strategies frequently are more declaratory than operational;
- Local public administrations lack of human resources and professional expertise for implementation of identified projects;
- Commercial banks lack experience in financing schemes as well as awareness of possible economic benefits arising from energy efficiency and renewable energy projects; this lack of experience is also related to the lack of standards within the banks, imposing an environmental and energy screening on all projects prior to financing;
- Lack of training and education possibilities for the formation of professionals with adequate skills for the preparation of energy audits, the identification of attractive project opportunities and the preparation of bankable project proposals;
- Lack of awareness on the side of consumers, which are used to consider energy more like a public service than like a valuable good and are very reluctant to change their consumption behaviour unless this implies a tangible improvement of their living standard;
- Limited demand for ESCO services, showing a lack of awareness on the side of many customers (especially small and medium enterprises) on the potential economic benefits and increase in productivity that may result from energy efficiency investments.

PART IV: CASE STUDIES ON OVERCOMING BARRIERS TO ENHANCED ENERGY EFFICIENCY AND USE OF RENEWABLE ENERGY THROUGH POLICY REFORMS

Chapter 13: Introductory Considerations

The Case Studies are to inform policymakers at different levels of the direct social, environmental and financial benefits that would be forthcoming from a specific energy efficiency investment project or series of projects if particular policy reforms are made. These may be economic, financial, energy pricing and tariff structure, institutional or comparatively simple administrative reforms. But they are often necessary changes that can transform economically attractive and pre-feasibility study business plans into bankable projects that could be considered for financing by the investment fund or its third party financing entities.

Each of the 12 Case Studies is described according the following structure:

- General description of the proposed policy reform;
- Approach of the Case Study;
- Specific impact of the implementation of the Case Study;
- Costs for the implementation of the Case Study;
- Regulatory preconditions for the successful implementation;
- Critical success factors;
- Risks to the successful implementation and continuation of the Case Study;
- Recommendations for the implementation of the Case Study in other countries.

According to the methodology for identification and replication of the Case Studies (Chapter 8) and to the methodology for the development of recommendations (Chapter 9), the results of the analysis of the case studies will lead to the development of conclusions and recommendations for replication in the project countries. These conclusions and recommendations will hence allow the subsequent development of recommendations for policy reforms, which will be discussed in detail in PART V.

Chapter 14: Overview of Barriers to Investments Addressed by the Case Studies

According to their specific purpose, each of the case studies addresses one barrier to investments in energy efficiency and/or renewable energy projects in the country in which it has been originated. In particular, as specified in Chapter 8, the Case Studies have been chosen in order to address the same barriers that have been identified in the project countries.

Table 14.1 visualizes the barriers addressed by the Case Studies and the main barriers to investments identified in the project countries.

Table 14.1: *Barriers to investments in energy efficiency and renewable energy projects addressed by the Case Studies*

Barrier Group	Barrier	Energy Efficiency Demonstration Zone (Bulgaria)	Tariff Reform Program (Russian Federation)	Environmental Impact Assessment of Projects (Turkey)	Incentives for Foreign Investments (Bosnia and Herzegovina)	Credit Line for Energy Efficiency (Bulgaria)	Network of Certified Auditors (Slovenia)	State Environmental Fund (Czech Republic)	Market Transformation on Solar Heating (Albania)	Establishment of an ESCO (Croatia)	Ukraine Energy Efficiency Programme (Ukraine)	Municipal Finance Facility (CEE countries)	Forest Resources and Technology Project (Russian Federation)
Legal, Institutional and Administrative Barriers	Complex authorization procedures, inefficient bureaucracy												
	Limitations to foreign investments												
	Budgetary restrictions for public administrations on the use of savings, restrictions related to administration structure, issues related to ownership												
	Lack of dedicated agencies or institutions for EE and/or RES												
	Complexity, fragmentation and intransparency of regulation												
	Regulatory framework in place but obsolete or not implemented or secundary legislation is missing, lack of penalties for non-compliance												
	National Energy Strategy generic on EE and RES projects, weak or absent targets, no implementation plan												
	Inefficiency or limited use of public tenders												
	Lack of energy data, standards or consumption information												
	Power and heat infrastructure is insufficient or inefficient and needs rehabilitation or extension												
Economic and Financial Barriers	Absent or insufficient public funding for projects and initiatives												
	Tariffs are not cost covering (subsidies and cross-subsidies exist) or too low to grant project profitability for projects developers and/or municipal utilities												
	State intervention in price formation and in private business activities (no liberalization or privatization)												
	No incentives for EE (tax incentives, dedicated credit lines)												
	Feed-in tariff not implemented or in need for revision or not attractive for investors												
	Small size of projects, high upfront costs, long payback periods, high interest rates on loand												
Lack of Awareness, human capacities and professional skills	Low level of awareness among population, public administration and policy makers												
	Market for EE services and ESCOs not existing or underdeveloped												
	Lack of professional skills for preparation of bankable projects												
	Lack of sustainability awareness, standards and instruments among commercial banks												

Chapter 15: Correlation between the Case Studies and the Countries in the Project Region and Overview of Recommendations for Replication

The correlation between each of the Case Studies and the countries of the project region is based on the commonness of identified barriers to investments in energy efficiency and renewable energy projects. If a certain barrier has been successfully overcome in the country originating the Case Study, then, under consideration of the specific situation of the target country of the project region, successful replication of the Case Study can be expected in this country, too.

Table 15.1 provides a recapitulatory overview of the barriers to investments in energy efficiency and renewable energy projects in the project countries (for more details on the identified barriers, please refer to Chapter 4 and more specifically to the last section of each country analysis).

The combination of Table 14.1 and Table 15.1 provides the correlation between the analysed Case Studies and the countries in the project region and therefore the background for the recommendations for replication which are provided for each Case Study. This correlation is visualized in Table 15.2.

Table 15.1: Overview of barriers to investments in energy efficiency and renewable energy projects identified in the project countries

Barrier Group	Barrier	Albania	Belarus	Bosnia and Herzegovina	Bulgaria	Croatia	Kazakhstan	Republic of Moldova	Romania	Russian Federation	Serbia	The former Yugoslav Republic of Macedonia	Ukraine
Legal, Institutional and Administrative Barriers	Complex authorization procedures, inefficient bureaucracy												
	Limitations to foreign investments												
	Budgetary restrictions for public administrations on the use of savings, restrictions related to administration structure, issues related to ownership												
	Lack of dedicated agencies or institutions for EE and/or RES												
	Complexity, fragmentation and intransparency of regulation												
	Regulatory framework in place but obsolete or not implemented or secundary legislation is missing, lack of penalties for non-compliance												
	National Energy Strategy generic on EE and RES projects, weak or absent targets, no implementation plan												
	Inefficiency or limited use of public tenders												
	Lack of energy data, standards or consumption information												
	Power and heat infrastructure is insufficient or inefficient and needs rehabilitation or extension												
Economic and Financial Barriers	Absent or insufficient public funding for projects and initiatives												
	Tariffs are not cost covering (subsidies and cross-subsidies exist) or too low to grant project profitability for projects developers and/or municipal utilities												
	State intervention in price formation and in private business activities (no liberalization or privatization)												
	No incentives for EE (tax incentives, dedicated credit lines)												
	Feed-in tariff not implemented or in need for revision or not attractive for investors												
	Small size of projects, high upfront costs, long payback periods, high interest rates on loand												
Lack of Awareness, human capacities and professional skills	Low level of awareness among population, public administration and policy makers												
	Market for EE services and ESCOs not existing or underdeveloped												
	Lack of professional skills for preparation of bankable projects												
	Lack of sustainability awareness, standards and instruments among commercial banks												

Table 15.2: Correlation between Case Studies and project countries and overview of recommendations for replication

Barrier Group	Barrier	Case Study	Albania	Belarus	Bosnia and Herzegovina	Bulgaria	Croatia	Kazakhstan	Republic of Moldova	Romania	Russian Federation	Serbia	The former Yugoslav Republic of Macedonia	Ukraine
Legal, Institutional and Administrative Barriers	Complex authorization procedures, inefficient bureaucracy													
	Limitations to foreign investments	**Incentives for foreign investments (Bosnia and Herzegovina)**												
	Budgetary restrictions for public administrations on the use of savings, restrictions related to administration structure, issues related to ownership													
	Lack of dedicated agencies or institutions for EE and/or RES													
	Complexity, fragmentation and intransparency of regulation													
	Regulatory framework in place but obsolete or not implemented or secundary legislation is missing, lack of penalties for non-compliance													
	National Energy Strategy generic on EE and RES projects, weak or absent targets, no implementation plan													
	Inefficiency or limited use of public tenders													
	Power and heat infrastructure is insufficient or inefficient and needs rehabilitation or extension	**Water Tariff Reform Program (Russian Federation)**												
Economic and Financial Barriers	Absent or insufficient public funding for projects and initiatives	**State Environmental Fund (Czech Republic)/ Municipal Finance Facility (CEE)**												
	Tariffs are not cost covering (subsidies and cross-subsidies exist) or too low to grant project profitability for projects developers and/or municipal utilities													
	State intervention in price formation and in private business activities (no liberalization or privatization)													
	No incentives for EE (tax incentives, dedicated credit lines)	**Credit Line for EE (Bulgaria)/ EE Programme (Ukraine)**												
	Feed-in tariff not implemented or in need for revision or not attractive for investors	**Market Transformation on Solar Heating (Albania)**												
Lack of Awareness, human capacities and professional skills	Low level of awareness among population, public administration and policy makers	**Energy Efficiency Demonstration Zone (Bulgaria)**												
	Market for EE services and ESCOs not existing or underdeveloped	**Establishment of an ESCO (Croatia)**												
	Lack of professional skills for preparation of bankable projects	**Network of certified auditors (Slovenia)/ Forest Management (Russian Federation)**												
	Lack of sustainability awareness, standards and instruments among commercial banks	**Environmental Impact Assessment of Projects (Turkey)**												

Chapter 16: Analyses of the Case Studies

16.1. *Energy Efficiency Demonstration Zone – Case Study of Bulgaria (recommendations for replication in Kazakhstan, Serbia, the former Yugoslav Republic of Macedonia and Ukraine)*

Box 13: Energy Efficiency Demonstration Zone

The presented Case Study relates to the barriers lack of awareness, human capacities and professional skills with regard to energy efficiency and renewable energy projects. Furthermore, overcoming of low level of awareness among population, public administration and policymakers were targeted by the Case Study. In particular, the absence of knowledge regarding financing mechanism and funding for energy efficiency projects and the absence of experts and trained personnel in the field of energy efficiency are discussed in the Case Study. The Case Study contributes in removing financial barriers (poor investments) and lack of competencies and know-how from municipalities and enables municipalities to efficiently (in terms of time and budget) undertake and realize energy efficiency projects.

The Case Study describes capacity building with regard to energy efficiency related topics on local, institutional, and municipal level. This is achieved by setting up training courses for municipal personnel on the topic of energy efficiency measures, energy audits, energy efficiency project management, and energy efficiency project financing in Bulgaria. Furthermore, the Case Study uses demonstration projects in the Municipality of Gabrovo in Northern Bulgaria to raise awareness regarding energy efficiency.

The Case Study is recommended for replication in Kazakhstan, the former Yugoslav Republic of Macedonia, Serbia, and Ukraine, since these countries are facing similar barriers as Bulgaria, before the implementation of the Case Study: In general the lack of dedicated agencies or institutions for energy efficiency and renewable energy is complemented by economic and financial barriers such as absent or insuffient public funding for projects and initiatives.

Furthermore, the lack of awareness, human capacities and professional skills in particular the low level of awareness among the population, public administration and policymakers, the lack of professional skills for preparation of projects and the lack of sustainability awareness, standards and instruments among commercial banks are major barriers in most of those countries.

16.1.1. Background to the Case Study

General situation in Bulgaria

The implementation of the Case Study started immediately after a serious political and financial situation in Bulgaria. Resulting was a radical restructuring of the political power in Bulgaria including the introduction of a Currency Board, which achieved financial stabilization through implementation of new rules and restrictions. Within this political and financial framework, the introduction of policies or measures aimed at energy efficiency improvements was extremely difficult or not possible at all. Municipalities experienced shortage of adequate experience, knowhow, and skills, as well as regulatory or financial restrictions with respect to investments. Mechanisms for an exchange of information were absent. Energy efficiency structures and a specific regulatory framework or dedicated laws regarding energy efficiency were missing.

Barriers in Bulgaria

In general, Bulgaria suffered from lack of awareness, human capacities and professional skills, related to a low level of awareness among population, public administration and policymakers. According to this the existing energy efficiency potentials in the municipalities could not be realized before the implementation of the Case Study, because of the missing of trained experts in the field of energy efficiency. Furthermore, there were no methodological guidelines or guides in Bulgarian language on how to develop energy efficiency projects and programmes. Other significant barriers were the absence of knowledge and professional skills for preparation of bankable projects particularly with respect to financing mechanism and funding for such projects.

16.1.2. Description of the Case Study

In order to overcome the barriers mentioned above, the Case Study described here was implemented in Bulgaria between 1998 and 2004. The Case Study aimed at the introduction and the development of policies and practices related to energy efficiency and the implementation of according energy efficiency measures. It was set up at Bulgarian municipality level and was aimed at the municipalities' functions with respect to energy planning and management.

The Case Study contributed in removing financial barriers (poor investments) and lack of knowledge and know-how from municipalities in the sense that the overall capacity building programme did not only include technical aspects but also guides and training materials related to financing. The Case Study therefore highly contributed in enabling municipalities to efficiently (in terms of time and budget) undertake and realize energy efficiency projects. The Case Study increased the general awareness regarding energy efficiency measures and programmes by implementation of demonstration projects in public and administrative buildings as well as in the district heating and the street lighting systems.

16.1.3. Approach for implementation of the Case Study

Local human and institutional capacity building for energy efficiency improvement and reduction of greenhouse gas emissions in Bulgarian municipalities represent the core objective of the Case Study. To support this capacity building process practical demonstrations contribute to the achievement of maximum results.

Results are achieved through a variety of activities, such as specialised studies, dissemination of general and specific information about efficient use of energy resources, and training of local decision makers and experts on energy planning and management.

The Case Study has been executed by the Center for Energy Efficiency (EnEffect), which is a non-profit non-governmental organization founded in 1992 in Sofia with the aim to support the general efforts of the central and local authorities to contribute to Bulgaria's sustainable development by a more efficient use of energy[309].

EnEffect actively collaborated with the Ministry of Environment and Water, the United Nations Development Programme, the United States Agency for International Development, the Municipality of Gabrovo and other local and international institutions and experts.

The entire executing team of the project and a broad range of municipal experts and decision-makers were involved in and contributed to the implementation of this task. Several parallel donor programmes contributed further to the expansion of the subject and scope of the training programmes.

The Case Study has been implemented in Bulgaria. Capacity building for energy efficiency has been supported nation-wide, while the demonstration projects were located in the Municipality of Gabrovo in Northern Bulgaria. The Case study has been conducted between 1998 and 2004.

Beside the general environmental objectives at the national scale (e.g. decrease of greenhouse gas emissions), key objectives of the Case Study are:

- Municipal energy efficiency policy - Creation of a sustainable local policy for the reduction of greenhouse gas emissions through energy efficiency;
- Specialized training on energy efficiency - Local institutional and human capacity building;
- Overcoming of barriers to energy efficiency – Creation of awareness.

To overcome the specific barriers to energy efficiency measures in Bulgaria an intensive training programme has been defined and implemented consisting of training sessions for municipal energy decision makers and increasing their ability of implementing energy efficiency projects.

In the framework of five training courses of six to eight months duration on average, conducted in the period 1999 to 2003, 124 senior municipal officials and experts from 39 EcoEnergy member-municipalities have received specialised training on municipal energy planning and management.

On average representatives from seven to nine municipalities participated in each course. In some courses energy companies were invited to attend. The participants mastered knowledge and skills on how to develop municipal energy programmes, how to identify investment projects, conduct energy expertise and quick energy audits, develop business plans and procure financing for project implementation.

The financial barriers have been overcome by applying the following key measures:

- **Identification of the barriers:** a review of the existing regulatory documents and practices, which affect the business climate for energy efficiency in municipalities, was elaborated.
- **Dissemination of knowledge and information on project financing:** five seminars and working meetings of representatives of municipalities with banks and other financing institutions have been conducted. Fourteen business meetings have been organized with energy services companies. Ten specialised training courses on financing, seminars and workshops were also conducted. A number of events were organized and conducted with the support and the participation of other sponsors and partners in close cooperation with this project.
- **Guides and training material related to financing**: a guide with instructions on how to use local and international sources of financing for municipal energy efficiency programmes and projects has been developed. Special attention is paid to sources, for which energy efficiency improvement and reduction of greenhouse gas emissions rank as a top priority. Through the training courses and specialized seminars, this information is popularized among the EcoEnergy member-municipalities (see below). An investment guide, designated for municipal decision makers and experts, was published. It provides useful hints on how to use different financing schemes and mechanisms, suitable for projects for energy efficiency improvement and reduction of greenhouse gas emissions. Special focus is laid on the mechanisms Third-Party Financing (Performance Contracting), Joint Implementation, Emissions Trading, as well as schemes and mechanisms for micro-financing. An information pack for investors in the field of energy efficiency and the use of renewable energy has been published. It offers a review of the potential for investments in municipalities and the regulatory framework with respect to the investment process.

The Case Study has involved the following key players and partners:

- The Municipality of Gabrovo is the main project partner and the host of the project.
- The Representative Office of the United Nations Development Programme in Sofia functions as the executive agency authorized by the Executive Office of the Global Environment Facility. It performs governing and control on project implementation (i.e. quality control);
- The Center for Energy Efficiency (EnEffect) took the responsibility for the practical implementation of the project. The organizational part of the project implementation is based on the rules and procedures of the United Nations Development Programme for project implementation;
- Municipal Energy Efficiency Network EcoEnergy (EcoEnergy) an association founded in 1997 which is used as a principal tool for dissemination of the project results. In the beginning of 2004, the membership of EcoEnergy comprised 54 municipalities and six regional associations of municipalities. Altogether they represent 68 per cent of the population of Bulgaria;
- For the successful implementation of the project a Steering Committee has been set up, which acts as a project coordinator. The Steering Committee is composed of representatives of the main financing institutions, governmental bodies, local authorities, and international organizations.

Beneficiaries of the implementation of the Case Study are municipalities which are members of the EcoEnergy association by their enhanced institutional and human capacity and know how. Furthermore, the Municipality of Gabrovo, which acts as a host to the Case Study and accommodates the demonstration zone for the project benefits from improvement of its energy intensive infrastructure, such as public lighting system.

The Case Study has been implemented using the following steps:

Step one: Definition of certified teams of trainers

24 Bulgarian trainers on energy planning and management have been awarded in-ternational certificates, issued by the United Nations Development Programme. They were selected among a significant number of carefully nominated architects, engineers and economists from the EcoEnergy member-municipalities, higher educational establishments from Sofia and other cities in the country, and from EnEffect. These trainers underwent a prolonged training course, conducted by an international team of consultants from the United Nations Development Programme. This team was composed of experts from the company ENSI International (Norway and France) and the Netherlands Agency on Energy and Environment Novem (The Netherlands).

Step two: Trained municipal management officials and specialists

In the framework of five training courses of six- to eight-month duration on the average, conducted in the period 1999 to 2003 by the 24 awarded Bulgarian trainers, educated in implementation step one, 124 senior municipal officials and experts from 39 EcoEnergy member municipalities received specialized training on municipal energy planning and management[310].

Step three: Implementation of demonstrations in Gabrovo

The demonstrations were concentrated in typical buildings in Gabrovo, to permit their broad replication in other Bulgarian municipalities or other countries. Energy efficiency measures were implemented for the street lighting system, the district heating system, the hospital building, a residential building, an industrial building, and an administrative building.

The Case Study was implemented in the years 1998 to 2004. According to this six years were necessary to achieve tangible benefits within the municipalities throughout the country.

To shorten the timeframe for achieving tangible assets when replicating the Case Study in other countries, implementation step two should be considered for re-organization. Instead of six- to eight-month courses, the courses should be divided into several complementary units with an average length of two months each conducted in subsequent years.

There are several consequences to this measure:

- The participants are able to implement their acquired knowledge immediately after the first training session;
- Organizing shorter training courses takes less effort in terms of non-productive time of the participants and as a consequence more potential participants are attracted by the courses;
- By reducing the time period needed for the individual training courses to a time period of six months allows a triplication of the number of participants, even if these participants only receive basic training in their first course.

16.1.4. Impact of case study

The implementation of the Case Study had an impact at municipal level, experts from 39 EcoEnergy member municipalities received specialized training. Since the according municipalities are widespread and cover 60 per cent of Bulgaria, the indirect impact of the Case Study is on a national level.

Economical, financial, and environmental benefits of the implementation of the Case Study are significant energy consumption and energy cost savings as well as a significant reduction in the emission of greenhouse gases. The table below summarizes the key benefits from the Case Studies' demonstration projects in buildings in the city of Gabrovo. Altogether, a net annual cost saving of USD 99,000 and a annual saving of 1,445 t of CO_2 emissions per year were achieved (see Table 16.1)[311].

Table 16.1: Key benefits from the Case Studies' demonstration projects in the city of Gabrovo

Key results	Unit	Hospital	School	Residential Building	Industrial building	Administrative buildings of the municipality	Total
Net annual cost savings	USD	46,690	22,661	5,595	6,903	16,650	98,099
Annual heat savings	MWh/year	2'310	557	245	133	318	3'563
Annual electricity savings	MWh/year		38.6	21	15	10	85
Economic life-cycle of the project	Years	5	10	10	10	10	10
Payback period	Years	2.2	2.5	3.4	1.6	2.5	2.3
Investments total for energy efficiency	USD	103,060	56,003	18,960	11,099	41,357	230,479
Co-financing by the municipality / others	USD	4,000	12,705	590	4,900	29,236	51,431
Internal Rate of Return	%	35	43	24	61	39	
Annual savings from reduced CO2 emissions	t/year	717.8	388.9	177.7	62.6	96.4	1,445.4

Source: Center for Energy Efficiency EnEffect[311] (2004)

The social benefit of the Case Study implementation besides the technical, economic and other social improvements is its impressive educational effect in so far that it shapes a new type of behaviour with respect to energy use. This is particularly true when schools, kindergartens, and residential buildings are taken into account. These projects may be also used as a training tool for upgrading the skills of operating and maintenance personnel. Local human and institutional capacity building for energy efficiency improvements constitute the key social benefit of the Case Study.

Furthermore, the implementation of the project created employment for high-skilled experts and technical personnel from small- and medium-sized local companies. More than 1,300 man/months of employment for high-skilled personnel directly employed by the Project Executing Agency have been realized alone with the funding provided by the Executive Council of the Global Environment Facility/United Nations Development Programme.

The estimated timeframe to achieve tangible benefits from the implementation of the Case Study is four to five years after implementation of the process. Implementation of process steps one and two will take at least two to three years altogether. The technical implementation of energy efficiency measures is estimated as six to 12 months, depending on the building parameters such as size, age, etc. Only after technical installation of equipment etc. has been finalized, the yearly energy consumption can be compared to previous periods.

A possible way to shorten this timeframe when replicating the Case Study in other countries is splitting the training courses into several different topics, such as investments and procurement of financing, energy expertise and energy audits etc. Parallel training sessions would be carried out and representatives of different municipalities who are trained in different topics would then develop energy efficiency measures in close collaboration immediately after they receive their specialized training.

16.1.5. Cost for implementation

The overall implementation of the Case Study required around USD 6.9 million. These costs are divided into Primary Input (Project Budget contributed by the Executive Council of the Global Environment Facility through the United Nations Development Programme), Co-financing (Bulgarian party cash and in-kind and bilateral donors, such as the United States Agency for International Development), and Parallel Financing (collaboration with other projects of the United States Agency for International Development and several institutions, such as the World Bank). The costs as well as the cost bearers and their respective contributions are summarized in Table 16.2.

Table 16.2: Costs and cost bearers of the Case Studies' demonstration projects in the city of Gabrovo

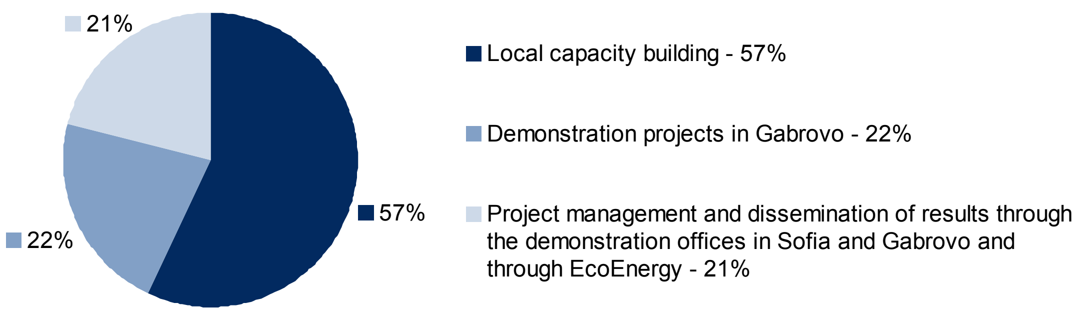
Title of the institution		Proposed financing	Actual financing
		USD	USD
A. Primary Input			
Project Budget	GEF through UNDP	2,575,000	2,575,000
B. Cofinancing			
Bulgarian party (cash)	Incl. NEPF[1)], Gabrovo Municipality, Committee of Energy, Elektroazpredelienie Gabrovo Branch, Toplofikatsiya Gabrovo SPSCo, private sector entities	2,256,000	847,000
Bulgarian party (in-kind)	Incl. Gaborovo Municipality, EcoEnergy member -municipalities, the Government and governmental institutions	1,705,000	1,710,000
Bilaterall donor	USAID – for the hospital in Gabrovo	900,000	900,000
C. Parallel Financing			
Bilateral donors[2)]	USAID – other projects, UNECE, Japan, the Netherlands, Norway, miscellaneous donors[3)]		861,000
Financing, total (A+B+C)		7,436,000	6,893,000

Source: Center for Energy Efficiency EnEffect[311] (2004)

1) National Environmental Protection Fund
2) The table does not comprise the amounts spent directly by the leading foreign contractors
3) The Regional Environmental Centre (REC), the World Resources Institute (WRI), the Organisation for Economic Co-operation and Development (OECD), the World Bank (WB), the European Commission (EC).

Figure 16.1 gives a major breakdown of costs into 57 per cent of the costs for local capacity building, 22 per cent of the costs for implementation of the demonstration projects in Gabrovo and 21 per cent of the costs for the project management and dissemination of results through the demonstration offices in Sofia and Gabrovo and trough the Municipal Energy Efficiency Network EcoEnergy (EcoEnergy).

Figure 16.1: Breakdown of costs of the demonstration projects in Gabrovo



Source: Center for Energy Efficiency EnEffect[311] (2004)

Scale-up effects for implementation in other Bulgarian municipalities mainly affect the project management and dissemination of results. Project management knowledge can be provided by consultants and personal involved in Gabrovo. The dissemination of results should take place via the Municipal Energy Efficiency Network EcoEnergy, which can be progressively expanded.

Scale-up effects for implementation in other countries mainly depend on the capacity already developed in the host country as well as on the demonstration projects chosen (e.g. street lighting, energy efficiency measures for hospital buildings). It is estimated that the project costs can be reduced by approximately ten to 15 per cent if close collaboration with Bulgarian project managers and technicians for an exchange of knowledge gained in Gabrovo and the establishment of partnerships is possible.

16.1.6. Regulatory preconditions

Globally, local policies are of exclusive importance for the development of any municipality and in this sense for the implementation of energy efficiency policy. For the successful implementation of the Case Study the following policies/regulation are advantageous:

- Established municipal energy efficiency policies;
- Clear defined objectives for reduction of greenhouse gas emissions at municipality level.

These key success factors were not clearly present at Bulgarian municipalities. The implementation of the overall project has been accordingly indirectly affected (i.e. longer).

Prior to the implementation of the Case Study a tool for dissemination of the project results should be set up on a national level (at least supraregional). In Bulgaria, this happened in 1997, when the Municipal Energy Efficiency Network EcoEnergy was founded. The following objectives should be binding for such an organization[312]:

- Establishment of municipal policy for efficient use of energy resources as a major component of the sustainable development policy;
- Diminishing of the burden of fuel and energy costs on municipal budgets;
- Diminishing of fuel and energy costs of energy end-users in municipalities.

The membership in an organization such as EcoEnergy should be mandatory for all municipalities within the according host country since it enables them to establish a common approach towards energy efficiency. If necessary such a membership should be fixed by an according energy efficiency regulation or law as a pre-requisite for implementation of the Case Study.

16.1.7. Critical success factors

The following key success factors contribute to the successful implementation of the Case Study:

- Choice of well experienced team of trainers is of high relevance, since they forward and transfer the knowledge to the municipalities;
- Awareness of decision makers regarding the potential of energy efficiency projects (possibly gained by membership in an organization like the Municipal Energy Efficiency Network EcoEnergy;
- Ensuring the support of the management bodies of concerned municipalities by consulting them rather than imposing distinct measures without their consent;
- Pioneered new approaches to energy efficiency in municipalities (priority on their agenda);
- Do not hesitate to involve utilities in workshops/seminars. Close collaboration with energy utilities, energy agencies etc. helps to transfer theoretical knowledge into practice.

The following points are relevant for an efficient replication of the Case Study:

- Existence of a high energy efficiency potential by municipalities (e.g. inefficient street lighting and institutional or public buildings heating systems);
- The use of alternative sources of financing should be possible (e.g. World Bank, United Nations Development Programme);
- Strike a balance among the interests of all stakeholders;
- Project design and monitoring are important. Municipalities are directly responsible for these tasks;
- Local capacity building should be a permanent priority for decision makers within municipalities.

16.1.8. Risks

The following possible factors may represent a risk to the successful implementation of the Case Study:

- The time period needed by the training sessions (six to eight months) might be too long for representatives of municipalities to attend, since the according daily tasks have to be covered within the municipality;
- Political changes happening during the time period needed to conduct the training sessions leading to a decrease within the political stability;
- Capacity building is only limited to certain geographic areas or regions of the host country due to missing communication platforms;
- The transfer of theoretical knowledge into practical demonstration projects might be difficult to realize within the municipalities given the complex nature of the energy efficiency measures taken into account;
- As only some municipalities are chosen for the initial demonstration projects, increased competition might lead to cannibalizing of projects or project financing between municipalities;
- Inviting people to the training courses in implementation step two, who are able to transfer knowledge within their own municipality afterwards due to several reasons, such as general atmosphere of opposition to change, time constraints due to heavy workload;
- Missing correct monitoring of the energy consumption within municipal, institutional or public buildings and therefore choice of inappropriate demonstration projects for implementation of the Case Study.

The following possible risks should be considered as a consequence of the implementation of the Case Study in the originating country as well as in the countries, in which the Case Study may be replicated:

- Unequal distribution of funds or finances in terms of geography or within the host country due to e.g. political situation or ethnology;
- Higher demand of highly skilled and trained personal for the maintenance of the energy efficiency implementations installed in the project;
- Higher demand of employees in the according municipalities due to key personal attending the training courses;
- Installation of highly complex or unnecessary equipment aiming at energy efficiency due to only partial understanding of transferred theoretical knowledge gained in training courses.

16.1.9. Conclusions and recommendations for replication

<u>Introduction</u>

In general the Case Study presents an approach to overcome the lack of awareness with regard to energy efficiency measures in public or institutional facilities, which are mostly related to barriers caused by the lack of knowledge and capacity regarding the practical implementation of energy efficiency measures and financing of such projects. By applying the discussed method of train-the-trainers and afterwards conducting several training sessions for a widespread transfer of knowledge the following two issues are approached in an efficient and pragmatic way: 1) Theoretical knowledge is build within the municipalities in scope and 2) knowledge about the financing of projects is transferred to the municipalities. By implementation of energy efficiency measures in demonstration projects the theoretical knowledge from the training sessions is transferred into distinct technical knowledge regarding energy efficiency projects.

Recommendations for implementation:

- Since capacity building involves human beings, the trainers for the training session conducted throughout the host country have to be carefully chosen. They should possess a natural feeling for respect and diplomacy in transferring knowledge as well as giving examples for implementation. By carefully selected trainers a pragmatic approach towards energy efficiency measures should be created;
- Since the implementation of the Case Study takes relatively large amounts of resources in terms of finance and time, the political stability in the host country is crucial for an efficient setup of the Case Study and should be considered previously of the implementation.

The Case Study is recommended for replication in those countries which suffers from barriers similar to those in Bulgaria before the implementation of the Case Study such as Kazakhstan, the former Yugoslav Republic of Macedonia, Serbia and Ukraine.

To implement the recommended Case Study in the recommended countries, a time period of four to six years is estimated. Costs of the implementation of the Case Study are estimated to be USD 1.5 million for overall capacity building (train-the-trainers) in Case Study Phase 2, four million USD for local capacity building within the municipalities in Case Study Phase three (conduct of training courses), and USD 1.4 million for project management and coordination during the setup of the trainings as well as for the implementation of the demonstration projects (Case Study phases one to three).

Recommendations for replication in Kazakhstan

General Situation in Kazakhstan

In Kazakhstan, there is no ESCO in operation beside the Almaty City Energy Service Company, which was established within the United Nations Development Programme/Global Environment Facility project Removing barriers to energy efficiency in the municipal heat and hot water supply. The municipal administration in Astana is considering the establishment of a second Energy Service Company in Astana, analogous to Almaty, jointly with the UNDP. At the moment the municipalities experience a lack of experience with respect to energy efficiency, similar to the situation in Bulgaria before the implementation of the Case Study.

Kazakhstan currently has approved a Law on Energy Savings, which came into force in 1997, but which was never effectively implemented. Since a specific regulatory framework or dedicated laws regarding energy efficiency are still missing in Kazakhstan, the situation resembles that in Bulgaria before the implementation of the Case Study.

Furthermore, there are no incentives for energy efficiency measures in Kazakhstan but legal entities and individuals are entitled to apply for subsidies in case they develop projects aimed at the reduction of the use of electricity or implement devices that are more energy efficient than standard devices. According to the draft law on energy efficiency energy auditors will be responsible for supervising the energy consumption of the enterprises, which were granted subsidies. Yet, no such energy auditors were assigned or trained until now, similar to the situation in Bulgaria before the implementation of the Case Study. In Kazakhstan, there is no specific energy efficiency or renewable energy sources fund available at the national level.

Barriers in Kazakhstan

The Law on Energy Savings of 1997 has never been set into force and similar to the situation in Bulgaria before the Case Study implementation there are neither targets nor action plans for energy efficiency. Furthermore, there is neither a national nor a municipal energy efficiency agency and an overall increase in energy efficiency appears to have only a moderate role in the National Energy Programme of Kazakhstan.

Although energy efficiency incentives are envisaged by the draft law on energy efficiency, the situation is unclear at present. The huge availability of natural resources has so far prevented the public administration, the financial sector and the final customers in Kazakhstan to develop awareness on the relevance and also on the potential benefits from energy efficiency. As such the overall situation of Kazakhstan resembles that in Bulgaria before the implementation of the Case Study.

As a summary, Kazakhstan suffers from lack of awareness, human capacities and professional skills with regard to energy efficiency and renewable energy projects. As such a low level of awareness among population, public administration and policy makers as well as a lack of sustainability awareness, standards and instruments among commercial banks are present in Kazakhstan. The concept presented in the Case Study contributes to overcome such barriers, since knowledge is spread and the awareness is increased by widely accepted trainers in addition to official representatives of the government.

Recommendations for Kazakhstan

The following steps should be carried out for successful replication of the Case Study:

- Since the Committee of Governmental Energetic Surveillance, which is part of the Ministry of Energy and Mineral Resources is responsible for energy efficiency according to the draft law on energy efficiency in Kazakhstan, the Committee of Governmental Energetic Surveillance should build a municipal network with mandatory membership for municipalities and develop a regulatory framework for this network (e.g. diminishing of municipal energy costs, dissemination of knowledge);
- The Ministry of Environmental Protection should define and establish municipal energy efficiency policies and objectives for reduction of greenhouse gases to establish a general framework for the implementation of the Case Study;
- The Republican Energy Saving Centre, which was established in June 2008 by the Kazakh Research Institute of Power Engineering as a response to the governments obligation to develop the Governmental Energy Saving Programme, should take over the overall project organization and work on the project financing for the implementation of the Case Study (e.g. supported by the former setup municipal network and international organizations, such as the World Bank, the United Nations Development Programme, or the European Bank for Reconstruction and Development);
- The Republican Energy Saving Centre should coordinate with the Committee of Governmental Energetic Surveillance to setup a committee to select trainers on energy planning and management and let the committee select 20-30 trainers on energy planning from the fields of architecture, engineering, and economy. First point of contact should be the Energy Service Companies in Almaty (Almaty City Energy Service Company) and Astana (Astana City Energy Service Company), both of which are not yet fully established, but for which rudimentary structures should exist. Another point of contact should be international organizations, which might be willing to send their consultants or experts for supporting the project;
- With the help of the Almaty City and the Astana City ESCO and with a strong assistance of the Committee of Governmental Energetic Surveillance as representant of the Ministry of Energy and Mineral Resources, the Republican Energy Saving Centre should identify experts for the “train-the-trainers” sessions, setup training schedules, and subsequently held up training sessions for the trainers;
- The identified experts and trainers should then setup training schedules, training agendas, and prepare training documentation for the representatives of the municipalities;
- The Republican Energy Saving Centre with assistance of the already identified trainers should select and invite participants for the trainings and convince municipalities to send those people, who will later on be responsible to implement the demonstration projects as well;
- After the training, the participants of the training sessions are advised to go back to their municipal administrations, analyse the potential for energy efficiency in their municipality, decide upon projects, organize project financing, and setup demonstration projects in their municipalities (depending on the individual situation in each municipality). The whole process is supported and guided by the Republican Energy Saving Centre and the municipal network established at the beginning of the project implementation phase by the Ministry of Environmental Protection;

- Have the municipal network with support of the Republican Energy Saving Centre monitor and support demonstration projects setup in municipalities, as well as collect and disseminate data and know-how gathered during the conduct of the demonstration projects for further replication.

Recommendations for replication in Serbia

General situation in Serbia

Similar to the situation in Bulgaria before the implementation of the Case Study, there is a main energy saving potential at the municipal level in Serbia. The modernization of public buildings and street lighting are estimated to cause 30 per cent of energy savings. Although some preconditions for the legal framework for running Energy Service Companies in Serbia were created by the German technical cooperation agency (GTZ), there are still no such companies existing in Serbia, which resembles the former situation in Bulgaria.

Third party financing schemes still need further legal development and capacity advancement to be fully developed. Comparable to the situation in Bulgaria before the implementation of the Case Study, there is no existing Energy Efficiency Law in Serbia, although substantive energy efficiency provisions are set by the Energy Law and its amendments will bring additional provisions, such as the establishment of the Energy Efficiency Fund, which is regarded as a necessary tool to increasing energy efficiency and stimulating rational energy use. Legal framework for the Fund's establishment should be created and respective secondary legislation scheduled for adoption in 2009. A law on the rational use of energy is currently being prepared and should be ready by the end of 2009. The law will introduce compulsory energy audits, thus preparing ground for the development of activities from Energy Services Companies. At the moment there are no incentive mechanisms in place for energy efficiency or wider use of renewable energy sources.

Barriers in Serbia

Similar to the situation in Bulgaria before the implementation of the Case Study, one of the primary barriers to successful project realization is the absence of monetary incentives and the absence of project financing mechanisms as well as the absence of knowledge and capacity regarding financing of energy efficiency projects. Furthermore, the lack of qualified human resources appears to be a major barrier throughout the entire public administration in Serbia as was the case in Bulgaria. Furthermore, a general lack of awareness on energy efficiency can also be perceived in Serbia.

In addition to what was known from Bulgaria before the implementation of the Case Study is the fact that there is no legal framework for ESCO activities and at the moment ESCO projects cannot be implemented in public-owned buildings whose energy costs are charged to the municipalities.

There is a reported lack of professional skills for the preparation of bankable projects to be submitted to funding institutions. The concept presented in the Case Study helps to overcome these barriers towards implementation of energy efficiency measures, since it a) increases the number of qualified employees within the Serbian public administration (i.e. municipalities), b) transfers knowledge regarding the preparation of project material and bankable project as well as general project financing, and c) increases general awareness towards energy efficiency by showing practical examples in public or institutional buildings.

Recommendations for Serbia

The following steps should be carried out for successful replication of the Case Study:

- The Energy Agency of the Republic of Serbia should build a municipal network with mandatory membership for municipalities and develop a regulatory framework for this network (e.g. diminishing of municipal energy costs, dissemination of knowledge). Such a municipal network could be a part of the already existing Serbian Energy Efficiency Network of the five Regional Energy Efficiency Centers;
- The Energy Agency of the Republic of Serbia with the support of the Ministry of Mining and Energy should define and establish municipal energy efficiency policies and objectives for

reduction of greenhouse gases to establish a general framework for the implementation of the Case Study;

- The Serbian Energy Efficiency Agency (SEEA) should take over the overall project organization and work on the project financing for the implementation of the Case Study (e.g. supported by the former setup municipal network and national and international programmes and organizations, such as the Fund for Environmental Protection and Energy Efficiency, the National Investment Programme, the Governmental Energy Efficiency Fund, the European Bank for Reconstruction and Development, the World Bank, and the German Kreditanstalt für Wiederaufbau);
- The Serbian Energy Efficiency Agency should coordinate with the assistance of the five Regional Energy Efficiency Centers (independent units at Serbian universities) to setup a committee to select trainers on energy planning and management and let the committee select 20-30 trainers on energy planning from the fields of architecture, engineering, and economy. Since there are still no Energy Service Companies in Serbia, first point of contact should be the German Kreditanstalt für Wiederaufbau, which already worked on the topic in Serbia. Another point of contact should be international organizations, which might be willing to send their consultants or experts for supporting the project;
- With a strong assistance of the Ministry of Mining and Energy, the Serbian Energy Efficiency Agency (SEEA) should identify experts for the “train-the-trainers” sessions, setup training schedules, and subsequently held up training sessions for the trainers;
- The identified experts and trainers should then setup training schedules, training agendas, and prepare training documentation for the representatives of the municipalities;
- The Serbian Energy Efficiency Agency with assistance of the already identified trainers should select and invite participants for the trainings and convince municipalities to send those people, who will later on be responsible to implement the demonstration projects as well;
- After the training, the participants of the training sessions are advised to go back to their municipal administrations, analyse the potential for energy efficiency in their municipality, decide upon projects, organize project financing, and setup demonstration projects in their municipalities (depending on the individual situation in each municipality). The whole process is supported and guided by the Serbian Energy Efficiency Agency and the municipal network established at the beginning of the project implementation phase by the Energy Agency of the Republic of Serbia;
- Have the municipal network with support of the Serbian Energy Efficiency Agency and the Energy Agency of the Republic of Serbia monitor and support demonstration projects setup in municipalities, as well as collect and disseminate data and know-how gathered during the conduct of the demonstration projects for further replication.

Recommendations for replication in the former Yugoslav Republic of Macedonia

General Situation in the former Yugoslav Republic of Macedonia

The existent building stock in the former Yugoslav Republic of Macedonia is not very energy efficient (residential, public, and commercial buildings). As such it resembles the situation in Bulgaria before the implementation of the Case Study. The former Yugoslav Republic of Macedonia already developed an Energy Efficiency Strategy in 2004, which focuses on institutional buildings and the upgrade of their heating systems as well as the building envelopes and the lighting systems. Like in Bulgaria before the implementation of the Case Study, there are no dedicated laws or secondary legislation on how to implement any measures related to the Energy Efficiency Strategy. In the former Yugoslav Republic of Macedonia municipalities are obliged to implement Local Energy Efficiency Programmes and Action Plans and energy audits and building certificates are envisaged. As was the case in Bulgaria before the implementation of the Case Study, municipalities lack the knowhow and capacity to realize such measures. Particularly since there are only two ESCOs in the former Yugoslav Republic of Macedonia and no energy audit programme or energy efficiency network is in place at the moment.

Barriers in the former Yugoslav Republic of Macedonia

Although the former Yugoslav Republic of Macedonia is undertaking a strong effort to develop policies for energy efficiency, much of the dedicated regulatory framework is still under development and the implementation may still take some time. Furthermore, there are no dedicated laws for energy efficiency, only draft versions are currently under development. As such the situation is similar to that in Bulgaria before the implementation of the Case Study.

There is no dedicated governmental agency for energy efficiency services nor is there a network of regional agencies to support on-field implementation at the local-level. In this respect, the former Yugoslav Republic of Macedonia also resembles Bulgaria before the implementation of the Case Study. Even more parallels between those two countries are present at the municipal level, where responsibilities regarding energy efficiency are not assigned to dedicated departments or personnel and it is not decided who should implement any energy efficiency related action plan.

In the private sector, there is an urgent need of capacity and awareness building regarding energy efficiency measures as it was the case in Bulgaria before the implementation of the Case Study, so that mandatory energy audits can be carried out from 2010 onwards. The former Yugoslav Republic of Macedonia suffers not only from lack of professional skills for preparation of bankable projects and lack of sustainability awareness, standards and instruments among commercial banks, but also from legal, institutional and administrative barriers such as lack of targets and implementation plans with regard to energy efficiency and renewable energy measures.

The build-up of capacities and awareness regarding energy efficiency measures and energy efficiency projects is necessary in all sectors in the former Yugoslav Republic of Macedonia. Therefore an implementation of the concepts presented in this Case Study is recommended but should be accompanied by measures to shorten the timeframe of the implementation of the Case Study to avoid the transition between election phases, which might lead to political instability.

Recommendations for the former Yugoslav Republic of Macedonia

The following steps should be carried out for successful replication of the Case Study:

- The Energy Regulatory Commission (ERC) should build a municipal network with mandatory membership for municipalities and develop a regulatory framework for this network (e.g. diminishing of municipal energy costs, dissemination of knowledge);
- The Energy Department of the Ministry of Economy with the support of the Energy Agency of the Republic of Macedonia should define and establish municipal energy efficiency policies and objectives for reduction of greenhouse gases to establish a general framework for the implementation of the Case Study;
- The Energy Agency of the Republic of Macedonia should take over the overall project organization and work on the project financing for the implementation of the Case Study (e.g. supported by the former setup municipal network and national and international organizations, such as the Macedonian Bank for Development Promotion and the World Bank);
- The Energy Agency of the Republic of Macedonia should coordinate with the assistance of the Research Center for Energy, Informatics and Materials of the Macedonian Academy of Science and Arts (ICEIM-MANU) to setup a committee to select trainers on energy planning and management and let the committee select 20-30 trainers on energy planning from the fields of architecture, engineering, and economy. First point of contact should be the two already existing Energy Service Companies Toplifikacija Engineering (for technical know-how) and ET ESCO (for know-how on energy audits), the latter not being fully established, but for which basic structures exist. Another point of contact should be international organizations, which might be willing to send their consultants or experts for supporting the project;
- With the help of the two Macedonian ESCOs and with a strong assistance of the Energy Department as representant of the Ministry of Economy, the Energy Agency of the Republic of Macedonia should identify experts for the “train-the-trainers” sessions, setup training schedules, and subsequently held up training sessions for the trainers;

- The identified experts and trainers should then setup training schedules, training agendas, and prepare training documentation for the representatives of the municipalities;
- The Energy Agency of the Republic of Macedonia with assistance of the already identified trainers should select and invite participants for the trainings and convince municipalities to send those people, who will later on be responsible to implement the demonstration projects as well;
- After the training, the participants of the training sessions are advised to go back to their municipal administrations, analyze the potential for energy efficiency in their municipality, decide upon projects, organize project financing, and setup demonstration projects in their municipalities (depending on the individual situation in each municipality). The whole process is supported and guided by the Energy Agency of the Republic of Macedonia and the municipal network established at the beginning of the project implementation phase by the Energy Regulatory Commission (ERC);
- Have the municipal network with support of the Energy Agency of the Republic of Macedonia and the Energy Regulatory Commission (ERC) monitor and support demonstration projects setup in municipalities, as well as collect and disseminate data and know-how gathered during the conduct of the demonstration projects for further replication.

Recommendations for replication in Ukraine

General situation in Ukraine

In contrast to the situation in Bulgaria, in Ukraine several Energy Service Companies are operating and there is a dedicated institution responsible for energy efficiency, the National Agency for Efficient Use of Energy Resources.

Furthermore the Law on Energy Savings will be replaced by a new draft law, including the efficient use of fuel resources. The Law on Energy Savings provides a system of institutional and regulatory measures and incentives for energy savings and the new law will in addition combine market mechanisms with state regulation elements based on the experience in pursuing energy efficiency policy of the European Union. Energy efficiency equipment and materials are exempted from taxes if they are not available for purchase in Ukraine. Furthermore, the income of companies included in the state registry of enterprises, institutions, and organizations involved in the development, implementation, and use of energy saving measures, and energy efficiency projects is only taxed at a maximum level of 50 per cent.

Governmental sources of financing include the State (national) Budget and local budgets at all levels. In early 2008, the State Energy Conservation Fund was established as a budgetary fund for financing energy efficiency improvements. The money in the fund derives from penalties collected from companies that are not using energy efficiently. International financing is available in Ukraine but Ukrainian commercial banks have so far not established any special energy efficiency or renewable energy sources credit lines and act more as intermediaries for international financing institutions.

Barriers in Ukraine

In theory the general situation is more favorable with regard to energy efficiency than what was known from Bulgaria before the implementation of the Case Study, yet several barriers towards energy efficiency are still in place in Ukraine. The legal framework for the energy efficiency sector is complex, fragmented, and intransparent.

The current law on energy savings is outdated, the new energy efficiency programme and draft law are still under development. Comparable to Bulgaria before implementation of the Case Study the new energy efficiency programme of 2008 lack a concept for funding or project financing that ensures the implementation of energy efficiency measures. Furthermore, the state of allocation of funds from the State Budget is still unclear and there is a lack of transparency regarding the financing volume and on the allocation criteria for the State Fund for Energy Conservation.

Similar to what was known from Bulgaria before the Case Study implementation, market opening is incomplete in Ukraine. Political decisions at municipal level hamper the profitability of energy efficiency projects and access to credit resources is still difficult, mainly due to the general lack of professional skills for preparation of bankable projects.

Similar to Bulgaria before the Case Study in the private business and commercial banking sector, sustainability awareness, standards and instruments for energy efficiency and renewable energy measures and understanding of the benefits of energy efficiency projects seem to be very limited.

In Ukraine, the access to credit resources is difficult due to banks' reluctance to provide loans for investments with a paypack period of over one year. As such public funding for projects and initiatives is insufficient. Furthermore, Ukraine is facing a lack of professional skills for preparation of bankable projects as well as technical capabilities. To overcome the barriers described here it is recommended to implement the concept provided in the Case Study. When implementing such a project, it is recommended to put special emphasis on the transfer of knowledge regarding project financing and include as many representatives of the national banking sectors as possible in the project. This will help to increase awareness on the business opportunities in energy efficiency measures in the national finance sector.

Recommendations for Ukraine

The following steps should be carried out for successful replication of the Case Study:

- The National Agency of Ukraine for the Effective Use of Energy Sources (NAER) should build a municipal network with mandatory membership for municipalities and develop a regulatory framework for this network (e.g. diminishing of municipal energy costs, dissemination of knowledge);
- The National Agency of Ukraine for the Effective Use of Energy Sources with the support of the Ministry of Environmental Protection should define and establish municipal energy efficiency policies and objectives for reduction of greenhouse gases to establish a general framework for the implementation of the Case Study;
- The Agency for Rational Energy Use and Ecology (ARENA-ECO) should take over the overall project organization and work on the project financing for the implementation of the Case Study (e.g. supported by the former setup municipal network and national and international organizations, such as governmental sources of financing like the State Budget, the World Bank, the European Bank for Reconstruction and Development, and the United States Agency for International Development);
- The Agency for Rational Energy Use and Ecology (ARENA-ECO) should coordinate with the assistance of the National Academy of Sciences of Ukraine to setup a committee to select trainers on energy planning and management and let the committee select 20-30 trainers on energy planning from the fields of architecture, engineering, and economy. First point of contact should be the already existing Energy Service Companies UkrESCO, ESCO-Rivne, ESCO-Zakhid, Kherson-ESCO, and Energy Alliance. Another point of contact should be international organizations, which might be willing to send their consultants or experts for supporting the project;
- With the help of the Ukrainian ESCOs and with the strong assistance of the Ministry of Environmental Protection, the Agency for Rational Energy Use and Ecology (ARENA-ECO) should identify experts for the "train-the-trainers" sessions, setup training schedules, and subsequently held up training sessions for the trainers;
- The identified experts and trainers should then setup training schedules, training agendas, and prepare training documentation for the representatives of the municipalities;
- The Agency for Rational Energy Use and Ecology (ARENA-ECO) with assistance of the already identified trainers should select and invite participants for the trainings and convince municipalities to send those people, who will later on be responsible to implement the demonstration projects as well;

- After the training, the participants of the training sessions are advised to go back to their municipal administrations, analyse the potential for energy efficiency in their municipality, decide upon projects, organize project financing, and setup demonstration projects in their municipalities (depending on the individual situation in each municipality). The whole process is supported and guided by the National Agency of Ukraine for the Effective Use of Energy Sources and the municipal network established at the beginning of the project implementation phase by the National Agency of Ukraine for the Effective Use of Energy Sources;
- Have the municipal network with support of the National Agency of Ukraine for the Effective Use of Energy Sources monitor and support demonstration projects setup in municipalities, as well as collect and disseminate data and know-how gathered during the conduct of the demonstration projects for further replication.

16.2. *Water Efficiency – Tariff Reform Programme – Case Study of the Russian Federation (recommendations for replication in Bulgaria and Ukraine)*

Box 14: Water Tariff Reform in the Russian Federation

The presented Case Study relates to legal, institutional and administrative barriers with insufficient water infrastructure and the need of rehabilitation and extension of the infrastructure. Furthermore, water tariffs were not cost covering before the implementation of the Case Study as such representing also economic and financial barriers in the Russian Federation. In particular, the Russian Federation experienced financial barriers experienced by utilities facing a degradation of municipal and water infrastructure. Municipalities and utilities were facing a decrease of water end customers' tariffs and non-rational tariff structures and prices and therefore lack the financial resources needed to realize investments regarding water and energy efficiency projects.

The Case Study describes the implementation of a revised water tariff system in the city of Cherepovets, located in the Northwest of the Russian Federation, between 1998 and 2000. In order to overcome the lack of financial resources of the city's utility and to ensure investments in an effort to improve Cherepovets' water efficiency infrastructure, an increase of water tariffs has been defined and implemented. The city of Cherepovet raised the tariff to a level which enabled it to generate enough money to cover investments costs for refurbishment of the water infrastructure.

The Case Study is recommended for replication in Bulgaria and Ukraine, since these countries are facing similar barriers as the Russian Federation before the implementation of the Case Study: in general, both countries suffer from infrastructure, which is insufficient or inefficient and needs rehabilitation or extension. Tariffs in those countries are usually not cost covering or too low to grant project profitability for energy efficiency projects.

Furthermore, there is a general low level of awareness among population, public administration and policymakers. As such in both countries investments and refurbishment programs at municipal level are mostly missing and they resemble the Russian Federation before the implementation of the Case Study.

16.2.1. Background to the Case Study

General situation in the Russian Federation

The local context in which the concept presented in this Case Study was developed and introduced started with a housing divestiture programme initiated in Cherepovets in 1995[313]. The programme led to a considerable increase in the number of municipal residential buildings. At the same time heat networks and water utilities showed a low reliability and quality due to immense deterioration of the facilities. As a consequence of the housing divestiture programme the share of housing and communal costs increased to approximately 30 per cent of the municipal budget. Residents' payments and payment collections covered less than 70 per cent of the municipal costs. The municipality of Cherepovets had no possibility to cover the additional costs and its debts rose significantly.

Furthermore, to limit the costs, municipal enterprises sharply reduced funds used for repair and maintenance of the municipality's facilities and suffered shortage situations in heat supply as a consequence. Within this context the programme of housing and communal services reform was ratified by the city of Cherepovets. A main part of the general municipal programme was a programme for water, heating and energy efficiency improvement[313].

Barriers in the Russian Federation

In general, the Russian Federation suffered from legal institutional and administrative barriers related to insufficient power and water infrastructure that needed rehabilitation or extension. Furthermore, absent or insufficient public funding for projects and initiatives are described for the Russian Federation. In particular, the barriers described here for the Russian Federation are financial barriers experienced by utilities facing a degradation of municipal infrastructure, such as water infrastructure. Municipalities and utilities are facing a decrease of water end customers' tariffs and non-rational tariff structures and prices and therefore lack the financial resources needed to realize investments regarding water-efficiency projects. Furthermore, there is the general perception in the Russian Federation that money from external donors is required for improvements or the implementation of changes in the Russian Federation[314].

16.2.2. Description of the Case Study

The Case Study refers to the establishment of a tariff reform programme that helps improving and rehabilitating Cherepovets city's water infrastructures, and in so doing, builds its economy and enhances the quality of life for its citizens. The tariff redesign was accomplished in a manner that built consensus within the city government and educated the population on the need to increase prices. This education helped to reduce public opposition. Part of this effort was a public awareness campaign, including educating children on water conservation through games in school.

The reform was only possible due to clear communication of the need for the increase of prices to the general public and the guarantee for Cherepovets' population that the tariffs would be used to improve the quality of heating and water services. The process for increasing prices was transparent and based on consensus. The generated profits were used to compensate the required costs to invest in water-efficiency projects. The results of the Case Study show that by utilizing a tariff reform it is possible to generate enough profits for considerable facility improvements even without outside funding.

16.2.3. Approach for implementation of the Case Study

This Case Study focuses on the water efficiency aspects of the improvements implemented in Cherepovets. The key objectives of the Case Study are:

- Rehabilitation of the global water infrastructure including leaking pipes, meters, and pumping stations;
- Removal of financial barriers from the water utility, which was facing a decrease of water end customer's tariffs and therefore lack of financial resources to realize investments regarding water-efficiency projects;
- Improvement of the overall financial situation of the utility;
- Enabling investments and cover investment costs for improving Cherepovets' water infrastructure without external funding.

The Case Study has been implemented in the city of Cherepovets, located in the Northwest of the Russian Federation, between 1998 and 2000. The Cherepovets Tariff Design Group, which consisted of managers from several key city departments, relevant committees of the city council, and members from the general public were responsible for the tariff programme and water efficiency investments.

In order to overcome the lack of financial resources of the city's utility and to ensure investments in an effort to improve Cherepovets' water efficiency infrastructure, an increase of water tariffs has been defined and implemented.

The change in the tariff system does not only concern prices itself but also the price structure. The structure has been changed from an integrated tariff to a separated one (separate price and charge for network and for consumption) enabling the stabilization of revenues from utilities.

The city of Cherepovet raised the tariff to a level which enabled it to generate enough money to cover investment costs. Information about the absolute price level before and after the reform is not publicly available.

The Case Study involved the following key players and partners:

- The city of Cherepovets (located in the Northwest of the Russian Federation) as initiator of the tariff reform and responsible for the definition and increase of water tariffs;
- The Cherepovets Tariff Design Group as responsible body for the conception of both the tariff reform programme and the water efficiency investments. This group included managers from several key city's departments (e.g. finance department, housing and communal

department) and representatives of the city council. The Tariff Design Group was given the status of an inter-department commission;

- Committees of the city council as decision makers for the Tariff Design Group;
- Members from the general public as representatives of the end customers;
- External advisors or organizations: no external advisors participated in the project.

The city of Cherepovets is the owner of the water infrastructure. It defined and implemented the tariff reform programme without political opposition or political approvals.

Beneficiaries of the implementation of the Case Study are the municipality of Cherepovet as owner of the water infrastructure as well as the citizens of Cherepovets. Furthermore, the Case Study serves as a positive model for the implementation of innovative ideas without the help of any external organization.

The Case Study has been implemented using the following steps:

Step one: Introduction of tariff increase

Analysis of water consumption in a number of buildings led to the development of recommendations to set up an adequate water consumption norm. Subsequently the communication about the importance of adopting new consumption rates to the general public was undertaken. Members of the Tariff Design Group used the mass media to present the new tariffs and to explain why it was important to change them. The objectives to improve the city's water infrastructure and the purpose of the investments were clearly presented. The public awareness campaign included e.g. educating children on water conservation through games in school.

Step two: Tariff reform

The water tariff reform including calculation of the required tariff increase and enabling Cherepovets to realize profits and investments was established and enforced. The tariff increase was designed to cover the required investments to the water infrastructure but also generate revenues for further investment. A major part of the tariff reform was the rationalization of subsidies on water tariffs on the basis of income. As a result, poorer people in Cherepovets pay at most ten per cent of their income to utilities, while people affording to pay the complete water tariff do not receive any subsidies from the municipality.

Step three: Water efficiency investment programmes

The city of Cherepovets defined a major water efficiency investment programme, including distinct water infrastructure projects as well as project financing. Part of the investment programme was the definition of buildings, where water consumption exceeded the standards defined under implementation step one. For such buildings specific repair and renovation plans were developed for internal water supply systems e.g. exchange of water taps. Furthermore, new technologies were used e.g. for the installation of water meters for water consumption management and control.

Step four: Technical implementation of defined projects

Step four consists of the installation of technical equipment and the renovation of the water infrastructure, such as exchanging old pipes and water pumps, installation of new pipes, new water meters etc. Furthermore, the market environment in the municipal housing und public utility services sector was gradually improved through tenders for renovations of public buildings and for technical maintenance of residential buildings.

Between 1998 and 2000, the tariff reform has been implemented and in parallel the investments on water infrastructure have been realized.

Since the communication to the public is one of the most important parts of the implementation process, when replicating the Case Study in the Russian Federation or other countries, this part of the process cannot be reduced or abbreviated. However, the implementation process can be shortened considerably if there are useful data on water consumption already available for decisions on water efficiency measures. It is estimated that availability of such data will lead to an implementation time which is two to six months less than described for implementation of the project in Cherepovets.

16.2.4. Impact of case study implementation

The implementation of the Case Study had an impact at municipal level as the tariff reform and water investment programme have been defined for the city of Cherepovets.

However, this Case Study is a positive model which could be applied to other municipalities in the Russian Federation as well as in other countries facing issues with aging infrastructures.

The Case Study demonstrated that end customers will support and pay for the rehabilitation of the water infrastructure despite opinions to the contrary.

Economical and financial benefits of the implementation of the Case Study are:

- The city raised water tariffs enough to cover costs and to invest in water efficiency projects. The raising of tariffs does not only cover costs but also generate profits to the investments;
- The water efficiency projects included a new water treatment facility, three new pumping stations, the replacement of 24 km of old, leaking pipes with new pipes, and the installation of more than 1,100 water meters in buildings all over the city, used to bill water on the basis of real consumption[315].

The net benefits due to the implementation of the tariff reform are not quantified or publicly available.

Environmental benefits of the implementation of the Case Study are a reduced water loss due to leakages in the water pipes and installations, a reduced amount of electricity for water pumping, and a monitoring of water consumption by the use of water meters which will lead to lower consumption on the medium term. Details for the benefits are:

- The city reduced leaks in the supply network from 25 per cent to ten per cent;
- The Case Study reduced the amount of electricity required to pump one m^3 of water through the system by 12 per cent;
- Before the initiative, 75 per cent of the network's pipes were more than 25 years old (intended lifetime is 20 years). Today, only 25 per cent of the pipes are older than 25 years[315].

As a social benefit, the Case Study generated additional employments for the realization of investments in the city's water infrastructures.

The estimated timeframe to achieve tangible benefits from the implementation of the Case Study is two to three years after starting to implement the process. An estimation of the time required by the implementation steps of the Case Study includes two to six months for the analysis of water consumption and the development of water consumption norm, at least three months for communication of the projects objectives and reformed tariff system to the general public, three months for the definition of the tariff reform, three to six months for the definition of the investment programme, including defined projects regarding water efficiency measures, and six to 12 months for the technical implementation of the defined projects. Only after the technical installation of water efficiency measures, such as new pipes, new water meters etc. has been finalized, the yearly energy consumption can be compared to previous periods.

A suggestion to shorten this timeframe when replicating the Case Study in other countries is a) parallel working on several topics such as having one working group defining the tariff reform while a second working group is communicating the work in progress at the same time, and b) involving representatives of national or international banks experienced in the topic of project financing, which will considerably shorten the time needed for definition of the investment programmes. It is estimated that the timeframe needed for implication of the Case Study can be reduced to two years instead of two to three years.

16.2.5. Cost for implementation

The costs to implement the technical installations of the Case Study (total investment costs) have been USD 1.6 million. The implementation of the tariff reform (tariffs increase) has enabled the following investments:

- A new water treatment facility: USD 1.3 million;
- Three new, modern pumping stations: USD 50,000;
- 24 kilometers of old, leaking pipes replaced with new pipes: USD 52,000;
- More than 1,100 water meters installed in buildings citywide, enabling consumption-based billing: USD 0.2 million.

There is no publicly available information about the costs of the initial analysis of water consumption, the awareness campaign regarding the tariff reform and water efficiency measures, and the definition of the distinct projects including the project financing.

The city of Cherepovets has financed 100 per cent of the project investments by generating profits with the reformed water tariff system. As such the citizens of the city of Cherepovets were indirectly covering the costs.

Scale-up effects for implementation in other Russian municipalities mainly affect the communication to the general public, the concept of the tariff reform, and the financing of the technical projects. A team of widely accepted specialists or representatives of the city of Cherepovets could help with effectively communicating the reformed water tariffs when replicated in other Russian municipalities. Concepts can be transferred and applied from the city of Cherepovets to other Russian cities and municipalities, provided they are suffering from similar issues with their water infrastructure.

Municipalities in other countries mainly benefit from transferring the concepts developed for the water tariffs in Cherepovets (concept about changing an integrated tariff to a separated one with a separate price and charge for network, i.e. for using the water infrastructure and for water consumption). By transferring the concepts to their own water industry scale-up effects can be realized.

16.2.6. Regulatory preconditions

As shown by the description of the Case Study, only a sound and rational tariff policy is necessary for the successful implementation of the Case Study. However, the following general setup at municipal level is advantageous for the successful implementation of the Case Study:

- Established municipal energy/water efficiency policies;
- Full support of the Case Study project by all decision makers on municipal level;
- Clearly defined objectives for profits gained by water tariff reforms;
- Laws on municipal level determining how to spend the profits made by facilitating water tariff reforms to avoid misuse of any profits gained by the reforms.

16.2.7. Critical success factors

The following key success factors contribute to the successful implementation of the Case Study:

- A public awareness campaign, including educating children on water conservation through games in schools;
- Education of the general public about the need for raising prices and assuring people that the tariffs would be used to improve the quality of heating and water services;
- Creation of a working group including members of different city departments and the general public for the successful definition and implementation of the reform (Tariff Design Group);
- A transparent process for increasing pricing, e.g. as introducing a dual tariff (network charge plus actual consumption payments) that improves and stabilizes the financial situation of municipal utilities;
- Restructuring public subsidies to citizens which provide for a social support to the least-paid population;

- Growth of the number of municipal facilities equipped with heat- and water meters;
- Gradual improvement of market environment in the municipal housing and public utility services sector through tenders for renovation of engineering systems in public buildings and for technical maintenance of residential buildings.

The following points are relevant for an efficient replication of the Case Study and for the ability to finance investment projects without outside funding:

- A sound and rational tariff policy, (i.e. network charge plus actual consumption payments) that improves and stabilizes the financial situation of municipal utilities, which is supported by all relevant decision makers on municipal level;
- A tariff restructuring that exchanges subsidies for all citizens with subsidies only for people truly in need;
- A public awareness campaign for informing the general public about the tariff reforms and the necessary tariff increases;
- A gradual improvement of the market environment in the municipal housing and public utility services sector through tenders for renovation of public buildings and for technical maintenance of residential buildings;
- Know-how of project financing within municipalities (i.e. decision makers);
- Prior to the implementation of the Case Study monitoring and analysis of water consumption in buildings (public and residential) should be possible.

16.2.8. Risks

The following possible factors may represent a risk to the successful implementation of the Case Study:

- Strong public opposition to the implementation of tariff reforms which prevent general public acceptance;
- Strong political opposition within municipal departments due to different perspectives or points of view;
- Missing capacity regarding knowledge of project financing and water/energy efficiency measures;
- Difficulties in providing a basis for data analysis due to deteriorated or outdated tools for measuring water consumption in buildings;
- Tendencies towards corruption at municipal level, which lead to distrust in the general public regarding the correct application of profits gained by the water tariff reform to the water infrastructure;
- Immense expenses spend for the public awareness campaigns (e.g. costs for broadcasting on television).

The following possible risks should be considered as a consequence of the implementation of the Case Study in the originating country as well as in the countries, in which the Case Study may be replicated:

- Implementation of tariffs too high to be borne by the citizens and therefore partial or complete loss of public acceptance during the progress of the project;
- Increase of municipality's debts by organizing public awareness campaigns before the tariff reform has been implemented;
- Increase of municipality's debts by incorrectly calculated tariff reforms which are not accompanied by realizable profits;
- Increasing public expenses due to increased maintenance costs after new technical equipment has been installed;
- Loss of newly installed equipment (e.g. water meters) due to theft or pilferage of equipment, which is later on offered on the black market in other regions of the country.

16.2.9. Conclusions and recommendations for replication

Introduction

In general the Case Study presents an approach to overcome financial barriers in municipal utilities preventing the renovation of water infrastructure as well as investments in the area of water/energy investments by mobilizing funds with the help of end users rather than international donor organizations.

As such the city of Cherepovets did not only successfully implement the water efficiency measures but also created a model for the rest of the Russian Federation, which can be duplicated by other cities or municipalities even without the existence of distinct regulations or access to externally gained funds.

By applying the concept of public awareness campaigns in combination with transparent and structured water usage and infrastructure usage tariffs, financial barriers can be overcome, trust is built in the general public, and general awareness regarding water efficiency is created. As such it is recommended to apply the concepts presented in the Case Study in other countries as well.

Recommendations for implementation are:

- The tariff reform should implement clear, transparent, and understandable prices, which are not open to any kind of interpretation;
- The application of the profits should be transparent and understandable by the end users, since they are stakeholders of the changes;
- Political conflicts or competition which might exist between the different departments of a municipality should not be a matter of debate when building working groups to develop and implement the concepts for improving the water infrastructure;
- Special emphasis should be laid on the communication of the results of the water tariff reform to the general public to gain awareness and a positive atmosphere regarding the application of water/energy efficiency measures;
- Implementation of the concepts of the Case Study should be accompanied by general capacity building regarding water/energy efficiency measures;

The Case Study is recommended for replication in those countries which experience similar barriers as the Russian Federation in the city of Cherepovets before the implementation of the Case Study, e.g. the lack of sufficient and modern water and heat facilities, such as Bulgaria and Ukraine.

To implement the recommended Case Study in the recommended countries, a time period of two to three years is estimated. Costs of the implementation of the Case Study are estimated to be at least USD one to two million for the technical implementation of defined infrastructure and renovation projects (Case Study phase four).

Recommendations for Bulgaria

General situation in Bulgaria

Bulgaria is committed to reduce its energy consumption by nine per cent of the average final inland energy consumption for the period 2001 to 2005 before 2016. To achieve that several national action plans were developed such as the First National Energy Efficiency Action Plan for 2008 to 2010. During the last years the process of harmonization of the energy efficiency framework of Bulgaria with European legislation was a priority and a new Energy Efficiency Act was adopted in November 2008. There are several financial incentives and tax exemptions for owners of buildings implementing energy efficiency measures in place.

Unlike the situation of the Russian Federation described above, in Bulgaria, there are already approximately 150 ESCO companies and the business model for ESCOs has been regulated in the Energy Efficiency Act in 2004 and is set up on the principle of public-private partnership. The main general programme for energy efficiency in residential buildings is the National Programme for Renovation of Panel Residential Buildings from 2005 to 2020. A subsidy of up to 20 per cent from the State Budget is envisaged for expenditures related to the implementation of energy efficiency measures in apartment blocks. Although the programme has not started yet, its start is expected soon.

Barriers in Bulgaria

Despite strong commitment of the Bulgarian government and significant progress in political reforms, there are still legal, institutional, and administrative barriers in Bulgaria. Such barriers are the insufficient heat and power infrastructure and the lack of penalties for non-compliance with energy efficiency regulation in general, e.g. companies are not respecting their obligation to conduct energy audits.

Despite national programmes and the availability of sufficient financing mechanisms for energy efficiency, the current degradated state of the district heating infrastructure is an indicator for the low level of awareness among population, public administration and policy makers as well as the lack of professional skills for preparation of bankable energy efficiency projects. As such the barriers described resemble those experience in the city of Cherepovets before the implementation of the Case Study.

The concept presented in the Case Study appears to be appropriate for organizing and financing the modernization urgently needed by the district heating infrastructure. Since no extensive regulatory framework is needed to start implementing public awareness campaigns and tariff reforms for the district heating infrastructure this can be achieved on municipal level.

Recommendations for Bulgaria

The following steps should be carried out for successful replication of the Case Study with regard to the district heating infrastructure in Bulgaria:

- The Energy Efficiency Agency (EEA) should act as the main project coordinator and chose municipalities in Bulgaria, which are appropriate for implementation of the Case Study. The Center for Energy Efficiency (EnEffect) should assist and support the EEA in doing so;
- Once one or several municipalities are chosen as pilots for a more widespread implementation of the Case Study the State Energy and Water Regulatory Commission (SEWRC) should establish a rational tariff policy for energy or water resources in the chosen geographical area (depending on the area in which the Case Study is meant to be applied: heating, water, or electricity). Furthermore, the SEWRC needs to setup rules or regulation for spending of the profits to avoid misuse of the gained profits;
- The Energy Efficiency Agency should consult experts on project financing and conduct of energy efficiency projects, such as the EnEffect Consult LTD for technical assistance and representatives of national financing institutes for assistance in developing a project financing plan. Although the renovation projects are to be financed by the profits gained from the revised tariffs, the initial project stages (project phases one to three) need preliminary financing concepts;
- The Energy Efficiency Agency needs to find experts to advice on the analysis of the given infrastructure within the chosen municipalities and analyze the situation to develop a reliable set of data as a basis for the further project planning. As a first point of contact, Enemona SA or Energy Efficiency Systems Ltd. should be contacted;
- In close cooperation with the municipalities chosen to participate in the pilot the Energy Efficiency Agency should setup consumption norms as benchmarks for comparison with the collected data (e.g. regarding consumers, buildings, infrastructure);
- In close cooperation with the municipalities chosen to participate in the pilot the Energy Efficiency Agency should develop project proposals for improving the overall situation in the municipality;
- For starting to explain and introduce the need for tariff revisions, the Energy Efficiency Agency should build and lead a team of members of the municipality and representatives of the ESCO analysing the infrastructure situation. Publishing of the revised tariffs should happen via mass media with the help of marketing agencies;

- In close cooperation with the State Energy and Water Regulatory Commission and the Energy Efficiency Agency the municipalities should establish a revised tariff structure based on rational tariffs;
- Under the supervision of the Energy Efficiency Agency the capacity should be build up within the municipalities e.g. by training personnel with regard to the new tariff structure and the need for investments to the infrastructure and raise awareness regarding the importance of energy efficiency measures in general. The training should be conducted by dedicated experts such as representants of the EnEffect Consult LTD, Enemona SA, or Energy Efficiency Systems Ltd;
- In close cooperation with the municipalities the Energy Efficiency Agency should define the projects to be setup on the basis of the revenues gained by the new tariff structure and define the technical equipment needed;
- The projects chosen for implementation should be implemented in two steps: 1) the Energy Efficiency Agency publishes tenders for renovations, projects in public buildings, energy or water infrastructure; 2) the Energy Efficiency Agency publishes tenders for technical maintenance of water infrastructure, public and residential buildings;
- The Center for Energy Efficiency EnEffect and its consulting subdivision should advise the municipalities in monitoring the renovations, improvements and consumption before and after investments. The results should then be published again via mass media to inform citizens about the results of the projects by the same team which handled the initial information campaign at the start of the implementation of the Case Study;
- If appropriate and if the necessary resources (in terms of time and capacity) are available at the municipalities, more responsibility can be assigned to representatives of the municipality. Such responsibilities are the development of project proposals or the publishing of tenders for renovation or maintenance of the infrastructure.

Recommendations for Ukraine

General situation in Ukraine

The general situation in Ukraine seems to be more developed than the situation in the Russian Federation before the implementation of the Case Study: in Ukraine, several Energy Service Companies are operating and there is a dedicated institution responsible for energy efficiency, the National Agency for Efficient Use of Energy Resources.

The Law on Energy Savings, which provides a system of institutional and regulatory measures and incentives for energy savings, will be replaced by a new draft law, including the efficient use of fuel resources. The new law will combine market mechanisms with state regulation elements based on the experience in pursuing energy efficiency policy of the European Union. Energy efficiency equipment and materials are exempted from taxes if they are not available for purchase in Ukraine. Furthermore, the income of companies included in the state registry of enterprises, institutions, and organizations involved in the development, implementation, and use of energy saving measures, and energy efficiency projects is only taxed at a maximum level of 50 per cent.

Governmental sources of financing include the State (national) Budget and local budgets at all levels. In early 2008, the State Energy Conservation Fund was established as a budgetary fund for financing energy efficiency improvements. The money in the fund derives from penalties collected from companies that are not using energy efficiently. International financing is available in Ukraine but Ukrainian commercial banks have so far not established any special energy efficiency or renewable energy sources credit lines and act more as intermediaries for international financing institutions.

Barriers in Ukraine

Theoretically, the general situation is more favorable with regard to energy efficiency than what was known from the Russian Federation before the implementation of the Case Study, yet several barriers towards energy efficiency are still in place in Ukraine.

There are legal, institutional and administrative barriers in Ukraine, such as the complexity, fragmentation and intransparency of regulation particularly with regard to the energy sector.

Additionally, the current law on energy savings is outdated, the new energy efficiency programme and draft law are still under development. Furthermore, although there is an existing State Budget, the financing volume and allocation of funds is not completely defined and therefore public funding for projects or initiatives is still absent or insufficient. Access to credit resources is difficult, mainly due to the general lack of professional skills for preparation of bankable projects.

Similar to the situation in the Russian Federation before the implementation of the Case Study, low level of awareness among population, public administration and policy makers leads to political decisions at municipal level, which hamper the profitability of energy efficiency projects. Ukraine suffers from tariffs, which are not cost covering or too low to grant project profitability for project developers and/or municipal utilities as such debt and a loss of profitability are generated in the municipal administrations, which are responsible for the management and pricing of district heating. As such investments and refurbishment programmes at municipal level are still missing in Ukraine.

The Ukranian district heating system is in a similar situation than the water infrastructure in Cherepovets prior to the application of the Case Study (except the city of Kyiv, where the district heating has been rehabilitated recently). As a consequence, the application of the concepts presented in this Case Study appears to be appropriate to overcome barriers for investments in Ukraine.

Recommendations for Ukraine

The following steps should be carried out for successful replication of the Case Study with regard to the district heating infrastructure in Ukraine:

- The National Agency of Ukraine for the Effective Use of Energy Sources (NAER) should act as the main project coordinator and choose municipalities in the Ukraine, which are appropriate for implementation of the Case Study;
- Once one or several municipalities are chosen as pilots for a more widespread implementation of the Case Study the National Electricity Regulation Commission of Ukraine (NERC) should establish a rational tariff policy for energy, water, or heat resources in the chosen geographical area (depending on the area in which the Case Study is meant to be applied: heating, water, or electricity). Furthermore, the NERC needs to setup rules or regulation for spending of the profits to avoid misuse of the gained profits;
- The Agency for Rational Energy Use and Ecology should consult experts on project financing and conduct of energy efficiency projects, such as the already active ESCOs (e.g. UkrESCO) for technical assistance and representatives of national or international financing institutes for assistance in developing a project financing plan (e.g. the European Bank for Reconstruction and Development). Although the renovation projects are to be financed by the profits gained from the revised tariffs, the initial project stages (project phases one to three) need preliminary financing concepts;
- ARENA-ECO needs to find experts to advise on the analysis of the given infrastructure within the chosen municipalities and analyze the situation to develop a reliable set of data as a basis for the further project planning. As a first point of contact, a nationally operating ESCO or the European Bank for Reconstruction and Development, which provides technical assistance in Ukraine, should be contacted;
- In close cooperation with the municipalities chosen to participate in the pilot the National Agency of Ukraine for the Effective Use of Energy Sources (NAER) should setup consumption norms as benchmarks for comparison with the collected data (e.g. regarding consumers, buildings, infrastructure);
- In close cooperation with the municipalities chosen to participate in the pilot the Agency for Rational Energy Use and Ecology should develop project proposals for improving the overall situation in the municipality;

- For starting to explain and introduce the need for tariff revisions, the Agency for Rational Energy Use and Ecology should build and lead a team of members of the municipality and representatives of the ESCO analysing the infrastructure situation. Publishing of the revised tariffs should happen via mass media with the help of marketing agencies;
- In close cooperation with the National Electricity Regulation Commission of Ukraine and the Agency for Rational Energy Use and Ecology the municipalities should establish a revised tariff structure based on rational tariffs;
- Under the supervision of the National Agency of Ukraine for the Effective Use of Energy Sources capacity should be build up within the municipalities e.g. by training personnel with regard to the new tariff structure and the need for investments to the infrastructure and raise awareness regarding the importance of energy efficiency measures in general. The training should be conducted by dedicated experts such as representants of the UkrESCO, ESCO Rivne, ESCO Zakhid etc;
- In close cooperation with the municipalities the National Agency of Ukraine for the Effective Use of Energy Sources should define the projects to be setup on the basis of the revenues gained by the new tariff structure and define the technical equipment needed;
- The projects chosen for implementation should be implemented in two steps: 1) the Agency for Rational Energy Use and Ecology publishs tenders for renovations, projects in public buildings, energy or water infrastructure; 2) the Agency for Rational Energy Use and Ecology publishes tenders for technical maintenance of water infrastructure, public and residential buildings;
- The projects chosen for implementation should be implemented in two steps: 1) The National Agency of Ukraine for the Effective Use of Energy Sources with the Ministry for Housing and Communal Services of Ukraine publish tenders for renovations, projects in public buildings, energy or water infrastructure; 2) The National Agency of Ukraine for the Effective Use of Energy Sources with the Ministry for Housing and Communal Services of Ukraine publish tenders for technical maintenance of water infrastructure, public and residential buildings;
- If appropriate and if the necessary resources (in terms of time and capacity) are available at the municipalities, more responsibility can be assigned to representatives of the municipality. Such responsibilities are the development of project proposals or the publishing of tenders for renovation or maintenance of the infrastructure.

16.3. *TSKB - Environmental Impact Assessment of Projects – Case Study of Turkey (recommendations for replication in Albania, Bosnia and Herzegovina and the Republic of Moldova)*

Box 15: Environmental Impact Assessment in Turkey

The presented Case Study relates to the barriers of lack of awareness, human capacities and professional skills with lack of sustainability awareness, standards and instruments among commercial banks. The Case Study contributes in removing barriers related to the provision of medium- and long-term loans for projects achieving targeted objectives in terms of social, financial, and environmental benefits. As such the establishment of standards within the banks, imposing an environmental and energy screening of all projects prior to financing helps to overcome financial barriers for energy efficiency or renewable energy projects.

This Case Study refers to the procedures that TSKB (Türkiye Sinai Kalkinma Bankasi) and TKB (Turkiye Kalkinma Bankasi) implemented for application of project developers for sub-loans financed under the World Bank Special Purpose Debt Facility (SPDF) for Renewable Energy Generation Financing. Projects to be reviewed are categorized according to the assumed related environmental risks. After implementation, all projects to be financed by the TSKB will be subject to an environmental review process. Thereby it is ensured that projects comply with defined financial, technical, and environmental prerequisites.

The Case Study is recommended for replication in Albania, Bosnia and Herzegovina, Kazakhstan, the Republic of Moldova, the former Yugoslav Republic of Macedonia, and Ukraine, since these countries are facing similar barriers as Turkey, before the implementation of the Case Study. The countries recommended for replication of the Case Study all suffer from lack of awareness, human capacities and professional skills, in particular related to low level of awareness among population, public administration and policy makers and the lack of sustainability awareness, standards and instruments among commercial banks. Three country recommendations are used as examples in this Case Study: Albania, Bosnia and Herzegovina, and the Republic of Moldova.

16.3.1. Background to the Case Study

General situation in Turkey

As Turkey aims to belong to the biggest economies by 2050, an increase in its energy consumption is inevitable. Electricity demand has been growing with an annual rate of approximately six per cent since 2002, up to current levels of 198,000 GWh/y. Scenarios forecast a six per cent growth rate until 2020, compared to growth rates of one to three per cent in developed countries. However, Turkey's growth of electricity supply barely matches its fast growth of demand. The country began experiencing shortages already. Total installed capacity is 42,000 MW, with foreign natural gas (48 per cent), coal (29 per cent) and hydro power (17 per cent) providing the biggest shares of resources. Besides large hydro, Turkey offers excellent conditions for wind, solar and geothermal power, but the share of renewable energy is only close to one per cent of the total installed capacity[316].

In 2006, the government passed a set of incentives to stimulate the renewable energy sector, but only modest steps have been taken so far since no clear targets or competitive incentives on new technologies has been set yet. Turkey has signed the UNFCCC Kyoto Protocol in 2009 and the country is going to be assigned a reduction of greenhouse gases for the post-2012-phase, which will eventually turn into clearer targets in its renewable energy sector.

It is expected that the Parliamentary General Assembly will pass an amendment to the Renewable Energy Resources Law 4628 in 2009, effectively setting a purchase price, or feed-in-tariff, for renewable energy. While rates in other European countries are much more attractive, it is the first serious step towards setting a long-term purchase price incentive for renewable energy producers. The mechanism is expected to increase developments in the Turkish renewable energy sector, and investors are already beginning to position themselves in the market.

Barriers in Turkey

Barriers experienced in Turkey before the implementation of the Case Study belong to the lack of awareness, human capacities and professional skills such as the lack of sustainability awareness, standards and instruments used in commercial banks. In particular, the Case Study contributes in removing barriers related to the provision of medium and long term loans for projects achieving targeted objectives in terms of social, financial, and environmental benefits. As such the establishment of standards within the banks, imposing an environmental and energy screening of all projects prior to financing helps to overcome financial barriers for energy efficiency or renewable energy projects.

16.3.2. Description of the Case Study

This Case Study refers to Environmental Impact Assessment processes and procedures by TSKB (Türkiye Sinai Kalkinma Bankasi) aiming at screening each project proposed for financing from a financial, technical, and environmental point of view as an important part of the project evaluation process. According to these procedures due diligences are performed for each project to ensure that they comply with financial, technical, and environmental prerequisites.

Key objective of the Case Study is to strengthen environmental sensibility of project developers when willing to develop and realize sustainable projects in the field of renewable energy. Through screening procedures projects are prioritized and only co-financed when answering bank necessary requirements.

16.3.3. Approach for implementation of the Case Study

The Environmental Impact Assessment (EIA) procedures were implemented in line with the realization of the World Bank's Renewable Energy Project in Turkey in 2004, whose objective is to increase privately owned and operated distributed power generation from renewable sources, without the need for government guarantees, and within the market-based framework of the Turkish Electricity Market Law, adapted in 2001. These project objectives should be achieved by establishing a commercial financing mechanism for renewable energy projects and demonstrating the feasibility of private development of economic and financially viable renewable energy projects within a competitive market framework. Besides Environmental Impact Assessment procedures all sub-loans financed under the World Bank are also subject to Resettlement Assessments (ensuring that no negative impacts arise from land acquisition or involuntary resettlement, provisions of the World Bank regarding projects on international waterways (other countries have to be notified and given time to express their concerns (if any), for projects which impact the flow or quality of water, and provisions of the World Bank concerning the dam safety (e.g. design complexities, location in a zone of high seismic activity, foundations that are complex and difficult to prepare, or retention of toxic materials)[317].

The Renewable Energy Project has one main component: the Special Purpose Debt Facility (SPDF) for renewable energy generation financing. Total investment in renewable energy generation financing under the projected was expected to be around USD 500 million which would include equity financing from private sponsors, debt financing from export credit agencies, the World Bank Special Purpose Debt Facility as well as commercial banks. The SPDF is a term lending facility which is operated by two financial intermediaries (FIs). The two FIs selected are:

- Turkiye Sinai Kalkinma Bankasi (TSKB) - the Turkish Industrial Development Bank (private);
- Turkiye Kalkinma Bankasi (TKB) - the Turkish Development Bank (state-owned).

The World Bank loan for the SPDF is on-lend from the Turkish Treasury (the borrower) to the financial intermediaries. The FIs utilize the Special Purpose Debt Facility to provide long-term debt financing to private sponsors of renewable energy projects. The SPDF is intended to leverage equity investment from local private developers, export credit financing and other financing for the construction of qualified renewable generation projects. The two FIs were selected based on their financial strength, and their capacity to appraise and to supervise project implementation. In addition, their status as development banks allows the Turkish Treasury to on-lend public funds to these organizations.

The renewable energy technologies eligible for financing under this project are:

- Small-Hydro projects: over 70 per cent of the small-hydro project potential in Turkey is based on existing irrigation canals and water conveyance facilities. Most of the remaining potential projects use existing irrigation dams. Therefore, the principal technical risk – the geological risk – is largely absent. For the few potential green field projects, where new dams are required, the dams are likely to be relatively small and any underground works very limited. The electro-mechanical technologies associated with these small-hydro projects are all mature technologies.
- Wind Projects: the technologies associated with wind projects are also well established and may be considered mature. Although innovations continue, there are no technical risks inherent to wind projects.
- Geothermal Projects: The technological and project configurations used to produce electricity from geothermal projects depend on the nature of the resource (temperature, water/steam purity and site conditions/geology)[318].

All sub-loans to be financed under the World Bank Special Purpose Debt Facility (SPDF) are subject to an environmental and resettlement review process by the Turkish Industrial Development Bank (TSKB) and the Turkish Development Bank (TKB). These procedures and requirements incorporate the Republic of Turkey's regulatory requirements for Environmental Review (Regulation on Environmental Impact Assessment (EIA) published in Official Gazette Nr: 24777 and dated 6 June 2002, as supplemented by Article 10 of Environmental Act No. 2872 dated 9 August 1983) and World Bank policies. Through these procedures, projects are prioritized and only co-financed when answering the loan's requirements and meeting environmental prerequisites.

The review procedure is based on the following seven elements:

- Screening;
- Documentation;
- Consultation;
- Disclosure;
- Review and approval;
- Conditionality;
- Monitoring and reporting.

The current Turkish Environmental Impact Assessment regulation classifies projects into two categories: (a) projects which have significant potential impacts and require an EIA and (b) projects which may have significant potential impacts and require further analysis. For the latter projects, a pre-EIA is prepared by the private sponsor and submitted to local authorities (governor) for a determination as to whether or not a full EIA report is required. Under current Turkish Regulation, projects, which do not fall into these two categories, are not required to take any further action with regard to the environment.

In general, projects which are evaluated by the participating banks need to fulfill two main criteria to get a positive evaluation by the Environmental Impact Assessment and to reach a loan agreement with the bank: 1) the proposed project need to be profitable to allow a short payback time, and 2) the project needs to have a positive environmental impact. As such a project which is attractive from an environmental point of view has a competitive advantage compared to projects which are only profitable.

The Case Study has been implemented through the following key steps:

Step one: Environmental Screening Categories

The first step in the overall due diligence of projects to be financed is the definition of the different environmental screening categories. Screening category refers to the level of risk of projects from low risks to strong environmental impacts, i.e. high risks.

- Category I (low risk): this includes projects whose environmental impacts are expected to be negligible, for which no EIA would be required;

- Category II (intermediate risk): this would include sub-borrowers/sub projects whose environmental impact is certified as negligible by report given by the Limited Environmental Assessment (LEA). This category also includes projects which may have intermediate levels of regular and accidental emissions;
- Category III (high risk): This includes projects which may have highly significant, negative and/or long-term environmental impacts, the magnitude of which are difficult to determine at the sub-project identification stage. A full EIA (in-depth EIA) would be prepared by the borrower in parallel with the techno-economic feasibility study.

Step two: Environmental Impact Assessment Process

This refers to the establishment of a complete EIA process including an environmental screening form that will summarize the nature of the project and borrower, as well as the screening category. The environmental assessment process includes nine key steps from the borrower's preliminary draft on the project to the loan approval and issuance:

- Step one: the sub-borrower prepares an initial project concept. It will be the responsibility of the sub-borrower to obtain the required and appropriated permits and licences;
- Step two: the bank screens the project and informs the sub-borrower of the EIA category prior to appraisal and subsequent follow-up requirements for sub-loan processing;
- Step three: the sub-borrower, or its consultant, submits the environmental analysis (if applicable);
- Step four: the bank reviews the environmental analysis that has been submitted and reports its findings to the sub-borrower;
- Step five: the sub-borrower incorporates the recommendations provided in the analysis into the project design and implementation plan, including associated estimated costs;
- Step six: the sub-borrower finalizes the sub-loan application package, including the relevant environmental documentation, and submits it to the bank for its appraisal;
- Step seven: the sub-loan becomes effective upon verification of the approval and clearance, which can be obtained at any step in the project preparation cycle;
- Step eight: the sub-borrower submits the clearance letter to the bank;
- Step nine: the bank monitors the implementation of the EIA mitigation plan.

Step three: Implementation of screening procedures

This step refers to the internal communication on new procedures including all forms and related documents to be filled out by applicants and reviewed by the bank for loan approval. Management of projects is done by TSKB and TKB. In both banks, specific employees are in charge of project management (including financial management) and implementation. There are also designated personnel who are responsible for financial reporting, document control, environmental issues and disbursement from the special account.

In TSKB any project appraisal is carried out by the Technical Services Division. In TKB project appraisals are done by the Project Appraisal Department. Each project proposal submitted to the banks is evaluated by a team of specialists comprised of an engineer(s), a financial analyst(s), and a project economist, who then prepare a project evaluation report. In TSKB, these project evaluation reports are submitted to a credit committee comprised of the chief executive officer and the executive vice presidents. In TKB, project evaluation reports are submitted to a credit committee.

Upon approval by the credit committees, these reports are submitted to the boards of directors of each bank for approval. After the approval by the boards and signing of the (sub-)loans agreement, the (sub-)loans are ready for disbursement.

The Case Study has involved the following key players and partners:

- The World Bank which defined safeguard policies on Environmental Impact Assessment;
- The Turkish Ministry of Environmental and Forests for the establishment of the Regulation on Environmental Impact Assessment (EIA);

- Finally, TSKB and TKB for the adoption and implementation of mandatory screening procedures.

16.3.4. Impact of Case Study implementation

The Environmental Impact Assessment procedures were implemented in 2004 in line with the World Bank's Renewable Energy Project in Turkey. The implementation was successful in assisting the Government of Turkey in establishing a comprehensive framework for renewable energy development, and a credible financial intermediation mechanism, that enabled Turkey to attract grants, concessional and bilateral sources of funds for renewable energy resource development. The Renewable Energy Project also enabled Turkey to add accessory non-polluting generating capacity to its current base of power plants.

So far seven sub projects have been finalized, four by TSKB and three by TKB. Four of these are smaller hydropower plants, two are geothermal and the last is wind power. As of 2009, another nine sub projects are under active preparation including several larger hydropower projects.

16.3.5. Costs for implementation

There are no detailed costs for the implementation of these Environmental Impact Assessment procedures available.

Estimated costs could be around EUR 200,000 to 250,000 for reviewing, updating and implementing new screening procedures. In particular, these costs include the following:

- Update of procedures/establishment of all new documents;
- Categorization of projects;
- Communication on new procedures.

All costs were borne by TSKB and TKB (implementation of new screening procedures as internal project).

16.3.6. Regulatory preconditions

The following policies or regulations are beneficial for successful implementation of the Case Study:

- National law providing a minimum of environmental review standards and procedures regarding development and financing of environment projects;
- Policies for project monitoring (policies regarding adoption of monitoring systems, policies on monitoring and reporting methodologies, frequency of reporting).

16.3.7. Critical success factors

The following key success factors have contributed to a successful implementation of the Case Study:

- Financing mechanisms for renewable energy projects need two aspects to be well-balanced: (a) marketing, project development and technical design to assist in preparing a pipeline of good projects, and (b) financing product development and loan origination skills;
- In order to review project documentation and assessments the necessary resources must be allocated sufficiently to the Environmental Impact Assessment process;
- For the sake of effectiveness and the optimum allocation of financial and human resources, EIA should particularly be applied where anticipated activities are likely to cause significant environmental impacts, in particular those with a long term or irreversible character.

16.3.8. Risks

The following factors may represent a risk to the successful implementation and continuation of the Case Study:

- Education and training should be regarded as an important tool to improve the practical application and implementation of EIA. Concerned staff members in both banks must be adequately skilled and experienced to handle the Environmental Impact Assessment process.

- Project developers might be unwilling to follow safeguards policies. Other donors do not have additional requirements beyond Turkish law.

16.3.9. Conclusions and recommendations for replication

Introduction

This Case Study refers to the establishment of standard procedures aiming at screening each project considering financial, technical and environmental aspects. Environmental Impact Assessment is a tool used for facilitating decision making regarding the significant environmental consequences of projects, developments and programmes.

EIA helps the stakeholders with the identification of the environmental, social and economic impacts of a proposed development before a decision is taking on whether or not to proceed. This normally includes consideration of the need for the project as well as possible alternatives (i.e. siting, designs and layout), and the no-development option. EIA should, in principle, be applicable to a wide range of activities including urban development, agricultural and industrial development (including retrofitting into old technology) and energy generation and transportation, the development and operation of physical infrastructures, natural resources exploitation, treatment, storage and disposal of waste. Through screening procedures, projects are prioritized and only co-financed when answering all requirements.

Furthermore, the application of an Environmental Impact Assessment will lower the risks associated with provisioning of loans to projects which do not achieve targeted objectives and may significantly harm the environment.

Depending on the nature and degree of the assessed impacts, EIA should continue during the construction, operational and decommissioning phases of activities in order to:

- Monitor compliance with the agreed conditions set out in construction permits and operating licenses;
- Review environmental impacts for the proper management of risks and uncertainties;
- Modify the activity or develop mitigation measures in case of unpredicted harmful effects on the environment;
- Verify past predictions in order to transfer this experience to future activities of the same type[319].

By considering environmental effects and mitigation early in the project planning cycle, environmental screening might result in particular in reducing project costs and delays. Furthermore, the screening of projects might result in optimizing the financing of projects by donors (optimal projects portfolio).

The implementation of the Case Study ensures the sustainable use of natural resources and minimizes the risks of negative environmental impacts. Through the review procedure, donors ensure financing of projects that comply with national environmental regulation. The implementation of Environmental Impact Assessment procedures of projects proposed for bank financing help ensure that these projects are environmentally sound and sustainable, and thus to improve decision making. EIA procedures evaluate a project's potential environmental risks and impacts in its area of influence, examines project alternatives, and identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts through project implementation.

EIA is initiated as early as possible in project processing and is integrated closely with economic, financial, institutional, social, and technical analyses of a proposed project. The donor reviews the findings and recommendations of the EIA to determine whether they provide an adequate basis for processing the project for financing. The donor may, if appropriate, require additional EIA work, including public consultation and disclosure.

This Case Study is recommended for replication in those countries which suffer from similar barriers than those experienced in Turkey before the implementation of the Case Study. Such barriers belong to the lack of sustainability awareness, standards and instruments among commercial banks, in particular the lack of a set of standards and procedures applied by national and private banks and other donors when deciding about assignments of loans in the area of renewable energy projects. In each country, an authority should be identified to introduce and oversee the administration of national EIA programmes.

The following recommendation shall exemplify the way this Case Study should be implemented in the countries Albania, Bosnia and Herzegovina, and the Republic of Moldova. Apart from the countries chosen as examples, we believe that due to their general situation and the barriers which need to be overcome in these countries also Kazakhstan, the former Yugoslav Republic of Macedonia, and Ukraine are appropriate for implementation of the presented Case Study.

To implement the Case Study in the recommended countries, a time period of approximately one year is estimated for each country. Costs of the implementation of the Case Study are estimated to be at least 200,000 to 250,000 EUR per country for the categorization of projects (Case Study phase one), for the update of procedures and the establishment of new documents (Case Study phases two and three), and for the communication on the new procedures (Case Study phases one to three).

Recommendations for replication in Albania

General situation in Albania

Currently, hydro power accounts for 98 per cent of electricity generation in Albania. Since Albania has a Mediterranean climate, the potential for solar energy utilization is high and the installation of solar panels for water heating has already begun. Due to a competitive and transparent concession policy and supported by a comprehensive legal framework, from March 2007 on, more than 170 new projects on small hydro power plants have been considered and 60 concessionary agreements have been approved. As such the situation with regard to such projects resembles what was the case in Turkey before the implementation of the Case Study.

In 2005, Albania approved an Energy Efficiency Law, which sets out plans to improve energy efficiency. According to the National Energy Strategy renewable energy resources (solar, wind, biomass, small hydro power plants) should be stimulated for a maximal use of indigenous resources. A National Strategy for Renewable Energy Sources and a Law on Renewable Energy Sources are currently under development.

According to the National Bank of Albania, the commercial banking sector suffered severely from the latest economic crisis, but experienced a slight improvement recently. Similar to the situation in Turkey before the implementation of the Case Study, commercial banks have little experience in financing energy projects. Nevertheless, some local banks are discussing lending to small hydro power plant projects. Comparable to Turkey, international finance institutions offer direct assistance programmes in Albania.

Barriers in Albania

The National Energy Strategy appears to be rather generic in its objectives on energy efficiency and renewable energy projects without a concrete implementation plan and appears to be more declaratory than operational. Furthermore, the development of renewable energy sources does not appear among the main targets.

The Law on Energy Efficiency has been barely set on force and the foreseen financing instruments for energy efficiency are very vague and do not appear to be much more than awareness raising measures. One major economic and financial barrier to the development of energy efficiency and renewable energy projects is Albania’s difficult economic situation. This is one of the main reasons for the absence of public funding and the lack of support for such projects.

Additionally, commercial banks suffer from the lack of sustainability awareness, standards and instruments and they have no experience in financing projects in the areas of energy efficiency and renewable energy projects. The implementation of the Case Study helped to overcome similar issues concerning project financing and the assignments of loans in Turkey.

Recommendations for Albania

The following steps should be carried out for successful replication of the Case Study in Albania:

- The Albanian National Agency of Natural Resources being responsible for establishing legal frameworks in the energy sector should establish a set of national rules or laws for standards on environmental reviews and procedures;
- The National Bank of Albania should act as overall project coordinator and should find a set of safeguard policies issued by an international financing institution (e.g. the World Bank, the Kreditanstalt für Wiederaufbau, or the European Bank for Reconstruction and Development) and find international projects, applicable to Albania, which are appropriate and willing to assign loans to projects being developed in Albania in a later stage of the Case Study implementation. Since the European Bank for Reconstruction and Development already provides three energy related credit lines in the western Balkans, it might be a good starting point;
- In close cooperation with the Albanian Bank Association, the National Bank of Albania should define policies for project conduct and project monitoring (including supported technologies and reporting structures);
- With the assistance of the Albanian Bank Association, the National Bank of Albania should find financing institutions (e.g. commercial national banks), which already established contact to renewable energy, infrastructure, energy efficiency etc. project developers for the sake of assigning loans;
- The National Bank of Albania in cooperation with the Albania-EU Energy Efficiency Centre (EEC), which already conducted projects in the area of energy efficiency and renewable energy sources, should create environmental screening categories for projects according to environmental risks associated with the projects. Furthermore, the National Bank of Albania should create an environmental assessment process (comparable to the EIA process described in the Case Study) and assign personnel to carry out the project assessments;
- The National Bank of Albania should establish a bank internal process and the according internal communication to handle the assessment process, define personnel to handle each form and step in the process, and assign responsibility for project approval to appropriate department (in the Case Study this was the board of directors);
- The National Bank of Albania with the assistance of the Albanian Bank Association should create inter-bank communication processes, since projects applying for loans will be handled by several banks at different stages of assessment in the overall process and set up the IT infrastructure needed for handling of the processes;
- The National Bank of Albania and the Albanian Bank Association should inform project developers who are willing to apply for loans about the new process, the documents, and forms they have to handle, and support project developers in handling the paperwork. At this stage of the Case Study implementation, national private banks should be actively involved through the Albanian Bank Association, since they represent the direct contact to the applicants, i.e. the project developers;
- The National Bank of Albania with assistance of the Albanian Bank Association should establish a quality control for the assessment process (e.g. processing time, transparency) and monitor the results of the projects, for which loans were assigned and make sure, that the projects are conducted according to the requirements of the programme, in which the loan was granted.

Recommendations for replication in Bosnia and Herzegovina

General situation in Bosnia and Herzegovina

The share of renewable energy sources in the electricity production is 44 per cent, mainly due to large hydro power plants. At the moment small hydro power plants are the most promising renewable energy source in Bosnia and Herzegovina. The wind energy potential and the solar energy potential in Bosnia and Herzegovina are significant and the most significant source for biomass for energy production is wood from forestry and from the wood processing industry.

Some actions are taken to prepare terms of reference on energy efficiency and renewable energies. In November 2008, a first landmark agreement on a national energy policy was reached. Although a Law on Energy Efficiency has been proposed, there are no energy efficiency laws in place at the state or entity level in Bosnia and Herzegovina. For renewable energies, targets to be met have been defined indirectly through international obligations, such as European Commission Directives. At present, there are no official ESCOs operating in Bosnia and Herzegovina, though there is at least one company using the ESCO concept in implementing small-scale projects.

The financing environment for energy efficiency and renewable energy sources is still very rudimentary and no existing operational funds are accessible at the state or entity levels. An energy efficiency programme Energy sanitation of Sarajevo was defined for the period 2007 to 2010 with a project budget of EUR 500,000 for energy efficiency pilot projects.

The European Bank for Reconstruction and Development plans to dedicate approximately EUR 20 million to Bosnia and Herzegovina targeting small and medium sized enterprises for energy efficiency and renewable energy sources projects. The main financing sources for energy efficiency and renewable energy sources are regular commercial loans that investors do not consider favorable since the interest rates for long term loans reach up to 12 per cent. The difficult financial situation of many companies in the industry and services sectors does not make energy efficiency investments a priority. However, there are several international organizations sponsoring development programmes aiming at capacity building and awareness raising. As such the overall situation in Bosnia and Herzegovina with respect to international project financing and the lack of availability of loans assigned to the actual projects resembles to what is known from Turkey before the implementation of the Case Study.

Barriers in Bosnia and Herzegovina

Bosnia and Herzegovina faces several legal, institutional and administrative barriers, which are related to the enduring political division of the country such as the absence of decisional competences in energy matters at the state level, the lack of interaction and coordination between the entities, and the lack of centralized information sources.

Apart from those barriers Bosnia and Herzegovina shares some barriers with other countries as well, such as the lack of coordination between institutions involved in energy efficiency and renewable energy sources. There are no agencies or dedicated institutions that may coordinate with other ministries or institutions and the regulatory commissions for the sake of developing a national energy strategy. There is a lack of secondary legislation for operative support of project development and policy implementation, such as construction standards, simplified authorization procedures, and requirements to consider energy efficiency projects in public procurement processes.

Similar to the situation in Turkey before the implementation of the Case Study, one of the main economic and financial barriers for investments and project development in energy efficiency and renewable energies in Bosnia and Herzegovina lie in the limited availability of financing mechanisms for projects caused by the low level of awareness among population, public administration and policy makers and the lack of sustainability awareness, standards and instruments among commercial banks.

Recommendations for Bosnia and Herzegovina

The following steps should be carried out for successful replication of the Case Study in Bosnia and Herzegovina:

- The Ministry of Foreign Trade and Economic Relations (MoFTER) as being responsible for policy defining and the development of basic principles in Bosnia and Herzegovina should establish a set of national rules or laws for standards on environmental reviews and procedures;
- Since the Raiffeisen Bank of Bosnia and Herzegovina is the only bank so far engaged in the field of energy efficiency and renewable energy sources, it should act as overall project coordinator and should find a set of safeguard policies issued by an international financing institution (e.g. the European Bank for Reconstruction and Development, which is already planning to dedicate a credit line to energy efficiency and renewable energy projects in Bosnia and Herzegovina) and find international programmes, applicable to Bosnia and Herzegovina, which are appropriate and willing to assign loans to projects being developed in Bosnia and Herzegovina in a later stage of the Case Study implementation;
- In close cooperation with the international institution granting the credit lines for Bosnia and Herzegovina, the Raiffeisen Bank of Bosnia and Herzegovina should define policies for project conduct and project monitoring (including supported technologies and reporting structures);
- The Raiffeisen Bank of Bosnia and Herzegovina should either establish contact to project developers willing to apply for loans or find other financing institutions (e.g. smaller commercial national banks), which already established contact to renewable energy, infrastructure, energy efficiency etc. project developers for the sake of assigning loans;
- The Raiffeisen Bank of Bosnia and Herzegovina with the assistance of the international institution granting the credit lines for Bosnia and Herzegovina should create environmental screening categories for projects according to environmental risks associated with the projects. Furthermore, the Raiffeisen Bank of Bosnia and Herzegovina should create an environmental assessment process (comparable to the EIA process described in the Case Study) and assign personnel to carry out the project assessments;
- The Raiffeisen Bank of Bosnia and Herzegovina should establish a bank internal process and the according internal communication to handle the assessment process, define personnel to handle each form and step in the process, and assign responsibility for project approval to the appropriate department (in the Case Study this was the board of directors);
- The Raiffeisen Bank of Bosnia and Herzegovina with the assistance of the former identified national banks should create inter-bank communication processes, since projects applying for loans will be handled by several banks at different stages of assessment in the overall process and set up the IT infrastructure needed for handling of the processes;
- The Raiffeisen Bank of Bosnia and Herzegovina and the identified national banks should inform project developers who are willing to apply for loans about the new process, the documents, and forms they have to handle, and support project developers in handling the paperwork;
- The Raiffeisen Bank of Bosnia and Herzegovina should establish a quality control for the assessment process (e.g. processing time, transparency) and monitor the results of the projects, for which loans were assigned and make sure, that the projects are conducted according to the requirements of the programme, in which the loan was granted.

Recommendations for replication in the Republic of Moldova

General situation in the Republic of Moldova

Renewable energy sources power plants account for approximately four to five per cent of electricity generation in the Republic of Moldova. The Energy Strategy of the Republica of Moldova until 2020 foresees to increase the share of renewable energy sources in the country's energy balance up to six per cent in 2010 and 20 per cent in 2020. In order to achieve these goals, the installation of huge amounts of solar installations, fuel wood power plants and large and small hydro power plants are necessary. The market for renewable energy sources in the Republic of Moldova is still in an early stage, but some renewable energy sources power plants are in construction or have already been built in recent years.

Energy efficiency is a priority in the Republic of Moldova and strategic policy objectives for energy conservation have been defined in the National Programme of Energy Conservation for 2003 to 2010. The Moldovan National Programme of Energy Conservation for the years 2003 to 2010 is the main policy document guiding government actions in pursuing increased energy efficiency of the economy. It sets out quantitative targets for efficiency improvements at the economy level, priority areas for energy conservation and efficiency interventions and it indicates activities to carry out in order to achieve stated objectives. The Programme aims at increasing energy efficiency by minimizing energy intensity by two to three per cent per year.

Lack of financing limits the demand for energy services until now. No real ESCO have been created but there are a limited number of companies actively working in the field of energy efficiency in the Republic of Moldova. Economic incentives to stimulate the implementation of energy efficiency projects have not been established so far in the Republic of Moldova. Secondary legislation elements like the law on ESCOs or regulation regarding energy conservation incentives are under development and will play a crucial role in supporting the implementation of the energy conservation policy.

So far commercial banks in the Republic of Moldova have not actively financed energy efficiency or renewable energy sources projects, or developed any dedicated credit lines. Such projects have been so far financed only by international financial institutions and/or international donors. The limited experience and the missing of dedicated national credit lines are similar to the situation in Turkey before the implementation of the Case Study.

Barriers in the Republic of Moldova

The revision of the current Law on Energy Conservation is ongoing since 2008 but no reliable information regarding the progress could be gathered until now. Furthermore, legal, institutional and administrative barriers such as the lack of secondary legislation to guarantee implementation of regulatory framework (e.g. to support the development of ESCOs) have been experienced so far. At the moment the overall political situation regarding the start of the operation of the National Agency for Energy Efficiency, the establishment of the planned Energy Efficiency Fund, and the takeover of all energy related tasks by the Ministry of Economy and Trade is unclear and is likely to hamper investments related to energy efficiency and renewable energies.

Comparable to what was the case before implementation of the Case Study in Turkey, public funding is absent or insufficient for projects and initiatives for the development of energy efficiency and renewable energy projects. The lack of private companies active in the sector of project development is an indicator not only for the lack of financial resources, but also for the lack of awareness of the possibilities of investment return offered by the energy sector. Furthermore, high interest rates applied by commercial Moldovan banks for loans to private investors do not support the formation of a market of private companies involved in the development of energy projects. The Republic of Moldova experiences a low level of awareness among population, public administration and policy makers as well as lack of sustainability awareness, standards and instruments among commercial banks.

The implementation of the concepts described in this Case Study is appropriate to overcome the lack of awareness, standards and instruments presently experienced in Moldovan commercial banks and therefore contribute to improving the overall situation with respect to energy efficiency and renewable energy in the Republic of Moldova.

Recommendations for the Republic of Moldova

The following steps should be carried out for successful replication of the Case Study in the Republic of Moldova:

- The National Agency for Energy Regulation (ANRE) being responsible for the introduction of market mechanisms and regulation of prices and pricing principles in the energy sector should establish a set of national rules or laws for standards on environmental reviews and procedures;
- The National Bank of Moldova should act as overall project coordinator and should find a set of safeguard policies issued by an international financing institution (e.g. the World Bank, or the European Bank for Reconstruction and Development) and find international donor programmes, applicable to the Republic of Moldova, which are appropriate and willing to assign loans to projects being developed in the Republic of Moldova in a later stage of the Case Study implementation;
- In close cooperation with the ENERGY Plus, an NGO working on the promotion of renewable energy sources, the National Bank of Moldova should define policies for project conduct and project monitoring (including supported technologies and reporting structures);
- The National Bank of Moldova should find financing institutions (e.g. commercial national banks), which already established contact to renewable energy, infrastructure, energy efficiency etc. project developers for the sake of assigning loans. Since the Moldova Agroindbank is the largest commercial bank of Moldova, it should serve as a starting point;
- The National Bank of Moldova should create environmental screening categories for projects according to environmental risks associated with the projects. For gaining experience on the topic, it should consult international organizations as the European Bank for Reconstruction and Development and/or national companies, which already have experience on the topic, such as Geotermal-AV or Dina-Cociug. Furthermore, the National Bank of Moldova should create an environmental assessment process (comparable to the EIA process described in the Case Study) and assign personnel to carry out the project assessments;
- The National Bank of Moldova should establish a bank internal process and the according internal communication to handle the assessment process, define personnel to handle each form and step in the process, and assign responsibility for project approval to appropriate department (in the Case Study this was the board of directors);
- The National Bank of Moldova with the assistance of the Moldova Agroindbank should create inter-bank communication processes, since projects applying for loans will be handled by several banks at different stages of assessment in the overall process and set up the IT infrastructure needed for handling of the processes;
- The National Bank of Moldova, the Moldova Agroindbank, and the "ENERGY Plus" should inform project developers who are willing to apply for loans about the new process, the documents, and forms they have to handle, and support project developers in handling the paperwork. At this stage of the Case Study implementation, smaller national private banks should be actively involved, since they are likely to represent the direct contact to the applicants, i.e. the project developers;
- The National Bank of Moldova should establish a quality control for the assessment process (e.g. processing time, transparency) and monitor the results of the projects, for which loans were assigned and make sure, that the projects are conducted according to the requirements of the programme, in which the loan was granted.

16.4. *Incentives for Foreign Investments – Case Study of Bosnia and Herzegovina (recommendations for replication in Kazakhstan and the Republic of Moldova)*

Box 16: Incentives for Foreign Investments

The presented Case Study relates to legal, institutional and administrative barriers, namely limitations to foreign investments. Although Bosnia and Herzegovina has a good potential for investments in energy efficiency and renewable energy sources, the investment climate of the country suffers from the administrative structure of the country leading to e.g. a lack of consistent regulation with regard to the handling of foreign investments.

The Case Study introduces changes in the fiscal framework and the establishment of a support fund with the objective to boost direct investments in Bosnia and Herzegovina. For this purpose, two key laws have been adopted in 1998 introducing tax incentives and policies supporting direct investments.

Furthermore, the Foreign Investment Promotion Agency (FIPA) of Bosnia and Herzegovina was established as state agency, to further develop and improve the business climate of the country. In 2007, a support fund has been designed within the FIPA providing financial support for foreign investors. The fund has an annual budget of EUR one million that is yearly renewed without defined duration at the moment.

The Case Study is recommended for replication in Kazakhstan, the Republic of Moldova, and the Russian Federation, since these countries are facing similar barriers as Bosnia and Herzegovina before the implementation of the Case Study. Although each of these countries already disposes of an agency concerned with the support of foreign businesses in the particular country, in each of the recommended countries one of the main barrier towards the development of energy efficiency and renewable energy projects is the limitation to foreign investments. Reasons for the barrier are manifold, like the lack of a consistent regulatory framework and the lack of dedicated budgets for the concerned agencies.

16.4.1. Background to the Case Study

General situation in Bosnia and Herzegovina

Bosnia and Herzegovina has a very good potential in renewable energy sources, especially in biomass and hydro. But the number of these resources being used effectively is very low because of the limited availability of foreign and domestic investments.

Furthermore, Bosnia and Herzegovina has a good potential for investments in energy efficiency, but the investment climate of the country suffers from the administrative structure of the country. Following the Dayton agreements, the state of Bosnia and Herzegovina has no competences regarding energy policy and national energy strategy, which is regulated at the entity level. This has led to the establishment of parallel policies, authorization procedures and the presence of administrative and legal barriers for investors wanting to operate in both entities.

Barriers in Bosnia and Herzegovina

Before Case Study implementation among the main economic and financial barriers for investments was the lack of regulation with regard to the handling of foreign investments in Bosnia and Herzegovina as well as the lack of dedicated institutions aiming at attracting foreign investment. Furthermore, this institutional barrier resulted in the lack of policies to increase or establish foreign investments. As a consequence, Bosnia and Herzegovina suffered from limitations to foreign investments before the Case Study was implemented.

16.4.2. Description of the Case Study

The Case Study introduces changes in the fiscal framework and the establishment of a support fund with the objective to boost direct foreign investments in Bosnia and Herzegovina. As such, in 1998 the Federation Law on Corporate Income Tax and the Law on the Policy of Foreign Investments have been adopted and the Foreign Investment Promotion Agency (FIPA) was established as state agency. Key mission of the FIPA is to further develop and improve the business climate of the country. In 2007, a support fund has been designed, the Foreign Investors Support Fund (FISF), which was meant to provide financial support for foreign investors in Bosnia and Herzegovina. The FISF has a yearly budget of EUR one million.

16.4.3. Approach for implementation of the Case Study

The Law on the Policy of Foreign Investment[320] was adopted by the Parliamentary Assembly in Bosnia and Herzegovina in 1998. The objective of the law is to encourage foreign direct investments, to protect the rights of foreign investors, to define investment and investors in line with international standards, and thus regulate the principles to increase foreign investments through established policies.

In 1998, the Foreign Investment Promotion Agency of Bosnia and Herzegovina was established. FIPA is an independent administrative organization and has the status of a legal entity. It promotes and improves foreign direct investments in accordance with the law, decisions and instructions of the Council of Ministers of Bosnia and Herzegovina.

The Foreign Investment Promotion Agency of Bosnia and Herzegovina supports potential investors in entering into business or projects in Bosnia and Herzegovina. The maximum subsidy granted by the FIPA is EUR 150,000 per project. In average, for supporting investment projects FIPA paid out about EUR one million per year. These funds are used to support industrial and commercial businesses.

FIPA offers practical assistance in dealing with government institutions, by advising potential investors on formalities, how to comply with formalities, and the according institutional competencies. Furthermore, in some regions there are so-called Business Service Centers (BSCs), which are offering similar services on regional level than the FIPA on state level.

FIPA is also working directly with investors and assisting the government in improving the legal framework for foreign investments. FIPA will also assist investors to develop contacts with the public and private sector. All of the Agency's services are free of charge.

At the proposal of the FIPA the Council of Ministers of Bosnia and Herzegovina adopted on 20 September 2007 the last three decisions necessary for the Foreign Investors Support Fund (FISF) to become operative. Key objectives are to provide financial support for projects realized in Bosnia and Herzegovina and financed through foreign investors, and to remove legal and administrative barriers that slowdown the economical and industrial growth of the country.

The Foreign Investors' Council (FIC) is another non-profit business association, representing the interests of foreign businesses in Bosnia and Herzegovina. It was established in August 2006, and was formally registered in December 2006. Its objectives are to improve the investment and business environment in Bosnia and Herzegovina, and promote communication and cooperation between the FIC and state authorities.

In order to encourage foreign investors and contribute to a productive business climate, the following incentives have been defined:

State Level Incentives

Establishment of a Foreign Investor Support Fund: the budget of the fund per year is around EUR one million. The amount of means provided to each applicant is maximum EUR 150,000. Resources of the fund may be used in order to finance foreign investment projects in production, research and development sectors. Evaluation of the projects will be made according to defined criteria (i.e. sector, environmental impact, economical feasibility, investment in undeveloped areas, associated risks). It is foreseen that the fund is used for financing projects of foreign investors in the production sector, sector of researches and development, and other projects except in catering and trade.

Tax Incentives

The Federation Law on Corporate Income Tax[321] (CIT) of the Federation of Bosnia and Herzegovina states that a taxpayer that generates more than 30 per cent of its total turnover from export activities within one calendar year is exempt from paying CIT for that year (Article 31).

A taxpayer that invests at least BAM 20 million (USD 16 million) in the territory of the Federation of Bosnia and Herzegovina within a period of five consecutive years is exempt from paying CIT for five years, starting with the first year of the investment; at least BAM four million must be invested in this first year (Article 32). Taxpayers must undertake certain actions and provide the competent tax authorities with evidence proving their entitlement to these CIT exemptions.

The Case Study has involved the following key players and partners:

- Council of Ministers of Bosnia and Herzegovina as responsible for the establishment of the FIPA and the fund (provision of financial resources). The FIPA and the Fund apply for the entire Republic of Bosnia and Herzegovina.
- The Foreign Investment Promotion Agency as main governmental organization for the promotion and the support of foreign investments and as manager of the fund. The FIPA has the mission to:
    - Attract and maximize the flow of foreign direct investment into Bosnia and Herzegovina, and encourage existing foreign investors to further expand and develop their businesses in Bosnia and Herzegovina;
    - Facilitate the interaction between public and private sectors, and have an active role in policy advocacy in order to contribute to continually improving the environment for business investment and economic development;
    - Promote a positive image of Bosnia and Herzegovina as a country that is attractive to foreign investors.
- The Government of the Federation of Bosnia and Herzegovina for the definition and adoption of the Law on Corporate Income Tax.

The main steps that allowed the implementation of the Case Study are the following:

Step one: Adoption of the Law on the Policy of Foreign Investments

Establishment and adoption of the Law on the Policy of Foreign Direct Investment (FDI Law) and the Law on Corporate Income Tax (CIT Law) including exemptions and appliance. The Federal Minister of Finance was responsible for the establishment and implementation of these laws.

The FDI Law ensures the national treatment of foreign investors: foreign investors have the same rights and obligations as residents of Bosnia and Herzegovina. The FDI Law specifically stipulates that foreign investors have the following rights and benefits:

(a) The right to invest and reinvest the profits of such investments into all sectors of the economy under the same conditions as any Bosnia and Herzegovina resident, with the exception of the armament and media sectors, where foreign control of a legal entity is limited to 49 per cent.

(b) If the foreign investment represents a contribution in kind into a company already established or to be established by a foreign investor or jointly by a foreign investor and domestic physical persons or legal entities, the contribution shall be exempted from paying customs (with the exception of passenger cars, slot and gambling machines, and parts of them), provided that the conditions below are fulfilled.

(c) The right to transfer abroad, freely, without delay, and in any currency, the profit resulting from investment in Bosnia and Herzegovina.

(d) The right to be entitled to the same ownership rights over real estate (once registered as the owner) as domestic nationals and resident legal entities.

The FDI Law strengthens the protection of foreign investments, stipulating that foreign investments shall not be subject to any act of nationalization, expropriation, or measures with similar effects, except when in the public interest in accordance with applicable laws and regulations, and against the payment of appropriate compensation. The FDI Law states that the rights and benefits of foreign investors and the obligations imposed on them by the FDI Law cannot be terminated or overruled by subsequent laws and regulations. Should a subsequent law or regulation be more favorable to foreign investors, the investor will have the right to choose the regime according to which the investment will be regulated[322].

Step two: Adoption of the Law on Foreign Investment Promotion Agency of Bosnia and Herzegovina[323]

The Parliamentary Assembly of Bosnia and Herzegovina, at the session of the House of Peoples held on 23 November 2004, and the session of the House of Representatives held on 3 December 2004, adopted the Law on Foreign Investment Promotion Agency. The law regulates the main competences and objectives of the Foreign Investment Promotion Agency.

Step three: Establishment of the Foreign Investment Promotion Agency

The Foreign Investment Promotion Agency was established in 1998 and mandated by the government to facilitate and support foreign direct investment. In order to accomplish its objectives, the Agency:

- Provides information to potential investors about the legislation of Bosnia and Herzegovina;
- Directs the investors towards potential investment projects in the entities, cantons, regions and certain economic sectors;
- Presents the advantages and characteristics relating to the projects, such as: Legal, economic and financial framework, tax system, industrial environment, and benefits given to the investors at the state, entity or lower levels;
- Organizes and/or participates at seminars, exhibitions and conferences on promotion of the state;
- Follows up and analyses the investment environment at the state and international level;
- Proposes legislation and legal measures aimed at promoting investment conditions;
- Takes part in negotiations on interstate, bilateral and multilateral investment agreements;
- Initiates and maintains the cooperation with the same or similar agencies of other countries.

Step 4: Establishment of the Foreign Investor Support Fund

In June 2007, the Foreign Investors' Support Fund was established at the state level as an institution to support foreign investors in Bosnia and Herzegovina. The FISF became operative as of February 2008. The FISF distributes its funds to eligible foreign investors. Foreign investors interested in applying for the FISF's resources must follow the procedures determined in the Rule Book on the Manner of Distributing Resources for the Support of Foreign Investors in Bosnia and Herzegovina.

16.4.4. Results of the Case Study implementation

The main rights and benefits of foreign investors in Bosnia and Herzegovina are regulated at the state level. Certain specific rights and benefits are incorporated into state-level laws (for example, the Law on Customs Policy) and entity-level laws (for example, corporate income tax laws).

The introduction of the Foreign Investors Support Fund and additional fiscal incentives (taxation) has mainly had an economical impact on Bosnia and Herzegovina:

- It has attracted and maximized the flow of foreign direct investment into Bosnia and Herzegovina. In 2007 direct foreign investments reached EUR 1,628 million (all-time high);
- It encourages existing foreign investors to further expand and develop their businesses in Bosnia and Herzegovina;
- It facilitates the interaction between public and private sectors through joint actions and efforts of all relevant stakeholders responsible for attracting foreign investments in the country;
- It contributes to continually improving the environment for business investments and economic development;

- It promotes a positive image of Bosnia and Herzegovina as a country that is attractive to foreign investors.

The establishment of the Foreign Investment Promotion Agency led to an effective networking with both the public and private sectors. It provides a link between governmental and non-governmental institutions (i.e. foreign investment agencies of Balkans) in order to facilitate investment and business development through the signature of MoU's (memorandum of understanding). Furthermore, the cooperation between local, regional and international organizations (i.e. World Bank, EU Commission) to promote and enhance the investment environment in Bosnia and Herzegovina has been strengthened and shall be expanded in the future.

The introduction of investment incentives has yielded no direct environmental benefits. However, it indirectly contributes to an increased deployment of renewable energy sources through the development and implementation of energy projects.

16.4.5. Costs for implementation

The implementation of the Case Study required financial resources for the setting-up of the Foreign Investor Support Fund which amount to approximately EUR eight to ten million. A detailed breakdown of these costs is not available.

The annual budget of the fund is EUR one million. The Council of Ministers of Bosnia and Herzegovina is the main cost-bearer as it established the Foreign Investment Promotion Agency and provided the required financial resources for the establishment and operation of the fund.

The Government of the Federation of Bosnia and Herzegovina has also participated financially in the development and implementation of related laws (i.e. law on taxation).

16.4.6. Regulatory preconditions

For the successful implementation of the Case Study, the following key programmes and policies are relevant:

- Solid legal groundwork (e.g. bankruptcy, collateral, and enforcement laws);
- Bilateral agreements and treaties avoiding double taxation and for mutual promotion and protection of capital investments;
- Regional investment policies enabling the development of infrastructure projects.

16.4.7. Critical success factors

The following key success factors have contributed to the successful implementation of the Case Study:

- A macroeconomic stability in Bosnia and Herzegovina;
- A positive effect on the domestic investment climate through strong regional cooperation and integration;
- Fast improving infrastructure (i.e. transportation) ensuring connection with the European and Commonwealth of Independent States markets.

Several “lessons learned” from the implementation of the Case Study should be considered for successful replication of the Case Study in other countries:

- The formulation of a national and regional investment promotion strategy and the establishment of a coordinating National Investment Agency have a beneficial influence;
- Strong regional cooperation and integration have a positive effect on the national investment climate;
- Attractive financial laws for foreign investors can successfully break new ground and profoundly improve general conditions for foreign investments;
- Joint-presentations of national and regional institutions and authorities are the most effective in attracting foreign direct investments.

16.4.8. Risks

The following factors may represent a risk to the successful implementation and continuation of the Case Study:

- Although the introduction of financial incentives and the continuous removal of legal and administrative barriers for the promotion of foreign investments have resulted in a more transparent situation for foreign investors, corruption and inefficient bureaucracy can still undermine any kind of improvement;
- While encouraging foreign investors to realize and invest in domestic projects, the government should be attentive to ensure that profits from the investments are maintained within the country. At the same time domestic companies should be encouraged to improve their know-how in all industry sectors, specifically in matters of renewable energy sources and energy efficiency;
- Due to the limited amount of capital provided within the Foreign Investors Support Fund in connection with the absence of decisional competences in energy matters at the state level, and the lack of awareness regarding energy efficiency and renewable energy projects, it is questionable whether fund capital will flow into this sector;
- A complex legal and regulatory framework, non-transparent business procedures (e.g. public procurement tenders) and weak judicial structures might still impede pursuing an improved investment climate.

16.4.9. Conclusions and recommendations for replication

Introduction

Bosnia and Herzegovina has made significant efforts to open its economy to more foreign investment. The state-level Law on Foreign Direct Investment provides a broad framework for foreign investment. The Law accords foreign investors the same rights as domestic investors. With a few exceptions, there are no restrictions on investment. Investors are also protected from changes in laws regarding foreign investment. Should the government make changes, the investor may choose the most favorable set of rules to apply. The law prohibits expropriation and nationalization of assets, except under special circumstances and not without due compensation. Finally, because of the requirement for equal treatment, the law also treats foreign investors the same as domestic investors with respect to bidding on privatization tenders.

The establishment of the Foreign Investment Promotion Agency and of the related fund is a policy measure at the state level and therefore helps to overcome the existing barriers related to the administrative structure mentioned above.

This Case Study contributes in removing legal and administrative barriers for foreign investments and is recommended for Kazakhstan, the Republic of Moldova and the Russian Federation. All those countries already established organizations or agencies, which have the aim to promote foreign investments (KAZINVEST in Kazakhstan, the Moldovan Investment and Export Promotion Organization, and the National Investment Agency in the Russian Federation).

However, these promotion centers do not have an established financial budget and they are not enclosed in clear regulatory frameworks such as is the case of the FIPA. Therefore the establishment of a clear financial budget for target sectors for investments (e.g. in the area of energy efficiency and renewable energy sources) and of a clear regulatory framework for attracting foreign investors in the countries would foster the development of markets for energy efficiency services and renewable energy sources.

The initial implementation of the Case Study happened in a timeframe of nine years altogether. However, since the most important project phases (phase one, two, and four) were carried out in a timeframe of two years (1998 and 2007), a timeframe of at least two to three years appears to be realistic for the successful replication of the Case Study.

Costs for the implementation of the Case Study are estimated to be at least EUR eight to ten million for the establishment of the Foreign Investor Support Fund (implementation phase four), not including the yearly budget of EUR one million.

Recommendations for replication in Kazakhstan

General situation in Kazakhstan

In Kazakhstan, the energy saving potential is high, particularly in the industry sector, since there is still outdated or obsolete technology in use. Furthermore, Kazakhstan has attractive opportunities to use renewable energy sources, such as hydro potential and potential for wind energy.

Kazakhstan disposes of an Investment Promotion Center, KAZINVEST, which was established as a closed joint-stock company in 2000 and which is owned by the state and managed by the Ministry of Foreign Affairs on behalf of the Government of the Republic of Kazakhstan. The main aim of KAZINVEST is to create an attractive investment image and a favorable environment for investors. Some of the services offered by KAZINVEST include the maintenance of information databases on projects which require financing, assistance to prospective investors and to domestic companies in the search of investors, provision of legal services on the whole range of issues in the area of investment activities, as well as providing support in the preparation of feasibility studies.

Barriers in Kazakhstan

Despite the efforts made by the government to support a positive environment for foreign investments, there are still administrative restrictions for foreign investments. Although KAZINVEST is actively supporting foreign investments since 2000, up to now it was not able to overcome the barrier of limited foreign investments in Kazakhstan. This is mainly due to the lack of dedicated regulation related to foreign investments and the lack of dedicated support budgets assigned to KAZINVEST. Furthermore, an increase in energy efficiency and in the deployment of renewable energy sources in particular related to the support of foreign investors do not appear to have a prominent role in the National Energy Programme of Kazakhstan, which points toward a general lack of awareness with regard to energy efficiency and renewable energy sources.

In Kazakhstan, the implementation of the Case Study is recommended for overcoming the barrier of limitations to foreign investments. However, since KAZINVEST is already existing in Kazakhstan, it should act as a project coordinator for Case Study implementation. Additionally, KAZINVEST should be supported by dedicated regulation and budgets for the support of foreign investors as is the case with Bosnia and Herzegovina's FIPA.

The replication of this Case Study can help to overcome barriers described here and develop a set of rules and laws on the conduct of the KAZINVEST as well as assigning budgets for the active support of foreign investments.

Recommendations for Kazakhstan

The following steps should be carried out for successful replication of the Case Study in Kazakhstan:

- The Ministry of Finance in cooperation with the Ministry of Energy and Mineral Resources of the Republic of Kazakhstan should either implement the already developed Law on Energy Savings and expand the law for the topic of foreign investment support or establish a new legal basis for foreign investments and regional investment policies, particularly covering the renewable energy and energy efficiency sector, enabling the development of infrastructure and power generation projects; or

- The Ministry of Finance should establish a law on the Policy of Foreign Direct Investment (FDI Law) and a law on Corporate Income Tax (CIT Law), to make sure that foreign and domestic investments are handled alike or at least that foreign investments are promoted in Kazakhstan. To comply with international standards, the Ministry of Finance could contact international organizations such as the World Bank for assistance;

- Since the Investment Promotion Center (KAZINVEST) is established, no further agency for the promotion of foreign investments needs to be setup. However, a set of rules or laws on the conduct of KAZINVEST should be established by the Ministry of Finance and a clear framework for KAZINVEST operations should be developed. KAZINVEST should receive as much support as possible from both Ministry of Finance and Ministry of Energy and Mineral Resources of the Republic of Kazakhstan, including a budget for supporting foreign investments;

- The Investment Promotion Center should consult experts on project financing (e.g. from international commercial banks or international organizations, such as the World Bank) for setting up the financial side of the project (e.g. finding a donor or credit line for the fund's yearly budget);
- The Investment Promotion Center needs to find financial support for a Foreign Investor Support Fund, either national (e.g. the Kazakhstan government) or international (e.g. international donor organizations such as the World Bank or European Bank for Reconstruction and Development);
- The Investment Promotion Center with assistance of the Ministry of Finance and if necessary with the assistance of international organizations should setup a Foreign Investor Support Fund and the according requirements for applying for the fund's resources;
- The Investment Promotion Center should inform foreign investors about the project developing possibilities and the incentives in the according country as a starting point to get into contact with potential investors, national and international commercial banks should be contacted and informed;
- The Investment Promotion Center should establish standard procedures for foreign investors interested in applying for the FISF's resources;
- After granting of loans or subsidies, the Investment Promotion Center should monitor each project setup with the resources of the FISF and make sure that the project complies with the according rules.

Recommendations for replication in the Republic of Moldova

General situation in the Republic of Moldova

Renewable energy sources power plants account for approximately four to five per cent of electricity generation in Moldova. The Energy Strategy of the Republica of Moldova until 2020 foresees to increase the share of renewable energy sources in the country's energy balance up to six per cent in 2010 and 20 per cent in 2020 but the market for renewable energy sources in the Republic of Moldova is still in an early stage.

Energy efficiency is a priority in the Republic of Moldova and strategic policy objectives for energy conservation have been defined in the National Programme of Energy Conservation for 2003 to 2010, but economic incentives to stimulate the implementation of energy efficiency projects have not been established so far. Secondary legislation elements like the law on ESCOs or regulation regarding energy conservation incentives are still under development.

The Republic of Moldova benefits from the presence of a Moldovan Investment and Export Promotion Organization (MIEPO), with the mission to support business development and partnerships in Moldova through involvement, communication, and promotion. MIEPO provides assistance with the identification and exploration of investment opportunities in Moldova. In general, foreign and domestic capital is legally equal, yet foreign investment is subject to some restrictions and some sectors are reserved for state enterprises.

Barriers in the Republic of Moldova

The revision of the current Law on Energy Conservation is ongoing since 2008 but no reliable information regarding the progress could be gathered until now. Furthermore, no secondary legislation to guarantee implementation of regulatory framework (e.g. to support the development of ESCOs) has been developed so far. At the moment the overall political situation regarding the start of the operation of the National Agency for Energy Efficiency, the establishment of the planned Energy Efficiency Fund, and the takeover of all energy related tasks by the Ministry of

Economy and Trade is unclear and hampering investments related to energy efficiency and renewable energies.

Despite the presence of the Moldovan Investment and Export Promotion Organization, the environment for foreign investments appears to be only moderately attractive. The MIEPO suffers from the lack of an established financial budget and it is not enclosed in clear regulatory frameworks such as is the case for the Foreign Investment Promotion Agency in Bosnia and Herzegovina. This general situation with regard to its legal, institutional and administrative barriers leads to limitations to foreign investments observed in the Republic of Moldovan's businesses (e.g. the lack of foreign investors active in the sector of project development).

The replication of this Case Study can help to overcome barriers described here and develop a set of rules and laws on the conduct of the MIEPO as well as assigning budgets for the active support of foreign investments.

Recommendations for the Republic of Moldova

The following steps should be carried out for successful replication of the Case Study in Moldova:

- The Ministry of Economy in cooperation with the Ministry of Finance should establish a solid legal basis for foreign investments and regional investment policies, particularly covering the renewable energy and energy efficiency sector, enabling the development of infrastructure and power generation projects;
- The Ministry of Economy should establish a law on the Policy of Foreign Direct Investment (FDI Law) and a law on Corporate Income Tax (CIT Law), to make sure that foreign and domestic investments are handled alike or at least that foreign investments are promoted in the Republic of Moldova. To comply with international standards, the Ministry of Economy could contact international organizations such as the World Bank for assistance;
- Since the Moldovan Investment and Export Promotion Organization for the promotion of foreign companies in Moldova already exists, no further agency for the promotion of foreign investments need to be setup. However, a set of rules or laws on the conduct of the MIEPO should be established by the Ministry of Economy and a clear framework for MIEPO operations should be developed. The MIEPO should receive as much support as possible from both Ministry of Economy and Ministry of Finance, including a budget for supporting foreign investments;
- The Moldovan Investment and Export Promotion Organization should consult experts on project financing (e.g. from international commercial banks or international organizations, such as the World Bank) for setting up the financial side of the project (e.g. finding a donor or credit line for the fund's yearly budget);
- The Moldovan Investment and Export Promotion Organization needs to find financial support for a Foreign Investor Support Fund, either national (e.g. the Moldovan government) or international (e.g. international donor organizations such as the World Bank or European Bank for Reconstruction and Development);
- The Moldovan Investment and Export Promotion Organization with assistance of the Ministry of Economy and if necessary with the assistance of international organizations should setup a Foreign Investor Support Fund and the according requirements for applying for the fund's resources;
- The Moldovan Investment and Export Promotion Organization should inform foreign investors about the project developing possibilities and the incentives in the according country, as a starting point to get into contact with potential investors, national and international commercial banks should be contacted and informed;
- The Moldovan Investment and Export Promotion Organization should establish standard procedures for foreign investors interested in applying for the FISF's resources;

- After granting of loans or subsidies, the Moldovan Investment and Export Promotion Organization should monitor each project setup with the resources of the FISF and make sure that the project complies with the according rules.

16.5. *Sustainable Energy Financing Facilities - Dedicated Loan Facilities to Local Banks Undertaking Energy Efficiency Projects – Case Study of Bulgaria (recommendations for replication in Albania, the Republic of Moldova and the former Yugoslav Republic of Macedonia)*

Box 17: Loan Facilities for Energy Efficiency Projects

The presented Case Study relates to economic and financial barriers like absent or insufficient public funding for projects and initiatives and in particular the missing of dedicated credit lines for project developers who were willing to undertake energy efficiency and renewable energy projects for the industrial or residential areas. Bulgarian industries, small- and medium-sized enterprises, and residential buildings were frequently confronted with the high costs of heating poorly insulated buildings, coupled with a lack of energy efficiency solution awareness and a discouragement of remediating initiatives.

This Case Study refers to the Bulgarian Energy Efficiency and Renewable Energy Credit Line (BEERECL) which was launched in 2004 as a joint initiative of the Bulgarian Government, the EBRD and the Kozloduy International Decommissioning Support Fund (KIDSF). Within this credit line, dedicated loan facilities to local banks are established for on-lending to clients (residential and industrial credit lines) undertaking energy efficiency and renewable energy projects.

The Case Study is recommended for replication in Albania, the Republic of Moldova, and the former Yugoslav Republic of Macedonia, since these countries are facing barriers similar to those experienced in Bulgaria before the implementation of the Case Study. These countries suffer from lack of sustainability awareness, standards and instruments among commercial banks and, with the exception of the former Yugoslav Republic of Macedonia, they also suffer from absent or insufficient public funding for projects and initiatives for energy efficiency and renewable energy projects.

16.5.1. Background to the Case Study

General situation in Bulgaria

Currently, there is about 12,668 MW of installed capacity in Bulgaria including thermal, nuclear, and hydroelectric resources. Except for solar, Bulgaria has very promising renewable development opportunities. It is one of the top countries identified for wind energy development (3,400 MW midterm potential), has a sizable reserve of geothermal energy and is rich in low geothermal waters used for space heating, greenhouses, and drinking water. Considering that approximately 90 per cent of the country’s land is arable, agricultural land, or forests, the potential for the development of biomass projects looks promising with about 3,400 MW of technical potential identified.

Despite the current excess of capacity, Bulgaria is actively seeking outside investment to expand since 40 per cent of the current generation is to be retired by 2010. Bulgaria also imports over 70 per cent of the fuel required for energy production and is interested in developing indigenous resources. As part of its obligation to the European Union, Bulgaria must have 11 per cent of its gross electricity consumption generated from renewable energy sources by 2010.

Furthermore, there is significant potential for improvement in energy efficiency in Bulgaria. The Bulgarian government has undertaken several key measures to combat energy wastage in the country. Nevertheless, energy consumption per unit of GDP remains well above the average for other EU states. However, energy conservation investments are still very small and are hampered by market imperfections.

Barriers in Bulgaria

Before the implementation of the Case Study, Bulgaria suffered from financial barriers such as absent or insufficient public funding for projects and initiatives and in particular the lack of grants and credit lines from local banks to project developers, who were willing to undertake energy efficiency and renewable energy projects for the industrial or residential areas.

The Bulgarian Credit Line SEI2 described in this Case Study has been established to support industrial energy efficiency and small renewable projects in the private sector and to overcome barriers still faced by sub-borrowers in developing/financing and implementing sustainable energy investments.

16.5.2. Description of the Case Study

This Case Study refers to the Bulgarian Energy Efficiency and Renewable Energy Credit Line (BEERECL) which was launched in 2004 as a joint initiative of the Bulgarian Government, the European Bank for Reconstruction and Development and the Kozloduy International Decommissioning Support Fund (KIDSF). It is part of the Sustainable energy financing facilities (SEI2) initiated by the EBRD in the context of its Sustainable Energy Initiative (SEI).

Within this credit line, dedicated loan facilities to local banks are established for on-lending to clients (residential and industrial credit lines) undertaking energy efficiency and renewable energy projects. Additionally, the BEERECL provides project developers with relevant benefits such as reduced production costs and improved competitiveness, improved profitability, rehabilitated and modernized assets, high quality expert advice on preparing business plans for lowering production energy costs, free energy audits for energy efficiency investments and assistance with loan applications to Bulgarian participating banks.

16.5.3. Approach of the Case Study

The EBRD countries of operation[xxiv] use up to seven times more energy to produce each unit of GDP than Western Europe and produce disproportionately high levels of greenhouse gases. In this context the EBRD launched the Sustainable Energy Initiative (SEI) in May 2006. The SEI responds to the specific needs of the energy transition in EBRD countries, as well as to the call of the G8[xxv] at the 2005 Gleneagles Summit directed at International Financial Institutions (IFI) to scale-up climate change mitigation investments.

The SEI is structured into the following activities: industrial energy efficiency (SEI1), sustainable energy financing facilities (SEI2), power sector energy efficiency (SEI3), renewable energy (SEI4), municipal infrastructure energy efficiency (SEI5), and carbon market development (SEI6).

The SEI is focused on enhancing energy efficiency in the industrial, power and municipal infrastructure sectors, developing renewable energy supplies and supporting the development of the carbon credit market in EBRD's countries of operation. In the first phase of the SEI the EBRD aimed to:

- Scale up its sustainable energy investments to EUR 1,500 million between 2006 and 2008, more than double the level of the previous period;
- Establish a broad partnership with donors to mobilize grant funds required to scale up public and private sector financing;
- Build policy dialogue to support the scaling up of investments and bring energy efficiency objectives into the mainstream of the Bank's activities with enhanced specialized support from a dedicated energy efficiency and climate change team;
- Work with other multilateral development banks and institutions to enhance the impact of its policy dialogue and share best practice.

The Sustainable Energy Initiative SEI2 was a project considered in 2004 and launched in 2006. It is still in operation, profiting of a new allocated budget from SEI phase two (2009 to 2011) investment target within a range of EUR three to five billion (sum of the six SEIs).

The EBRD has agreed to a second extension of the Bulgarian Energy Efficiency and Renewable Energy Credit Line (BEERECL) facility through 30 June 2011 to continue on-lending through local banks to private industrial companies in Bulgaria to finance energy efficiency and small renewable energy projects. The extension adds up to EUR 55 million to the existing BEERECL portfolio.

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xxiv 30 countries in the Caucasus, Central Asia, Eastern Europe, Russia, Ukraine, Western Balkans

xxv The Group of Eight (G8) is a forum for the governments of the eight richest countries in the world: Canada, France, Germany, Italy, Japan, the Russian Federation, the United Kingdom, and the United States.

In order to remove financial barriers, several financing instruments have been defined by the European Bank for Reconstruction and Development under the Sustainable Energy Initiative. These are foremost:

- Private Loans and Syndication: e.g. SEVERSTAL, Russia (USD 150 million + USD 350 million Syndication);
- Non Sovereign Loan to Municipal Infrastructure Companies: e.g. COLTERM, Romania (EUR 23 million investment, of which EUR 15 million financed by EBRD);
- Equity Investment in Equity Fund: e.g. ENERCAP renewable energy Financing Vehicle (a commitment of EUR 25 million);
- ESCO Financing: e.g. ENEMONA, Bulgaria (EUR seven million);
- Carbon Finance: e.g. Multilateral Carbon Credit Fund (with EUR 190 million in commitments from 12 Sovereign and Private Participants);
- Energy Efficiency Credit Lines (like this Case Study, under SEI2).

Among these different financial instruments, SEI2's dedicated credit lines have been designed for financing energy efficiency in industry and housing as well as small renewable energy projects.

The Case Study has involved the following key players and partners:

- The EBRD as the main provider of financial resources and the initiator of SEI2;
- Sixteen professional experts (also from the EBRD) in energy efficiency and climate change who work closely with local institutions to identify possible energy efficiency and renewable energy projects:
    - Thirteen are located in EBRD Headquarters and three in Kiev, Moscow and Tbilisi who work closely with country and sector teams;
    - All team members have backgrounds in engineering, finance, carbon credits, environmental economics and policy.
- At least six local banks which ensure that dedicated loans are used in respect with requirements of the EBRD in terms of energy efficiency and renewable projects are involved:
    - Eurobank EFG Bulgaria (Postbank);
    - Raiffeisenbank (Bulgaria);
    - MKB Unionbank;
    - Piraeus Bank Bulgaria;
    - United Bulgarian Bank;
    - UniCredit Bulbank.
- The Kozloduy International Decommissioning Support Fund (KIDSF), which undertakes safety and decommissioning activities, and financial contribution. The KIDSF provides grant support to overcome barriers still faced by sub-borrowers in developing, financing and implementing sustainable energy investments. These grants provide a completion fee to sub-borrowers ranging between 15 to 20 per cent of the BEERECL loan amount, and free technical assistance to sub-borrowers. KIDSF also focuses international support on essential investment projects within the Bulgarian energy sector. These investments help achieve the country's strategic energy objectives, as outlined in the 2003 Bulgarian Energy Law, e.g. securing supplies, guaranteeing nuclear safety, and improving energy efficiency.

The main steps that allowed the implementation of the Case Study are the following:

Step one: Definition of credit line and rules

Definition of total amount of credit line; setting-up of rules for eligibility of projects and typical loan amount; definition of standard reporting and implementation verification:

- Prospective applicants: sub-borrowers must be private enterprises, firms, businesses, sole proprietors or other private legal entities formed under the laws of the Republic of Bulgaria and operating in the Republic of Bulgaria. Sub-borrowers may not be majority-owned or controlled by the Republic of Bulgaria, or by any other political, governmental or administrative body, agency or sub-division thereof. Under the Energy Efficiency and Renewable Energy (EERE) Credit Line Framework, any sub-borrower will be eligible to borrow up to a maximum amount of EUR 2.5 million (or the equivalent thereof) whether in one or more sub-loans, unless otherwise agreed by EBRD;

- General Eligibility Requirements: eligible investments are investments carried out by private entities on both the energy demand and generation side contributing to the improvement of the energy performance of the industry sector. The loan can be used as a standalone project or a part of a larger general investment. The project must comply with the minimum energy savings and internal rate of return requirements;
- For energy efficiency projects, the energy savings, expressed as an Industry Sector Indicator (ISI) which is calculated by the Project Consultant, shall be greater than or equal to the national requirements of Bulgaria for this type of project. In the absence of a national requirement, the ISI has to be not less than 0.20;
- For energy efficiency or renewable energy projects, the minimum Internal Rate of Return (IRR), as calculated by the Project Consultant, has to be at least ten per cent unless otherwise agreed by the EBRD.

Step two: Selection of participating banks

A selection of local participating banks that will provide sub-borrowers loans to develop, finance and realize eligible energy efficiency and renewable energy projects. These banks are mentioned above and are large financial institutions able to support the SEI2 initiative and sub-borrowers projects.

Step three: Contracts

Establishment of required donor-funded contracts with consultants and energy experts to provide assistance to participating banks and sub-borrowers. Apart from the 16 experts mentioned above, the European Bank for Reconstruction and Development contracted DAI Europe which in co-operation with EnCon Services will provide consultancy services to project developers in preparing business plans (rational energy utilization plans), loan applications and implementation.

The EBRD furthermore contracted KEMA[xxvi] as Independent Energy Expert, to verify the project after completion, on whether it meets the objectives of the facility and the Kozloduy International Decommissioning Support Fund (KIDSF), which will be the basis for the decision to pay the project developer an incentive of up to 15 per cent for energy efficiency or 20 per cent for renewable energy of the loan given to the developer under the credit line facility.

16.5.4. Results of the Case Study implementation

Participating banks in Bulgaria were acting both at national and local levels, therefore the implementation had an impact on both levels. From 2006 to early 2009, more than 25 energy efficiency and renewable energy project loans have been financed and realized through dedicated credit lines achieving valuable energy savings.

The implementation of the Case Study enabled to achieve the following financial benefits:

- Financial energy savings in the industrial sector (industrial credit line): more than EUR 40 million per year;
- Energy saving in the residential sector (residential credit line): EUR four million per year;
- Increased market penetration of independent energy efficiency and renewable energy consultants, building companies, and equipment industry in Bulgaria.

The implementation of the Case Study enabled to achieve the following environmental benefits:

- Energy saving in the industrial sector (industrial credit line): nearly 735 GWh per year;
- Energy saving in the residential sector (residential credit line): nearly 73 GWh per year;

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xxvi Established in 1927, KEMA is an independent knowledge leader and a global provider of high-quality services to the energy value chain, specializing in business & technical consultancy, operational support, measurements & inspection, and testing & certification.

- Other environmental benefits such as urban renewals, reconstructing plans under quality labels, and old plants decommissioning action plans.

The key social benefits of the implementation of the Case Study are the following:

- Enhancement of co-operation between donors and international organizations;
- Strong assistance of EBRD experts to both participating local banks and sub-borrowers (i.e. technical assistance, audits, purchasing of equipments);
- Enhanced housing quality, due to modernization and implementation of energy efficiency measures.

16.5.5. Costs for implementation

The costs of the implementation of the Case Study have been shared between the European Bank for Reconstruction and Development (90 per cent) and the Kozloduy International Decommissioning Support Fund (ten per cent). For both industrial and residential credit lines, costs have been as follows:

SEI2 Bulgaria Credit Line No. 1: Industrial energy efficiency and renewable energy projects

- A EUR 50 million EBRD credit line framework granted to Bulgarian banks for on-lending to the private sector for industrial energy efficiency and small renewable energy projects;
- A grant of EUR ten million from KIDSF used for:
  - Cash incentives to local banks and sub-borrowers (80 per cent);
  - Technical assistance package: project preparation and project validation (20 per cent).
- Six loans were signed for the full amount of EUR 50 million.

SEI2 Bulgaria Credit Line No. 2: Residential Sector

- A EUR 50 million EBRD Credit Line Framework granted to Bulgarian banks for on-lending to individuals for energy efficiency investments in the residential sector;
- A grant of EUR ten million from Kozloduy International Decommissioning Support Fund (KIDSF) used for:
  - Preparation, marketing, and verification purposes: EUR 0.7 million;
  - Incentives to sub-borrowers and participating banks: EUR 9.3 million.
- A total amount of EUR 150 million dedicated loans for participating banks;
- Total sub-loans utilization as beginning of 2009: EUR 137 million;
- Average sub-loan amount: EUR 0.6 million;
- Remaining budget: approx. EUR ten million.

16.5.6. Regulatory preconditions

For the successful implementation of the Case Study the following policies/regulations are a precondition:

- A formulated national strategy focusing on energy efficiency and renewable energy sources including binding national targets;
- Development of dedicated laws and regulations regarding renewable energy sources and energy efficiency.

16.5.7. Critical success factors

The following key success factors contributed to the successful implementation of the Case Study:

- Strong assistance of European Bank for Reconstruction and Development experts and sub-contractors collaborating with banks in order to grant loans to sub-borrowers;

- Commitment of incentivizing payments paid to participating banks and completion fees paid to sub-borrowers upon successful implementation of eligible energy efficiency and renewable energy projects;
- Definition of acceptable energy efficiency criteria for the financing of projects, enabling eligibility of investments.

16.5.8. Risks

The following factors may represent a continuous risk to a successful implementation and continuation of the Case Study:

- Legal and regulatory framework regarding energy efficiency and renewable energy sources may offer only insufficient incentives for investments;
- Inefficient and long bureaucratic public administration procedures and complicated public tender regulations may lead to project delays;
- Subsidized (non cost-reflective) energy prices and poor cost allocation mechanisms obstruct willingness to invest and may lead to a lack of awareness of energy saving benefits and behavioral barriers for action;
- Credit-worthiness of stakeholders and difficulties with decision making may hamper the achievement of the Case Study's goal;
- Low market penetration for high quality energy savings and renewable energy technologies may lead to bottleneck situations in procurement processes.

16.5.9. Conclusions and recommendations for replication

Introduction

Launched in 2004 as a joint initiative of the Bulgarian Government, the EBRD and the Kozloduy International Decommissioning Support Fund (KIDSF), the BEERECL facility aims to support investments in small-scale energy efficiency and renewable energy projects that mitigate the closure of the Kozloduy Nuclear Power Plant by either reducing energy demand or by replacing lost capacity with green energy supply.

Eligible projects are industrial energy efficiency and small-scale renewable energy investments. The programme does not only give financial assistance, but also helps with selecting projects and employing marketing strategies, as well as identifying specific energy efficiency measures and preparing technical studies to support applications. BEERECL will receive an additional EUR 50 million between 2009 and 2011 to reduce Bulgaria's energy intensity.

The key objective of the Case Study is to provide local and national financial institutions with necessary economic resources to achieve energy savings within industrial and residential sectors. It contributes to removing financial barriers in particular regarding the lack of grants from local banks to industrial and residential clients willing to undertake energy efficiency and small renewable energy projects. Countries, which suffer from similar barriers as those experienced in Bulgaria before the implementation of the Case Study and for which an implementation can be recommended are Albania, the Republic of Moldova, and the former Yugoslav Republic of Macedonia.

To implement the Case Study in the recommended countries, a time period of approximately three years is estimated for each country.

90 per cent of the costs for the implementation of the Case Study were covered by the EBRD, only ten per cent were covered by the Kozloduy International Decommissioning Support Fund (KIDSF). As such it is recommended for Case Study implementation to find an international donor programme (such as EBRD), which is able to cover the major part of the implementation costs.

The potential credit lines associated with the Case Study should be divided into a) industrial energy efficiency and renewable energy projects, and b) residential sector energy efficiency and renewable energy projects. For each credit line approximately EUR 100 million should be envisaged. If possible, the residential sector credit line should include a further EUR 100 to 150 million as dedicated loans for participating banks for on-lending to project developers.

Recommendations for replication in Albania and the Republic of Moldova

Given the current economical situation in Albania and the Republic of Moldova, it is evident that monetary assistance and foreign investments will be needed to helping overcome economical and financial barriers in those countries. Holding out the prospect of a credit loan by an international institution like the World Bank or the European Bank for Reconstruction and Development may even successfully stimulate the governments of both countries into accelerating the development of a transparent and financially stimulating legal and regulatory framework related to energy efficiency and renewable energy.

General situation in Albania

Currently, hydro power accounts for 98 per cent of electricity generation in Albania. Since Albania has a Mediterranean climate, the potential for solar energy utilization is high and the installation of solar panels for water heating has already begun. Due to a competitive and transparent concession policy and supported by a comprehensive legal framework, from March 2007 on, more than 170 new projects on small hydro power plants have been considered and 60 concessionary agreements have been approved.

In 2005, Albania approved an Energy Efficiency Law, which sets out plans to improve energy efficiency. Similar to Bulgaria, there is a strong political will to develop the ESCO market in Albania. Yet, there are still neither Energy Services Companies nor incentives for energy efficiency in place in Albania. The potential for energy savings in Albania is high (up to 25 per cent of the projected energy use in 2020), mostly related to degraded heat distribution systems, outdated technologies and non-contemporary equipments and standards in industry, inadequate building insulation and low-efficiency appliances such as stoves and boilers used in the household and service sector.

Similar to what is known from Bulgaria, Albania is very interested in stimulating indigenous renewable energy resources as well. According to the National Energy Strategy such resources (solar, wind, biomass, small hydro power plants) should be stimulated for a maximal use. A National Strategy for Renewable Energy Sources and a Law on Renewable Energy Sources are currently under development.

Barriers in Albania

One major economic and financial barrier to the development of energy efficiency and renewable energy projects is Albania’s difficult economic situation, which is one of the main reasons for absent or insufficient public funding and the lack of support for energy efficiency and renewable energy projects. Additionally, commercial banks have no experience in financing projects and lack awareness regarding sustainability, standards and instruments needed for the financing and promoting of energy efficiency and renewable energy projects. The implementation of the Case Study helped to overcome a similar lack of public funding (i.e. credit lines) for project financing in Bulgaria.

Recommendations for Albania

The following steps should be carried out for successful replication of the Case Study in Albania:

- The Albanian National Agency of Natural Resources (AKBN) with its responsibility to establish legal frameworks on energy efficiency and renewable energy should hold a leading role with respect to the Case Study implementation. AKBN should furthermore develop dedicated laws on regulations regarding renewable energy sources and energy efficiency;
- AKBN in cooperation with the Ministry of Environment, Forests and Water Administration (MoEFWA) should formulate a national strategy on energy efficiency and renewable energy sources including binding national targets;
- AKBN with assistance of the National Bank and the Ministry of Finance should identify an international financing institute to cooperate with and which supports the loans granted in the project (e.g. European Bank for Reconstruction and Development, World Bank);

- Once such an international donor organization is identified, AKBN with assistance of the National Bank should consult this financing institute on international project standards and on internationally accepted technologies to be taken into account when granting loans;
- AKBN with the assistance of the international donor organization should define financing instruments, credit lines, and rules for application of loans according to international standards;
- AKBN with assistance of the international donor organization, the National Bank and if necessary the Ministry of Finance should setup a total amount of credit line and subdivide the total according to different areas needing support (e.g. energy efficiency projects, renewable energy projects, capacity building projects). For information regarding the different areas the Albania-EU Energy Efficiency Centre (EEC) with its experience in project developing in the field of energy efficiency and renewable energy sources could serve as a starting point;
- AKBN with the assistance of the National Bank should select local banks to cooperate with during the onset of the Case Study implementation (later on the number of banks involved can be increased);
- The involved local banks with coordination of the AKBN and the National Bank should establish processes to handle the application for loans in a standardized and cost conscious way and setup the necessary IT infrastructure (e.g. databases);
- The involved local banks with coordination of the AKBN and the National Bank should define personnel in each bank to handle the application forms and assign responsibilities for handling each step in the procedure;
- AKBN and the involved donor organization should establish standard contracts to be used when granting loans (donor-funded contracts), implemented in all local banks participating in the project;
- The Albanian National Agency of Natural Resources with the assistance of the Albania-EU Energy Efficiency Centre and local banks involved should find international experts or consultants to provide support to the project developers in preparing business plans and loan applications;
- AKBN should inform potential project developers via the National Bank, local banks, and via media campaigns about the new possibilities for loan applications and the according requirements. Included should be regional project developers, municipalities, etc;
- AKBN with assistance of local banks should setup a quality management for a) the process of granting loans (e.g. regarding time needed, efficiency of the bureaucratic environment); b) the projects for which loans are assigned (e.g. monitor the projects during later stages of project development to make sure, that they are still in compliance with the loan requirements).

General situation in the Republic of Moldova

Renewable energy sources power plants account for approximately four to five per cent of electricity generation in Moldova. Comparable to the situation in Bulgaria before the implementation of the Case Study, the Energy Strategy of the Republica of Moldova until 2020 foresees to increase the share of renewable energy sources in the country's energy balance up to six per cent in 2010 and 20 per cent in 2020 but the market for renewable energy sources in the Republic of Moldova is still in an early stage.

Energy efficiency is a priority in the Republic of Moldova and strategic policy objectives for energy conservation have been defined in the National Programme of Energy Conservation for 2003 to 2010, but economic incentives to stimulate the implementation of energy efficiency projects have not been established so far. Secondary legislation elements like the law on ESCOs or regulation regarding energy conservation incentives are still under development.

Furthermore, according to the Law on Renewable Energy Sources from 2007, an Energy Efficiency Fund should have been created by the end of 2008, which has as a main activity the management of finances with a view of promoting the financing of energy efficiency and renewable energy in compliance with the state strategies and programmes for the development of these fields.

However, since the energy saving potential in the Republic of Moldova is high (mostly due to its outdated and inefficient heat distribution system) it is estimated that a well-planned and concerted implementation of an energy efficiency programme in the Republic of Moldova, such as the one described for Bulgaria in this Case Study, could reduce the financial impact of the energy sector on the GDP by almost two per cent per year, starting with 2008 (Energy Strategy of the Republic of Moldova 2020).

Barriers in the Republic of Moldova

At the moment the overall political situation regarding the start of the operation of the National Agency for Energy Efficiency, the establishment of the planned Energy Efficiency Fund, and the takeover of all energy related tasks by the Ministry of Economy and Trade is unclear and this unclear situation is hampering investments related to energy efficiency and renewable energies in the Republic of Moldova. The development of private business in the Republic of Moldova is low and all energy efficiency or renewable energy projects under development are being developed by state institutions.

Similar to the situation in Bulgaria before the implementation of the Case Study, the lack of private companies active in the sector of project development is an indicator for the lack of financial resources and also of the lack of awareness of the possibilities of investment return offered by the energy sector. As such the Republic of Moldova suffers from absent or insufficient public funding for projects and initiatives as well as lack of sustainability awareness, standards and instruments among commercial banks. Furthermore, high interest rates applied by commercial Moldovan banks for loans to private investors do not support the formation of a market of private companies involved in the development of energy projects.

Recommendations for the Republic of Moldova

The following steps should be carried out for successful replication of the Case Study in the Republic of Moldova:

- The Moldovan National Agency for Energy Regulation (ANRE) with its responsibility to support the introduction of market mechanisms in the energy sector should hold a leading role within the Case Study implementation. The Ministry of Economy should furthermore develop dedicated laws on regulations regarding renewable energy sources and energy efficiency;
- The Ministry of Economy should formulate a national Action Plan on energy efficiency and renewable energy sources, including more specific binding national targets than those specified in the Energy Strategy of the Republic of Moldova 2020;
- The Ministry of Economy should identify an international financing institute to cooperate with and which supports the loans granted in the project (e.g. European Bank for Reconstruction and Development, World Bank);
- Once such an international donor organization is identified, the Ministry of Economy with assistance of the National Bank should consult this financing institute on international project standards and on internationally accepted technologies to be taken into account when granting loans;
- The Ministry of Economy with the assistance of the international donor organization and the National Bank of Moldova should define financing instruments, credit lines, and rules for application of loans according to international standards;

- The Ministry of Economy with assistance of the international donor organization and the National Bank of Moldova and if necessary the Ministry of Finance should setup a total amount of credit line and subdivide the total according to different areas needing support (e.g. energy efficiency projects, renewable energy projects, capacity building projects). For information regarding the different areas the Alliance for Energy Efficiency and Renewable (AEER), the ENERGY Plus NGO and operating ESCOs with they experience in project developing in the field of energy efficiency and renewable energy sources should serve as a starting point;
- The Ministry of Economy with the assistance of the National Bank of Moldova should select local commercial banks to cooperate with during the onset of the Case Study implementation (later on the number of banks involved can be increased). Since the Moldova Agroindbank is the largest commercial bank in Moldova, it should be involved in the first place;
- The involved local banks with coordination of the Ministry of Economy and the National Bank of Moldova should establish processes to handle the application for loans in a standardized and cost conscious way and setup the necessary IT infrastructure (e.g. databases);
- The involved local banks with coordination of the Ministry of Economy and the National Bank of Moldova should define personnel in each commercial bank to handle the application forms and assign responsibilities for handling each step in the procedure;
- The Ministry of Economy and the involved donor organization should establish standard contracts to be used when granting loans (donor-funded contracts), implemented in all local banks participating in the project;
- The Ministry of Economy with the assistance of the Alliance for Energy Efficiency and Renewables (AEER), ENERGY Plus, operating ESCOs and commercial banks should either support project developers themselves or find international experts or consultants to provide support to the project developers in preparing business plans and loan applications;
- The Ministry of Economy should inform potential project developers via the National Bank of Moldova, local commercial banks, operating ESCOs in Moldova, as well as AEER, and ENERGY Plus, and via media campaigns about the new possibilities for loan applications and the according requirements. Included should be regional project developers, municipalities, etc.;
- The Ministry of Economy with assistance of local commercial banks and the identified international donor organization should setup a quality management for a) the process of granting loans (e.g. regarding time needed, efficiency of the bureaucratic environment); b) the projects for which loans are assigned (e.g. monitor the projects during later stages of project development to make sure, that they are still in compliance with the loan requirements).

Recommendations for replication in the former Yugoslav Republic of Macedonia

General situation in the former Yugoslav Republic of Macedonia

The existent building stock in the former Yugoslav Republic of Macedonia is not very energy efficient (residential, public, and commercial buildings). As such it resembles the situation in Bulgaria leading to the implementation of the Case Study. The former Yugoslav Republic of Macedonia already developed an Energy Efficiency Strategy in 2004, which focuses on institutional buildings and the upgrade of their heating systems as well as the building envelopes and the lighting systems.

Up to now, there are no dedicated laws or secondary legislation on how to implement measures related to the Energy Efficiency Strategy. In the former Yugoslav Republic of Macedonia municipalities are obliged to implement Local Energy Efficiency Programmes and Action Plans and energy audits and building certificates are envisaged. Currently, municipalities lack the knowhow and capacity to realize such measures. At the moment there are only two ESCOs in the former

Yugoslav Republic of Macedonia and no specific incentives for investments in energy efficiency are in place.

On the national level, only one credit line is active among the Macedonian Bank for Development and Promotion and five local commercial banks. The creation of an Energy Efficiency Fund envisaged in the Energy Law from 1997, has never been established. As such the overall situation resembles Bulgaria before the implementation of the Case Study, where small industrial or residential projects in the areas of energy efficiency and renewable energy were not adequately supported.

Barriers in the former Yugoslav Republic of Macedonia

Although the former Yugoslav Republic of Macedonia is undertaking a strong effort to develop policies for energy efficiency, much of the dedicated regulatory framework is still under development. Furthermore, despite efforts to strengthen the financial sector in the former Yugoslav Republic of Macedonia the commercial banking sector remains relatively weak.

The three largest banks account for approximately 70 per cent of all deposits and loans, capital markets are unable to provide credit alternatives for businesses, while the cost of financing and difficulties in assessing credit risks of potential borrowers remain high. The Macedonian banking sector suffers from lack of professional skills for preparation of bankable projects and from lack of sustainability awareness, standards and instruments among commercial banks. Furthermore, the absence of economic incentives such as dedicated credit lines, and low energy prices constitute significant economic and financial barriers in the former Yugoslav Republic of Macedonia.

Although there is an urgent need of capacity and awareness building regarding energy efficiency measures the undertaking of energy efficiency and renewable energy projects remains difficult and the overall situation is comparable to that in Bulgaria before the implementation of the Case Study.

The establishment of loan facilities to local banks for on-lending to clients, in connection with professional expertise and services by external consultants as described in this Case Study can help resolving economical and financial barriers and as a consequence enhance the awareness regarding energy efficiency measures and renewable energy projects in the former Yugoslav Republic of Macedonia.

Recommendations for the former Yugoslav Republic of Macedonia

The following steps should be carried out for successful replication of the Case Study in the former Yugoslav Republic of Macedonia:

- The Energy Agency of the Republic of Macedonia with its responsibility for project implementation and coordination should hold a leading role within the Case Study implementation. The Energy Department of the Ministry of Economy should furthermore develop dedicated laws on regulations regarding renewable energy sources and energy efficiency;
- The Energy Agency of the Republic of Macedonia in cooperation with the Energy Department of the Ministry of Economy should formulate a national strategy on energy efficiency and renewable energy sources including binding national targets;
- The Energy Agency of the Republic of Macedonia with assistance of the Macedonian Bank for Development Promotion should identify an international financing institute to cooperate with and which supports the loans granted in the project (e.g. European Bank for Reconstruction and Development, World Bank);
- Once such an international donor organization is identified, the Energy Agency of the Republic of Macedonia with assistance of the Macedonian Bank for Development Promotion should consult this financing institute on international project standards and on internationally accepted technologies to be taken into account when granting loans;
- The Energy Agency of the Republic of Macedonia with the assistance of the international donor organization and the Macedonian Bank for Development Promotion should define

financing instruments, credit lines, and rules for application of loans according to international standards;

- The Energy Agency of the Republic of Macedonia with assistance of the international donor organization, the Macedonian Bank for Development Promotion and if necessary the Ministry of Finance (for granting credit lines from the state budget or to approve international donor activity) should setup a total amount of credit line and subdivide the total according to different areas needed to support (e.g. energy efficiency projects, renewable energy projects, capacity building projects). For information regarding the different areas the already operating Macedonian ESCOs and the Research Center for Energy, Informatics and Materials (ICEIM-MANU) of the Macedonian Academy of Sciences and Arts with its experience with regard to new technologies in the field of energy efficiency and renewable energy sources should serve as a starting point;
- The Energy Agency of the Republic of Macedonia with the assistance of the Macedonian Bank for Development Promotion should select local banks to cooperate with during the onset of the Case Study implementation (later on the number of banks involved can be increased);
- The involved local banks with coordination of the Energy Agency of the Republic of Macedonia and the Macedonian Bank for Development Promotion should establish processes to handle the application for loans in a standardized and cost conscious way and setup the necessary IT infrastructure (e.g. databases);
- The involved local banks with coordination of the Energy Agency of the Republic of Macedonia and the Macedonian Bank for Development Promotion should define personnel in each bank to handle the application forms and assign responsibilities for handling each step in the procedure;
- The Energy Agency of the Republic of Macedonia, the Macedonian Bank for Development Promotion, and the involved donor organization should establish standard contracts to be used when granting loans (donor-funded contracts), implemented in all local banks participating in the project;
- The Energy Agency of the Republic of Macedonia with the assistance of the Macedonian ESCOs and local banks involved should find international experts or consultants to provide support to the project developers in preparing business plans and loan applications;
- The Energy Agency of the Republic of Macedonia should inform potential project developers via the Macedonian Bank for Development Promotion, local banks, and via using media campaigns about the new possibilities for loan applications and the according requirements. Included should be regional project developers, municipalities, etc;
- The Energy Agency of the Republic of Macedonia with assistance of the Macedonian Bank for Development Promotion and local banks should setup a quality management for a) the process of granting loans (e.g. regarding time needed, efficiency of the bureaucratic environment); b) the projects for which loans are assigned (e.g. monitor the projects during later stages of project development to make sure, that they are still in compliance with the loan requirements).

16.6. *Enhancement of Awareness-Raising through the Development of a Network of Certified Energy Auditors – Case Study of Slovenia (recommendations for replication in Albania and the former Yugoslav Republic of Macedonia)*

Box 18: Network of Certified Energy Auditors

The presented Case Study relates to the barriers of lack of awareness, human capacities and professional skills, in particular lack of professional skills for preparation of bankable projects and the low level of awareness among population, public administration and policy makers. In Slovenia these barriers are mainly represented by the lack of financing know-how and experience on the part of auditors, municipalities and building owners particularly with regard to energy efficient building technologies and the lack of a market for energy efficiency and auditing services.

The Case Study describes the implementation of the Slovenian Energy Auditing Programme (EAP), which is part of a large national Programme for the Promotion of Energy Efficiency and Renewable Energy Sources. The EAP was aiming at industrial sites, commercial, and residential buildings with the target of enhancing awareness of decision makers and owners regarding energy efficiency measures.

Such energy efficiency measures shall lead to energy savings and to the increase of know-how with regard to the preparation of bankable projects by energy auditors. The initiative has been implemented by proposing subsided energy audits through a domestic network of selected and trained professional auditors.

The Case Study is recommended for replication in Albania and in the former Yugoslav Republic of Macedonia, since these countries are facing similar barriers as Slovenia before the implementation of the Case Study, namely the lack of awareness, human capacities and professional skills. Those countries either suffer from underdevelopment of the market for energy efficiency services and non-existing ESCOs and/or from lack of professional skills for preparation of bankable projects.

16.6.1. Background to the Case Study

General Situation in Slovenia

Slovenia is a small consumer of electricity compared to other European countries, it has rather limited energy resources of its own, and imports all its oil and gas.

Slovenia went through an economic contraction in the early 1990ies and subsequently also CO_2 emissions fell. However, after the Slovenian economy's recovery, with the support of a successful redirection of exports to foreign markets, CO_2 emissions increased rapidly between 1993 and 1996, and continue to increase at a more moderate but still substantial annual rate.

The Strategy for the Use and Supply of Energy from 1996 and the National Energy Plan from 2004 emphasize increasing the share of renewable energy and increasing energy efficiency by two per cent per year.

Barriers in Slovenia

Despite relatively high energy saving potential within the industry and all kinds of buildings, considerable barriers to the implementation of energy efficiency measures and the promotion of renewable energy in Slovenia were the lack of professional skills for preparation of bankable projects as well as the low level of awareness among population, public administration and policymakers. These barriers were in particular true when it came to energy efficient building technologies. The development of an energy service market, including energy audits and energy consulting were still lacking before the implementation of the Case Study.

16.6.2. Description of the Case Study

In order to overcome the Slovenian barriers to the implementation of energy efficiency projects, a number of energy efficiency programmes have been designed and supported by the governmental budget and by the PHARE Programme[xxvii]. By subsidizing energy audits and energy consulting, an energy service market should be developed and an increase in awareness and investments in energy efficiency should be supported by such measures. Furthermore, the need to build up a proper institutional environment for energy efficiency became important in Slovenia.

This Case Study refers to the implementation of the Slovenian Energy Auditing Programme (EAP) which has been operative since 1998 and incorporates the deployment of a network of energy advisory and licensed energy auditors throughout the country, dedicated to multi-dwellings, buildings and companies. The EAP is led by the Ministry of Environment and Spatial Planning (MESP).

The EAP introduces subsidized energy advisory and auditing services to big electricity consumers, promoting energy efficiency investments by monitoring and evaluating energy savings and preparing the necessary documentation for financing of such projects. The goal of the programme was to provide and increase expertise and awareness in energy management, energy efficiency and energy efficiency measures, applicable technologies, financing of energy efficiency measures, and to inform about their effects on “money returns” when investments are the key issue. Furthermore, the programme was aimed at providing professional skills in order to successfully identify and execute energy efficiency audits and projects[324].

16.6.3. Approach for implementation of the Case Study

The key objectives of the Slovenian Energy Auditing Programme (EAP) are:

- To inform and generate awareness in new building projects regarding energy efficiency;
- To provide energy advising services for multi-dwelling, commercial and industrial buildings;
- To set up a national network of energy advisors and auditors;
- To subsidize feasibility studies related to energy saving measures;
- To provide a local energy saving concept and financial incentives for energy efficiency investments;
- To provide knowledge with regard to the preparation of projects for financing.

An energy audit results in a list of proposals of organizational measures and investment proposals. It presents a basis for developing a site strategy to reduce energy consumption and increase energy efficiency as well as a basis for project financing. The audits have to be performed according to the common methodology. Subsidizing energy audits of companies and multi-apartment buildings is limited to the range of EUR 1,100 to 8,600, but not more than 50 per cent of the energy audit eligible costs. Some additional subsidy (up to EUR 1,000) can be given for the promotion of energy efficient use of energy (awareness and information activities) to tenants in case of multi-apartment buildings.

The Methodology defines three different types of energy audits:

- Preliminary energy audit: the simplest way of energy audit based on one day visit of company or building and data of energy use;
- Core audit recommended for simple and easy-to-understand cases;
- The energy audit model that is precisely described by the Energy Audit Realization Methodology and the only type of energy audit that can be subsidized.

[xxvii] The Programme of Community aid to the countries of Central and Eastern Europe (PHARE) is the main financial instrument of the pre-accession strategy for the Central and Eastern European countries (CEECs) which have applied for membership of the European Union. Since 1994, PHARE's tasks have been adapted to the priorities and needs of each CEEC. The revamped PHARE programme, with a budget of over EUR 10 billion for the period 2000 to 2006 (about EUR 1.5 billion per year), has two main priorities, namely institutional and capacity-building and investment financing. Although the PHARE program was originally reserved for the countries of Central and Eastern Europe, it is set to be extended to the applicant countries of the western Balkans.

The Energy Audit Realization Methodology and Energy Audit Handbook were developed between 1994 and 1997 to assure energy audit quality. The Methodology is obligatory in case of subsidized energy audits. The Energy Audit Realization Methodology is a part of public call documentation and is applicable for industrial sites and residential buildings. The Energy Audit Handbook is suggested to be applied for energy audits. The handbook is available from the Agency of the Republic of Slovenia for Efficient Use of Energy or can be downloaded on its web page[xxviii].

The introduction of a network of licensed energy auditors and subsidies for feasibility studies concerning investments in building's energy infrastructure, has led to several public and private voluntary investments in energy efficiency measures of buildings. These investments have been motivated by the experience of selected and licensed energy auditors and their calculation of proved money returns on a short term basis.

Selected auditors were hired and also trained under the PHARE project called Energy Audits and Training of Auditors in Slovenia (1996 to 1998). During this period, several training sessions, seminars and workshops were organized under different topics such as energy auditing, energy management, energy technologies and project financing.

In this Case Study the following key players were involved at different levels of the Energy Auditing Programme:

- The administration of the Energy Audit Programme (EAP) has been done by the Ministry of Environment and Spatial Planning, Agency for Efficient Energy Use. The administration includes planning, financing, contracting, monitoring and evaluation and promotion;
- The PHARE (European Union's Assistance Programme for Central and Eastern Europe) project Energy Audits and Training Auditors in Slovenia (1996 to 1998) has trained and selected energy auditors for the network;
- The Regional Environmental Center for Central and Eastern Europe (REC) Country Office Slovenia assisted with organizing seminars, workshops and forums, providing trainings and information flow, and the allocation of grants. The REC also supported Slovenian environmental non-governmental organizations, local communities, local authorities, and the business and academic sector in order to engage in important roles in national development programmes;
- Private and public institutes such as the Jožef Stefan Institute, a leading Slovenian scientific research institute, are covering a broad spectrum of basic and applied research in energy efficiency and energy saving technologies;
- The Slovenian Environmental Development Fund (SEDF) contributed financially to the Programme. The SEDF was established in 1993 as a legal public entity under the Environmental Protection Act 1993. It was constituted as a non-profit, joint stock company with a start-up capital of SIT ten million allocated from the state budget. The Fund is currently 100 per cent owned by the Republic of Slovenia;
- Commercial banks acting as administering banks (loan administrators): based on a service contract, the selected commercial banks carried out all the administrative work associated with the administration of energy efficiency investment's loans;
- The monitoring and evaluation of energy audits in the programme was conducted by independent consultants.

Three years (1995 to 1998) were necessary to fully implement the Case Study, realizing the following steps:

Step one: National Climate Change Programme

The National Climate Change Programme of 1993 is the first national policy setting the country forth to sign the Kyoto Protocol. Slovenia signed the Kyoto Protocol on 21 October 1998, according to which, in the period 2008 to 2012, Slovenia is obliged to reduce its greenhouse gas emissions by eight per cent below 1986 emission levels. This commitment has been determinant for implementing measures such as the Energy Auditing Programme.

[xxviii] www.aure.si

Step two: CO_2 Tax

Slovenia was the first Central Eastern Europe country to implement a CO_2 tax. The tax came into force on 1 January 1997, and was initiated at a rate of approximately EUR 5.5 per ton of CO_2, followed by a March 1998 increase to EUR 16 per ton of CO_2. The cost of the CO_2 tax is shifted to consumers.

Step three: Energy Audit Programme

The Energy Audit Programme was launched in 1995, targeting top priority energy consumers with a minimum of:

- 300 MWh for multi-apartment buildings;
- 500 MWh for enterprises.

Step four: Energy Audit Elaboration Scheme

After determining the main consumers, auditors pursued an Energy Audit Elaboration Scheme driven by the following steps:

- Presentation of analysis and results in order to identify potential energy efficiency measures;
- List compiling best practice methods and advanced technologies, which can be used for energy saving measures;
- Selection of proposed energy efficiency measures, according to each case or group of cases (e.g. national schools, administrative buildings, etc);
- Feasibility of selected energy efficiency measures, savings calculation and investment costs determination;
- Preparation of a basis for application for financing for the energy efficiency project;
- Composition of a concluding Energy Audit Report.

First tangible benefits could be identified at the end of 1999. Evaluation of the Energy Auditing Programme has shown that the energy costs of audited companies accounted for nine per cent of the total energy bill of the industrial sector of Slovenia. The measures proposed enabled an average reduction of each energy bill by 15 per cent. All energy audit reports have been reviewed by an independent expert organization.

The Energy Auditing Programme is still running under the name Energy Advisory Network ENSVET. It is managed by the Building and Civil Engineering Institute ZRMK, and is still being financed by the Slovenian Ministry of Environment and Spatial Planning.

16.6.4. Impact of case study implementation

During nine years of the Energy Advisory Network ENSVET project, 24 energy advisory offices and nine subsidiaries have been established following the state and municipal initiative and support. The Energy Advisory Network is now uniformly dispersed all over Slovenia, with average distance from the customer to the office not exceeding 20 km. Current extent is 34 offices and 73 advisers and an average of 6,000 advices per year between 1998 and 2005.

Energy advisers offer advises to the households with the aim to raise energy efficiency awareness, to promote and stimulate implementation of energy efficient measures and the use of renewable energy sources. They also take part in education of new advisers, contribute to promotion of the ENSVET and energy efficiency, improving their knowledge and transferring new approaches in operational scheme of the project. Advises are free of charge for the customers.

The economic and financial benefits of the Case Study for the period 1998 to 2005 are as follows:

- 166 subsidized energy audits were conducted (68 buildings, 98 enterprises);
- Between 70 to 90 per cent of the measures recommended and discussed during the advisory sessions resulting from audits were implemented;
- An average pay-back period of 1.4 years (return on investment) could be achieved, also a costs savings estimated/subsidies ratio of 14.7 to 1, and a subsidies/CO_2 reduction ratio of EUR 0.9/ton CO_2 per year[325].

Between 1998 and 2005, the Case Study has achieved energy savings of 10.4 PJ (seven per cent of energy production in 2006) and a CO_2 emission reduction average of 826,000 tons per year (five per cent of CO_2 emissions in 2006).

The Case Study was successful in realizing many social benefits by:

- Raising awareness and providing free information to promote implementation of energy efficiency measures through the licensed energy auditors network;
- Creating job opportunities through energy audit training programmes;
- Stimulating local engineering, construction, building and energy related markets;
- Motivating other initiatives such as the national project Energy consulting to larger industrial consumers (1997 to 2000).

16.6.5. Costs for implementation

The effective costs of the Energy Audit Programme amounted to EUR 627,000 between 1998 and 2005. This figure considers only subsidies and does not include national or private administration and investment costs.

The project costs were financed by:

- The CEE Environmental Funds Network, which is supported in Central Eastern Europe by the European Union's (EU) PHARE Programme;
- The Slovenian Environmental Development Fund (SEDF);
- Regional Environmental Center Country Office Slovenia.

16.6.6. Regulatory preconditions

For the successful implementation of the Case Study, the following points are relevant:

- A formulated national strategy focusing on energy efficiency and renewable energy sources including binding national targets;
- Development of dedicated laws and regulations regarding renewable energy sources and energy efficiency;
- The possibility to subsidize energy auditing feasibility studies;
- The establishment of an Energy Fund administrated by the government for subsidizing part of the energy saving projects.

16.6.7. Critical success factors

The following key success factors contributed to the successful implementation of the Case Study:

- The development of the subsidy scheme into a full scale energy audit programme must be maintained without interruption;
- All parties involved have shown a continuous top-level commitment for the implementation of the programme;
- The establishment of a tight quality control procedure has guaranteed client satisfaction, which has been successfully preserved on a high level until now;
- Working closely with clients, auditors, and ministries, the Energy Auditing Programme has been able to introduce the energy auditing to the market place in a very effective manner. Although the subsidies are still needed to maintain existing auditing volumes, normal business-to-business rules are applied as far as possible.

The following points must be taken into account as "lessons learned" to replicate the implementation of the case:

- The timing was perfect since the real estate and construction business was in a steep dive and there was a real interest to cut all possible costs, including energy costs;

- The large share of identified no-cost or low-cost energy saving measures was the main reason why the average payback time of all proposed measures is as low as two years;
- Government and EU support would not exist without the good results, which the Energy Auditing Programme has continuously provided throughout the years.

16.6.8. Risks

The following factors may represent a risk to the successful implementation and continuation of the Case Study:

- Low market penetration for high quality energy savings and renewable energy technologies may lead to bottleneck situations in procurement processes;
- When energy prices fall and the construction business starts to heat up, the market for energy audits can collapse;
- Subsidized (non cost-reflective) energy prices can obstruct willingness to invest and may lead to a lack of awareness of energy saving benefits and behavioral barriers for action.

16.6.9. Conclusions and recommendations for replication

Introduction

This Case Study describes the establishment of an Energy Auditing Programme implemented by an association of certified energy auditors with the objective to enhance the penetration of energy auditing procedures in Slovenia through transfer of know-how and experience in energy auditing as well as transfer of financing know-how for the preparation of bankable projects.

This Energy Auditing Programme contributes to removing development barriers like lack of professional skills for preparation of bankable projects and lack of awareness, know-how, and professional expertise and experience (of decision makers, municipalities, property owners) regarding energy efficiency measures and energy efficient building technologies.

The implementation of the programme is therefore recommended in countries which lack awareness, professional skills, and dedicated legislation on energy efficiency as main bottlenecks for the development of a domestic market for energy efficiency and energy saving projects. Countries in which an implementation can be recommended are Albania and the former Yugoslav Republic of Macedonia.

Recommendations for replication in Albania

General situation in Albania

Similar to the situation in Slovenia, Albania is a net energy importer. It imports mainly petroleum products and electricity, and the overall energy situation is comparable with the situation in Slovenia, since in 2006 98 per cent of electricity generation in Albania was based on hydro power plants. As well as Slovenia, Albania is a small consumer of electricity in comparison to other European countries. Yet, electricity plays a very important role in the energy system in Albania, since heating in the building sector is essentially achieved through electricity.

Comparable to the Slovenian Strategy for the Use and Supply of Energy, an Energy Efficiency Law was approved in 2005 to improve the overall energy situation in Albania, and subsequent plans to improve the energy efficiency situation were published. Up to now, those plans were barely set in force in Albania. Furthermore, according to the Ministry of Finance currently there are no incentives for energy efficiency in Albania.

Within the fields of energy efficiency and renewable energy is a) the Albania-EU Energy Efficiency Centre (EEC) which disposes of technical capacities for energy efficiency services, but not for the financial resources to develop own energy efficiency projects, and b) the Albanian National Agency of Natural Resources (AKBN), which is an institutional policy maker, that is not developing own energy efficiency projects, although its field of interest covers energy efficiency as well.

Barriers in Albania

One major economic and financial barrier to the development of energy efficiency and renewable projects is the difficult economic situation of Albania, which causes the absence of public funding in the energy sector. Comparable to the former situation in Slovenia before the implementation of the Case Study, the market for energy efficiency services is underdeveloped in Albania. Commercial banks have no experience in financing projects in energy efficiency and renewable energy projects and technical and financial support from international programmes are not utilized at the moment. Furthermore, knowledge about the preparation of bankable projects is not very widespread.

The widespread habit of energy fraud and the highly inefficient use of electricity for heating purposes are signs of a scarcely existing awareness for the final value of energy and of national resources among population, public administration and policymakers. As such the situation in Albania resembles what was the case in Slovenia before the implementation of the Case Study.

Recommendations for Albania

Implementing this Case Study in Albania might help starting to concientize building owners, (industry) companies and financial institutes for the effectiveness and efficiency of energy saving measures and their potential money returns. At the same time organizing seminars, workshops and forums, and providing trainings and information flow can help build up know-how and professional skills in that regard. The main goals would be as follows:

- The provision of good practice examples of successful energy saving projects and demonstration of technical viability of energy saving measures in practical situations;
- The monitoring, evaluation and promotion of projects results, which will convince energy users of achieving similar energy, environmental and economic benefits;
- And finally, to show that organizational or institutional barriers which restrict energy users from making savings can be overcome.

To implement the recommended Case Study in Albania, a time period of approximately two to three years is estimated. Within this time period the following steps should be carried out for successful replication of the Case Study:

- The Albanian National Agency of Natural Resources should contact as many experts and auditors as possible to create a nationwide network and develop a common basis of know-how and knowledge. As a starting point AKBN should work with the Albania-EU Energy Efficiency Centre and the Academy of Science of Albania. If there are no more experts in Albania, the AKBN should try to contact international companies;
- AKBN should furthermore encourage all experts to get connected with each other, e.g. by creating a common platform for communication and the exchange of knowledge;
- Based on the knowledge collected with the help of the energy experts and auditors, AKBN and the Academy of Science of Albania should start to develop standards and databases for energy audits and price standards for audits and services;
- Under the supervision of the Ministry of Economy, Trade and Energy (METE), AKBN should determine personnel responsible for the conduct of energy efficiency audits and measures in each municipality, and train them based on the knowledge collected;
- Once the basis for the conduct of energy audits is created, the main energy consumers in Albania (in terms of industrial and residential buildings) should be determined by AKBN. To raise awareness and cover the costs, not only the owners of the buildings should be contacted, but in the case of residential buildings also the residents or energy end consumers;
- The energy audits should be conducted by the municipal personnel determined to have that responsibility, and standardized energy efficiency measures should be proposed for each audited building, taking into account new technologies with the assistance of the Albanian Academy of Science;
- Since no national financing schemes are available in Albania, for financing of the implementation of the Case Study international organizations should be contacted, such as the World Bank (Country Assistance Strategy, CAS), the European Bank for Reconstruction and Development (Second Energy Community of South East Europe, APL, Programme;

Sustainable Energy Direct Financing Facility Programme), PHARE Programme of the European Union;

- Furthermore, the Albanian Energy Regulatory Authority (ERE) should develop and introduce a regulation for incentives for implementing energy efficiency measures (e.g. tax incentives) in Albania.

Recommendations for replication in the former Yugoslav Republic of Macedonia

General situation in the former Yugoslav Republic of Macedonia

Comparable to the overall situation in Slovenia the former Yugoslav Republic of Macedonia still suffers from outdated and inefficient technical equipment in the industrial sector. Furthermore, the existent building stock is not very energy efficient (residential, public, and commercial buildings).

The former Yugoslav Republic of Macedonia already developed an Energy Efficiency Strategy in 2004, which focuses on institutional buildings and the upgrade of their heating systems as well as the building envelopes and the lighting systems. Similar to Slovenia, the Energy Law contains provisions about the development of a strategy for improvement of energy efficiency. Municipalities are obliged to implement Local Energy Efficiency Programmes and Action Plans. The law includes provisions of energy audits and building certificates.

In the former Yugoslav Republic of Macedonia, there are only two ESCOs: Toplifikacija Engineering and ET ESCO. Until now, there are no specific incentives for energy efficiency investments in the former Yugoslav Republic of Macedonia and as it was the case in Slovenia before the implementation of the Case Study, there is no energy audit programme or energy efficiency network in place.

Barriers in the former Yugoslav Republic of Macedonia

Although the former Yugoslav Republic of Macedonia is undertaking a strong effort to develop policies for energy efficiency, much of the dedicated regulatory framework is still under development and the implementation may still take some time. Furthermore, there are no dedicated laws for energy efficiency, only draft versions are currently under development. There is no dedicated governmental agency for energy efficiency services nor is there a network of regional agencies to support on-field implementation at the local level. In this respect, the former Yugoslav Republic of Macedonia resembles Slovenia before the launch of the Energy Audit Programme.

At the municipal level, responsibilities regarding energy efficiency are not assigned to dedicated departments or personnel and it is not decided who should implement any energy efficiency related action plan. Regarding the awareness for the relevance of energy efficiency and the availability of professional skills for the preparation of bankable projects, the former Yugoslav Republic of Macedonia is trailing behind other countries in the region. According to that lack of awareness, missing human capacities and professional skills are one of the main barriers in the former Yugoslsav Republic of Macedonia.

In the private sector, there is an urgent need of capacity and awareness building regarding energy efficiency measures as it was the case in Slovenia before the implementation of the Case Study, so that mandatory energy audits can be carried out from 2010 onwards.

Recommendations for the former Yugoslav Republic of Macedonia

Implementing this Case Study can solve the immediate need for build-up of professional expertise which will be able to perform the energy audits that should be compulsory as of 2010 and to advise the companies and asset owners on which measures to implement as a consequence of energy audits and how to finance such measures. This implies not only technical skills but also sufficient financial skills to evaluate economic profitability and provide banks and other financing institutes with technical expertise and experience to grant loans for energy efficiency projects.

Since there is already a rudimentary energy efficiency infrastructure existing in the former Yugoslav Republic of Macedonia (establishment of two ESCOs and the obligation of municipalities to implement local energy efficiency programmes), the implementation of the Case Study is estimated to take only two years. Within this time period the following steps should be carried out for successful replication of the Case Study:

- The Energy Agency of the Republic of Macedonia should contact as many experts and auditors as possible to create a nationwide network and develop a common basis of knowhow and knowledge. As a starting point it should contact Toplifikacija Engineering, which already has experience in the area of energy efficiency, and ET ESCO, which is not yet operational, but is concentrating on energy efficiency in public buildings. Furthermore, the Research Center for Energy, Informatics and Materials of the Macedonian Academy of Sciences and Arts (ICEIM-MANU) should be contacted for getting access to the latest research on the topic (e.g. information on new technologies);
- The Energy Agency of the Republic of Macedonia should also try to get into contact with international experts and auditors on energy efficiency to create a larger base of knowledge;
- The Energy Agency of the Republic of Macedonia should furthermore encourage all experts (ESCOs, research institutions, international experts) to get connected with each other, e.g. by creating a common platform for communication and the exchange of knowledge;
- Based on the knowledge collected with the help of the energy experts and auditors, the Energy Agency of the Republic of Macedonia with the help of the ICEIM-MANU should start to develop those standards and databases for energy audits and price standards for audits and services, which are to be set in place by the municipalities according to the Energy Law;
- Under the supervision of the Energy Regulatory Commission (ERC) the Energy Agency of the Republic of Macedonia should determine personnel responsible for the conduct of energy efficiency audits and measures in each municipality, and train them based on the knowledge collected and the current regulation (e.g. the Rulebook for energy efficiency of new buildings and reconstruction of existing ones);
- Once the basis for the conduct of energy audits is created (assignment of responsibilities, capacity building, development of standards), the main energy consumers in the former Yugoslav Republic of Macedonia (in terms of industrial and residential buildings) should be determined by the Energy Agency of the Republic of Macedonia. To raise awareness and cover the costs, not only the owners of the buildings should be contacted, but in the case of residential buildings also the residents or energy end consumers;
- The energy audits should be conducted by the municipal personnel determined to have that responsibility, and standardized energy efficiency measures should be proposed for each audited building (new buildings with a square footage above 1,000 m^2 and reconstruction for old buildings), taking into account new technologies as advised by the ICEIM-MANU;
- In the former Yugoslav Republic of Macedonia, a national credit line is active among the Macedonian Bank for Development Promotion and five local commercial banks. For financing of the Case Study implementation the Energy Agency of the Republic of Macedonia should apply for loans via the Macedonian Bank for Development Promotion;
- If it is not possible to cover the project costs with the loans granted on a national level alone, international organizations should be contacted. With the assistance of the Macedonian Bank for Development, the Energy Agency of the Republic of Macedonia should contact the World Bank (for participating in the Sustainable Energy Project of the former Yugoslav Republic of Macedonia established by the World Bank since 2006), the European Bank for Reconstruction and Development, the United States Agency for International Development, or individual ministries or agencies of economy in EU countries (such as e.g. the Austrian Development Agency);
- Furthermore, the Macedonian Bank for Development Promotion should promote the establishment of the Energy Efficiency Fund, which was envisaged by the Energy Law from 1997, but was never established. Once established, this fund could be used to cover the costs for nationwide implementation or development of energy audits and energy efficiency measures;
- The Energy Regulatory Commission (ERC) and the Energy Department of the Ministry of Economy should develop a regulation for incentives for implementing energy efficiency measures (e.g. tax incentives for municipalities).

16.7. *Green Facility – State Environmental Fund (SEF) and Green Investment Scheme (GIS) – Case Study of Czech Republic (recommendations for replication in Bulgaria, Romania and the Russian Federation)*

Box 19: Green Facility – State Environmental Fund and Green Investment Scheme

One of the main barriers towards the realization of energy efficiency potentials and potential renewable energy projects in the household as well as commerce and industry sector in the Czech Republic before the implementation of the Case Study was the shortage of public funds for such projects. The household sector and several industrial sectors suffered from a lack of investments necessary for the introduction of modern and energy efficient and renewable energy technologies.

The Case Study refers to the financing of a public fund (Green Facility – State Environmental Fund, SEF) by the sale of CO_2 emission certificates via the implementation of a Green Investment Scheme in the Czech Republic. The Case Study contributes in removing financial barriers and strengthening financial capabilities of national governments by raising additional money for a public fund supporting energy efficiency and renewable energy measures. These measures are in particular refurbishment of residential buildings and the replacement of coal stoves by renewable heating applications.

The Case Study is recommended for replication in Bulgaria, Romania, the Russian Federation and Ukraine, since these countries have, similarly to the Czech Republic, a surplus of CO_2 emission certificates, which could be sold to other countries which are signatories of Annex B to the Kyoto Protocol.

16.7.1. Background to the Case Study

General situation in the Czech Republic

The Czech Republic is experiencing a boom with regard to its propensity to consume and expenditures for the Czech households' consumption are continuously increasing, particularly with regard to the number of electronic household appliances.

Regarding its economy, the Czech Republic can still be characterized by high-energy intensity, and high shares of solid fuels (particularly coal) in electricity generation (59 per cent in 2006[xxix]). Although material and energy intensity of the Czech economy has significantly decreased between 1995 and 2006, the domestic material consumption and energy intensity of GDP is still high compared to other EU member states. A share of 13 per cent of renewable energy sources in final energy consumption by 2020 has been set as a national target in the EU Directive on the promotion of the use of energy from renewable resources (2009/28/EC). The Czech Republic's renewable energy sources percentage of total primary energy consumption is currently 6.4 per cent (in 2006[xxx]), although a very gradual increase can be observed since 1997 (3.8 per cent in 1997, 4.1 per cent in 2004).

Barriers in the Czech Republic

One of the main barriers towards the realization of energy efficiency potentials and potential renewable energy projects in the Czech Republic before the implementation of the Case Study was the shortage or lack of financing mechanisms and funding for such projects. Several industrial sectors suffer from a lack of investments necessary for the introduction of modern technologies and the inappropriate structure of the economic environment is threatening the existence of small and medium-sized enterprises, particularly related to energy efficiency and renewable energy sources.[xxxi]

16.7.2. Description of the Case Study

The Case Study refers to the financing of a public fund (SEF) by the sale of CO_2 emission certificates via the implementation of a Green Investment Scheme in the Czech Republic. The Case Study contributes in removing financial barriers and strengthening financial capabilities of

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xxix EUROSTAT, 2008
xxx EUROSTAT, 2008
xxxi The Czech Republic Strategy for Sustainable Development (2004), Prague

national governments by raising additional money for a public fund supporting energy efficiency and renewable energy measures. These measures are in particular refurbishment of residential buildings and the replacement of coal stoves by renewable heating applications.

16.7.3. Approach for implementation of the Case Study

The Green Investment Scheme is a newly developed mechanism in the framework of International Emission Trade. It is designed to achieve greater flexibility in reaching the targets for the Kyoto Protocol while preserving environmental integrity of the International Emission Trade.

Under the GIS a country being part of the Kyoto Protocol expecting that the development of its economy will not exhaust its Kyoto quota can sell the excess of its Kyoto quota units (AAUs = Assigned Amount Unit) to another country. The proceeds from the AAU sales should be "greened", i.e. channeled to the development and implementation of the projects either acquiring the greenhouse gases emission reductions (hard greening) or building up the necessary framework for this process (soft greening).[xxxii],[xxxiii]

The development of the Green Investment Scheme requires additional effort in creating the necessary legislative, administrative, and institutional basis. The sale of emission credits is governed by strict rules. The selling countries must use the revenues from the sold credits obtained from countries that are unable to comply with the Kyoto Protocol exclusively for special schemes and programmes aimed at reduction of greenhouse gases emissions. As such, greenhouse gases emissions in one country are thus reduced in lieu of emissions released in some other country.[xxxiv]

In general, there are certain expectations towards the host countries with regard to the legislative development: Transparency in legal authorities and procedures for the handling of the AAUs, traceability of the fund, which is used for redistributing the revenues gained by the sale of AAUs, a transparent reporting system of emission reductions by the Green Investment Scheme in the host country, development of human resources programmes related to the investments financed by the Green Investment Scheme.[xxxv]

On 14 November 2007, the Czech government decided to further implement the Green Investment Scheme (GIS) in the Czech Republic. The decision was right in time for the start of the second EU ETS period on 1 January 2008. From 24 February 2008 onwards, the Czech Republic was fully eligible under the Kyoto Protocol. The Czech Republic expected a surplus amount of 100 million Kyoto quota units (AAUs) per Kyoto commitment period 2008 to 2012. Potential buyers of AAUs were identified as foreign governments as well as private sector companies. The revenues gained through selling the Kyoto quota units (AAUs) were planned to be used to feed the Green Facility – State Environmental Fund (SEF). According to the Czech government, the resources from the SEF are one of the most important instruments of state environmental policy, while Czech domestic resources are limited with regard to energy efficiency and renewable energy measures.

[xxxii] Green Investment Scheme, Retrieved 17 November 2009 from http://www.rec.org/REC/Programs/ClimateChange/green-investment-scheme.html

[xxxiii] AAU (= Assigned Amount Unit) is a unit within the Kyoto Protocol that represents the entitlement of a country to release into the air one ton of CO2 in the 2008 to 2012 period. A country that has reduced its emissions more than the level to which it committed itself in the Kyoto Protocol may sell its surplus units to a country that is unable to achieve its commitment under the Kyoto Protocol.
The difference between emission credits (AAUs) and emission allowances: Allowances and credits are often confused. Emission allowances are traded in the framework of the EU emission trading scheme (EU ETS) by individual polluters, i.e. enterprises. As of 2013, companies will cease to receive emission allowances free of charge and will have to purchase them directly in auctions. Emission credits (AAUs) form part of the Kyoto Protocol mechanisms, in the framework of which the Czech Republic was obliged to reduce its total production of greenhouse gases emissions by eight per cent compared to 1990. Currently, the Czech Republic produces 24 per cent less greenhouse gases emissions than in 1990. Thus, the Czech Republic is entitled to sell the difference between its commitment and the actually reduced emissions in the form of units (emission credits) to countries that are unsuccessful in fulfilling the Kyoto Protocol.

[xxxiv] Green Investment Scheme from Sale of Emission Credits (Czech Republic), Retrieved 17 November 2009 from http://www.economicinstruments.com/index.php

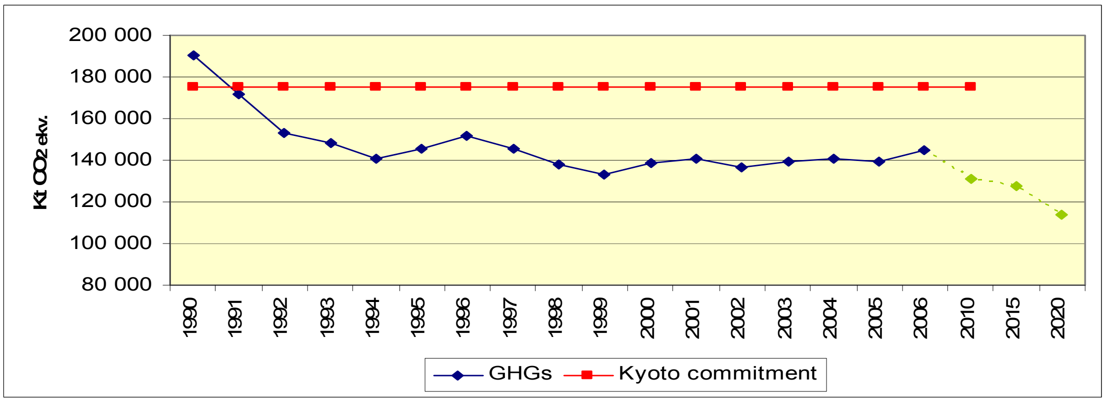
[xxxv] Perspective of Japanese Buyers towards Green-AAUs, opportunities and barriers, Facilitating Green Investment Schemes: first lessons learnt and the way forward Central and Eastern Europe, Belarus, Russia and Ukraine (2008). Natsource Japan Co., Ltd.

The State Environmental Fund was established by the Czech National Council Act in 1991 as a State Institution, in effect merging and replacing the preexisting State Air Fund and State Water Fund. The chief objective behind the establishment of the SEF was to create a comprehensive and flexible financial instrument for implementing state environmental policy. The SEF, which began its operations in 1992, is a separate legal entity administered by the Ministry of Environment (MoE), with the Minister ultimately responsible for the allocation and use of the SEF's resources. The Minister is advised in the use of the SEF's resources by the Fund Council, whose 12 members and chairperson are appointed by the Minister. The SEF's mandate is implemented through the work of the Fund Office, whose director is appointed by the Minister and currently has a staff of over 70 people. The SEF's principal sources of revenue before the implementation of the Case Study are pollution charges and fines, proceeds from privatization, and loan repayments. The SEF's current environmental investment priorities are: air pollution abatement; water pollution abatement; minimization of waste, especially hazardous waste; support for renewable energies, energy efficiency, and protection of nature and landscape. The majority of SEF's financial support has been awarded either as grants or soft loans, though the SEF may also offer loan guarantees and interest rate subsidies for loans extended by commercial banks.[xxxvi] (Detailed information about the Green Facility – State Environmental Fund is published via Internet www.sfzp.cz).

The Czech Republic gained the right to sell the Kyoto quota units (AAUs) because it decreased its greenhouse gases emissions by approximately 24 per cent by 2008 compared to 1990, while it only committed itself to an eight per cent decrease in the Kyoto Protocol.

Since there was a main focus on the modernization of the housing sector in the Czech Republic, the Czech government planned to utilize the above mentioned revenues from the International Emission Trading for financing energy savings in family houses and flats, administrative and public buildings. Additional sectors to be supported by the Green Facility – State Environmental Fund will be decided on at a later stage of project implementation and development.[xxxvii]

Figure 16.2: Case Study of Czech Republic – Development of Greenhouse Gas Emission



Source: Ministry of Environment, Climate Change Department (2008)

The Case Study has involved the following key players and partners[xxxviii]:

- The Government of the Czech Republic, which is responsible for the development and implementation of the Green Facility – State Environmental Fund;
- The Ministry of Environment (MoE), which acts under a mandate of the Government of the Czech Republic and which reports to the government directly. The MoE issues Memorandums of Understanding, which have to be signed by the states buying the Kyoto quota units (AAUs). The MoE is responsible for the handout of the AAUs sold to the Buying states;
- A Working Group, which has been assigned responsibility for supervising operative matters of the SEF e.g. supervision of the accounts for payment transfers. The Working Group

xxxvi OECD/EAP Task Force Secretariat and EU Phare Program Review of the Czech State Environment Fund (1999), Prague

xxxvii Green Investment Scheme (GIS) in the Czech Republic. (2008). Ministry of Environment, Climate Change Department

xxxviii Green Investment Scheme (GIS) in the Czech Republic. (2008). Ministry of Environment, Climate Change Department, Powerpoint Presentation reports to the Ministry of Environment and develops rules and reporting structures for the SEF. The Working Group furthermore negotiates and finds agreements about selling the Kyoto quota units (AAUs) to foreign governments;

- The SEF as state fund, transferring revenues gained by the sale of Kyoto quota units (AAUs) and conducting the deals according to the rules defined by the Working Group. The SEF transfers the revenues to the Green Investment Scheme-project groups or companies benefitting from the SEF. Payments are to be made in USD or EUR;
- The Buying states, which are interested in buying amounts of Kyoto quota units (AAUs) from the Czech Republic;
- The World Bank with the responsibility to support the setup of the Green Investment Scheme in the Czech Republic.

Beneficiaries of the implementation of the Case Study are energy efficiency and renewable energy projects and programmes receiving funds from the SEF to refurbish buildings, houses etc (e.g. the Green Light for Savings Programme). Furthermore, municipalities indirectly benefit from the modernization of their administrative buildings and from the improvement of the overall building infrastructure with regard to energy efficiency and energy efficiency measures.

The proposed areas of support primarily include energy saving and energy efficiency investments in the country's housing sector[xxxix]:

- Heat insulation of family and apartment buildings;
- Improving energy efficiency by replacing existing equipment with more efficient equipment;
- Fuel switch to more environmentally friendly fuels (e.g. switch from coal to renewable energy);
- Support for construction of new passive family houses and apartment buildings;
- Installation of low-emission biomass sources;
- Installation of solar thermal collectors in family houses and apartment buildings by providing subsidies to residents for these purposes.

The Case Study has been implemented using the following steps:

Step one: Establishment of Working Group for GIS / SEF

As a functional unit to control the establishment of the Green Investment Scheme and its relation to the State Environmental Fund, the Working Group has been established and its main tasks on the international and the domestic side have been defined.

Step two: Setup of legal/financial/technical framework for GIS

For the legal/financial setup of the emission credit sales (GIS) to feed the State Environmental Fund (SEF) laws about the conditions of trading with allowances have been defined and amended, auctions have been prepared, taxes and accounting questions have been settled. For the technical setup grants and documentation have been prepared, criteria, validation, reporting, and verification processes have been defined for the SEF. Furthermore, calls for proposals have been issued.

Step three: Pilot transactions GIS

A pilot transaction has been negotiated and agreed upon by the Working Group, the Ministry of Environment and a Buying state: In April 2009, the final agreement was signed on the sale of 40 million emission credits (AAUs) by the Czech Republic to Japan. Although the total financial volume of the transaction is not publicly available, there are plans for approximately CZK ten billion to be involved in the deal. This sum will then be made available to the Green Facility – State Environmental Fund.

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xxxix Project information document (PID) concept stage (2009). The World Bank, Report No. 48088

Czech Republic is currently also negotiating the sale of AAUs with interested parties amongst other countries (e.g. Spain), as well as the World Bank. Revenues gained through these transactions will also be used for the SEF.

Step four: Support dedicated projects under GIS / SEF

The scheme is planned to lead to a significant reduction in greenhouse gases emissions in the Czech Republic. Projects for financing energy savings in family houses and flats, administrative and public buildings are to be identified, developed, and implemented.

On example project, which is financed by the Green Investment Scheme and the SEF is the Green Light for Savings Programme, which was launched in the Czech Republic in spring 2009. This programme supports investments in energy saving measures in residential buildings and use of renewable energy sources at the household level. The programme should help to reduce annual CO_2 emissions by 1.1 million tons by 2012. The programme shall also help to establish or enlarge markets for energy efficient or energy saving products and renewable energy sources. The target group of the programme includes all potential applicants, citizens of the Czech Republic, municipalities, enterprises, housing associations or communities of housing units' owners. Information about the programme and about the application for the programme can be found e.g. on advertising elements along roads, on television, during fairs and exhibitions, in newspapers, on the internet, etc.[xl]

The implementation of the Case Study started in November 2007, when the Czech government made the final decision about the Green Investment Scheme implementation and defined the necessary steps. The pilot project mentioned above was launched in spring 2009 as well as the Green Light for Savings Programme for redistribution of the gained revenues, as such the complete implementation including all implementation steps described above took approximately 18 months.

Taking into account the large number of key players involved as well as the necessary organizational structure for setting up the emission credit sales and the subsequent financing of the SEF, when replicating the Case Study in other countries it is unlikely that the timeframe can be substantially shortened. Yet, a suggestion to save some implementation time is the amending of laws needed for setting up the legal infrastructure for the Case Study instead of the time-consuming approval of new laws.

16.7.4. Impact of case study implementation

The implementation of the Case Study has an impact at regional and municipal level, since programmes supported under the Green Investment Scheme are aimed at concrete energy efficiency and renewable energy measures as the reduction of greenhouse gases emissions. Furthermore, the programmes are spread all over the country while the indirect impact of the Case Study is on a national level. Economical, financial, and environmental benefits of the implementation of the Case Study are significant energy consumption and energy cost savings, particularly for residential heating as well as a significant reduction in the emission of greenhouse gases.

According to the Ministry of Environment in 2008 there were still approximately 560,000 households being heated by lignite. Switching fuel for the majority of these households to biomass and improving the thermal insulation of the residential buildings is estimated to save approximately two million tonnes CO_2 per year. An additional amount of 1.5 million tonnes CO_2 per year will be saved under the Green Investment Scheme, if approximately 1.2 million apartments in residential buildings are equipped with modern central heating systems using gas. Supporting other sectors with revenues gained through the Green Investment Scheme will be possible at a later stage of the Case Study implementation (e.g. industry sector).

A social benefit of the Case Study implementation is the significant reduction in air pollution that causes increased occurrence of respiration against allergies amongst Czech children and other diseases of the respiratory tract. Furthermore, the Czech Republic estimates that the

[xl] Czech Republic National Reporting for CSD-18/19 (n.d.). http://www.un.org

implementation of the Green Investment Scheme will create between 3,900 and 7,900 jobs per year.

By 2012 the impact of the Green Light for Savings Programme shall include[xli]

- A reduction in CO_2 emissions of at least one per cent of all Czech emissions (at least 1.1 million tons);
- 6.3 PJ energy savings in heating, which represents an annual saving in household heating costs of billions of Czech crowns;
- Creation or retention of up to 30,000 jobs;
- Improvement of the housing conditions for 250,000 households receiving support;
- 3.7 PJ increase in heat generation from renewable energy sources;
- 2.2 million kg reduction in dust particle contamination.

Since the distribution of the revenues gained from the Green Investment Scheme liquidation of emission credits (AAUs) started in 2009 with the launch of the Green Light for Savings Programme, the estimated timeframe to achieve tangible benefits from the implementation of the Case Study is approximately two years (approximately six months after the start of Case Study phase four). Implementing Case Study phase three (emission credit sales) and phase four (launch of energy efficiency and renewable energy projects) at the same time using initial funding provided by World Bank or European Bank for Reconstruction and Development credit lines could shorten this timeframe when replicating the Case Study in other countries. It is estimated that such measures will save up to three to six months of implementation time.

16.7.5. Cost for implementation

Information about the cost of implementing the Green Investment Scheme in the Czech Republic (Case Study phase one to three) are published by the World Bank, which provided a credit amount of approximately 20 to 30 million EUR[xlii]. For Case Study phase four, in 2010, the Green Light for Savings Programme shall distribute up to 749 million USD (approximately 500 million EUR), the larger part financed by the sale of emission credits under the GIS[xliii].

16.7.6. Regulatory preconditions

There are a number of national and EU documents that serve as a background to the Green Investment Scheme. One of the major requirements to the newly designed mechanism is compliance to the following documents and directives:

- The country has to be fully eligible under the Kyoto Protocol;
- 2002/91/EC Directive on the Energy Performance of Buildings (EPBD), being transposed into Czech national legislation by the Energy Management Act;
- 2006/32/EC Directive on Energy End-Use Efficiency and Energy Services National Climate Change Strategy;
- National Energy Policy;
- National Programme for Energy Efficiency and Use of Renewable and Waste Energy Sources;
- Procedural framework on setting up deals with respect to the selling of emission credits (AAUs);
- Procedural framework on decision of programmes and projects to be support by the emission credit revenues distributed by the State Environmental Fund .

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xli About the green savings programme (2009), from: http://www.zelenausporam.cz/sekce/582/about-the-green-savings-programme/

xlii Integrated Safeguards Data Sheet, Concept Stage, Report No. 48089 World Bank

xliii Clean Technologies, European Opportunities. (2009). United States of America Department of Commerce, from: http: www.buyusa.gov/czechrepublic/en/265.pdf

16.7.7. Critical success factors

The following key success factors contribute to the successful implementation of the Case Study:

- Creation of the necessary legislative, administrative, and institutional basis for implementation of the Green Investment Scheme;
- Existence of state funds with the aim of supporting energy efficiency or renewable energy projects or the general aim of protecting the environment;
- Existence of programmes or projects in the field of energy efficiency and renewable energy for re-distributing and "greening" the revenues gained by the Green Investment Scheme, such as the Green Light for Savings Programme, which aims to reduce greenhouse gases emissions;
- Setup of a Working Group to negotiate the agreements about selling the AAUs, to mediate between the Ministry of Environment (representing the government) and the fund, and to coordinate the distribution and re-distribution of the revenues gained.

The following points are relevant for an efficient replication of the Case Study:

- Establishment of relationships with possible buying states for emission credits (AAUs) (e.g. Japan, Spain);
- Financing of the implementation of the Green Investment Scheme should be enabled by e.g. credit lines by the World Bank or the European Bank for Reconstruction and Development;
- The Working Group has to strike a balance among the interests of all stakeholders (e.g. with regard to the price of the AAUs);
- Finding efficient and unbureaucratic decisions to setup the organizational structure for the Green Investment Scheme

16.7.8. Risks

The following possible factors may represent a risk to the successful implementation of the Case Study:

- Incorrect approximations or estimations of the amount of AAUs available to be sold and incorrect estimations of the possible price of AAUs to be sold;
- Agreements are not in favour of the selling country due to inappropriate negotiation of agreements;
- Due to long-winded bureaucratic decision finding implementation of the Green Investment Scheme in the according country is taking a disproportional long time;
- Financial support granted to setup the organizational and administrational environment for implementing the Green Investment Scheme is used for other purposes;
- The implementation of the Green Investment Scheme is perceived as unnecessary or unwanted top-down measure and is not supported appropriately by the according ministries and administration;
- Revenues gained by the selling of emission credits are not used for renewable energy or energy efficiency projects related to projects reducing greenhouse gases in the host country, but used elsewhere in the state budget.

The following possible risks should be considered as a consequence of the implementation of the Case Study in the originating country as well as in the countries, in which the Case Study may be replicated:

- Competition between different members of the Working Group representing different aspects or political directions in the country or government leading to long-winded decision or is putting off decision finding of the Working Group;
- Due to missing procedures or requirements for project application projects, projects are supported by the state fund, which are not appropriate to reduce greenhouse gases emissions (e.g. by implementing energy efficiency measures);

- Due to a lack of technical assessment of the projects, e.g. due to missing capacity building measures or lack of personnel assigned such tasks, supported projects do not match the state funds criteria or do not match country specific conditions (e.g. climate and weather conditions).

16.7.9. Conclusion and recommendations for replication

Introduction

In general the Case Study presents an approach to overcome the lack of financial support and funding for energy efficiency and renewable energy projects with the goal of reducing greenhouse gases emissions. To implement the Green Investment Scheme the according country has to be fully eligible under the Kyoto Protocol and has therefore already committed itself to reduce its greenhouse gases emission.

Recommendations for replication in Bulgaria

General situation in Bulgaria

Bulgaria's primary energy supply is based on fossil fuels holding the majority share (74%), followed by nuclear (20%), and a modest contribution of hydropower (1%). Bulgaria's electricity generation is dominated by nuclear (43%), coal (42%), and hydropower (10%).

Bulgaria's energy intensity of the GDP at Purchasing Power Parity for is almost double the EU-27 average and slightly lower than the project region average. Although the overall energy intensity of the country is currently on a high level, it has decreased significantly since 1990. In 2005 final energy consumption was 40 per cent lower than in 1990. In the period 1990-2007 CO_2 emissions decreased by 35.8 percent.

Similar to the situation in the Czech Republic before the implementation of the Case Study, Bulgaria has a surplus of CO_2 certificates, which could be transferred to other Annex I countries of the Kyoto Protocol and financing instruments supporting investments in energy efficiency and renewable energy, e.g. Bulgarian Energy Efficiency Fund (BgEEF), Bulgarian Energy Efficiency and Renewable Energy Credit Line (BEERECL), and the Bulgarian Residential Energy Efficiency Credit Line (REECL). The potential for greening CO2 emissions in Bulgaria is estimated with 75 million tons for a five years period.[xliv]

Barriers in Bulgaria

Despite significant progress in political reforms, mainly driven by the implementation of the acquis communautaire of the European Union, Bulgaria faces some legal, institutional and administrative barriers. Frequent amendments of existing regulations and a strong regulatory proliferation may originate uncertainty and confusion among investors and project developers. Besides the lack of commitment by Bulgarian commercial financing institutions, no significant economic and financial barriers could be found in Bulgaria, with exception to the feed-in-tariff mechanism, which is perceived as rather complicated. Nevertheless, the implementation of a Green Investment Scheme as described in the Case Study for the Czech Republic could provide additional funding for the funds such as the Bulgarian Energy Efficiency Fund, thus accelerate the market penetration of sustainable energy technologies.

Recommendations for Bulgaria

In Bulgaria the potential for greening CO2 emission reduction certificates is estimated with 75 million tons for a five year period. A World Bank Study[xlv] recommended a multi-sectoral investment programme under the Green Investment Scheme.

The following steps should be carried out for successful replication of the Case Study::

- The Ministry of Environment and Water should establish an inter-ministerial working group comprising representatives from key ministries with leadership from the Prime Minister's

xliv Energy Institute, 2008, www.rec.org

xlv Options for Designing a Green Investment Scheme for Bulgaria (2004), World Bank office. Such working group could include, at a minimum, representatives from the Ministry of Energy and, Ministry of Finance and Ministry and Justice;

- The Ministry of Environment in cooperation with the Ministry of Justice should contract a consultant for a legal review of the proposed Green Investment Scheme under Bulgarian law. In particular, the review should examine how a forward sale contract can be executed (i.e. current disbursement against future delivery of CO_2 emission reduction certificates);
- The Ministry of Environment and Water should establish a Central Management Unit charged with overseeing the countries obligation under the United Nation Framework Convention on Climate Change (UNFCCC) and the Kyoto Protocol_ as well as strategically deciding on the use and allocation of CO_2 certificates trades, and for an established national reserve;
- The Ministry of Environment and Water should establish a new or nominate an existing fund e.g. the Bulgarian Energy Efficiency Fund (BgEEF) or the manager of the Bulgarian Energy Efficiency and Renewable Energy Creditline (BEREECL) as an independent entity wholly owned by the Government, created under Bulgarian law (corporation, non-profit-organization or governmental organization). It should be professionally managed by a fund manager, with a distinct investment committee that decides on funding and related matters;
- The Ministry of Environment and Water should identify and contact likely buyer(s) and establish general guidelines for sales transaction of CO_2 emission reduction certificates and define an appropriate structure of the Green Investment Scheme with sufficient details (e.g. candidate projects, timing/phasing, costs and financing, emission reduction schedule, implementing agencies/parties, consistency with applicable regulations such as State Aid rules under the European Union, etc.);
- The Ministry of Environment and Water should prepare and finalize an Information Memorandum for consideration by buyers of Bulgaria's Green Investment Scheme and circulate it along with a request for proposal on the offer of certain volume of CO_2 emission reduction certificates. The package would have to include monitoring and reporting procedures on the implementation of the Green Investment Scheme, including any proposals for additional capital mobilization and risk mitigation to specific parties (e.g. commercial lenders to the Green Investment Scheme);
- The Ministry of Environment and Water in cooperation with the Fund Manager should discuss and negotiate with each buyer on the request for proposal and conclude final agreements.

Recommendations for replication in Romania

General situation in Romania

Romania has significant fossil fuel (crude oil, natural gas and coal) and hydroelectric resources. Most of these reserves are lignite and sub-bituminous coal. The total hydroelectric power potential is about 40 TWh per year of which 12 TWh per year has already been developed. Domestic production supplies 70 per cent of the primary energy demand.

In 2007 the energy intensity of GDP at Purchasing Power Parities was around 20 per cent higher than the EU-27 average. The period following 1990 has been characterized by a significant decrease in energy use as well as in total greenhouse gas emission amounting to 45.3 percent in the period 1989 to 2007.[xlvi]

The Government Decision 1892/2004 introduced a quota system for new renewable energy sources for electricity production (green certificates). International financing institutions established dedicated funds and credit lines, i.e. Romanian Energy Efficiency Fund (FREE), EU/EBRD Romanian Energy Efficiency and Renewable Energy Credit Line. Like in the Czech Republic before the implementation of the Case Study, Romania has a surplus in CO2 certificates as well as dedicated funds and credit lines for sustainable energy technologies.

[xlvi] EEA, 2009

Barriers in Romania

Romania has done much in recent years to reduce its energy intensity and to increase the share of renewable energy generation. With the strong development of the financial sector and the adoption of policy measures promoting investments in energy efficiency and renewable energy, there are no major economic or financial barriers to the development of energy efficiency and renewable energy sources projects in Romania with one exception. At the municipal level, the availability of co-financing on a non-guaranteed basis remains uncertain as project preparation, utilization capacity and co-financing ability are generally weak. These issues are particularly apparent in smaller municipalities, which to date have not had the benefit of either international or local bank financing. Thus, a Green Investment Scheme, as described in the Case study, could provide funding dedicated to energy efficiency and renewable energies implemented by municipalities.

Recommendations for Romania

The following steps should be carried out for successful replication of the Case Study:

- The Ministry of Agriculture, Forests, Water and Environment (MAPAM) should establish an inter-ministerial working group comprising representatives from key ministries with leadership from the Prime Minister's office. Such working group could include, at a minimum, representatives from the Ministry of Economy and Commerce, Ministry of Finance and Ministry of Justice;
- The Ministry of Agriculture, Forests, Water and Environment in cooperation with the Ministry of Justice should contract a consultant for a legal review of the proposed scheme under Romanian law. In particular, the review should examine how a forward sale contract can be executed (i.e. current disbursement against future delivery of CO_2 emission reduction certificates);
- The Ministry of Agriculture, Forest, Water and Environment should establish of a Central Management Unit charged with overseeing the countries obligation under the United Nation Framework Convention on Climate Change and the Kyoto Protocol as well as strategically deciding on the use and allocation of CO_2 certificates trades, and for an established national reserve;
- The Ministry of Agriculture, Forest, Water and Environment should establish a new or nominate an existing fund as an independent entity wholly owned by the Government, created under Romanian law (corporation, non-profit-organization or governmental organization). It would be professionally managed by a fund manager, with a distinct investment committee that decides on funding and related matters. Taking into account its track record in funding environmental projects, as well as its existing internal organization structure, the Environmental Fund Administration (EFA) could be used as the key structure in managing and implementing the GIS;
- The Ministry of Agriculture, Forest, Water and Environment should identify and contact likely buyer(s) and establish general guidelines for sales transaction and define an appropriate Green Investment Scheme structure with sufficient details (e.g. candidate projects, timing/phasing, costs and financing, emission reduction schedule, implementing agencies/parties, consistency with applicable regulations such as State Aid rules under the EU, etc.);
- The Ministry of Agriculture, Forest, Water and Environment should prepare and finalize an Information Memorandum for consideration by buyers of Romania's Green Investment Scheme and circulate it along with a request for proposal on the offer of certain volume of CO_2 emission reduction certificates. The package would have to include monitoring and reporting procedures on the implementation of the GIS, including any proposals for additional capital mobilization and risk mitigation to specific parties (e.g. commercial lenders to Green Investment schemes);
- The Ministry of Agriculture, Forest, Water and Environment in cooperation with the designated Fund Manager should discuss and negotiate with each buyer on the request for proposal and conclude final agreements.

Recommendations for replication in the Russian Federation

General situation in the Russian Federation

The Russian Federation is the world's largest exporter of natural gas, the second largest oil exporter, and the third largest energy consumer. Due to large domestic production of crude oil, gas, petroleum products and coal, the Russian Federation generates an energy export surplus of 78.5 per cent.

Primary energy supply is dominated by gas and crude oil, with shares of 43 per cent and 39 per cent respectively. The industry sector with a share of 30 per cent of primary energy consumption is the first energy consumer in the Russian Federation followed by the household sector with 27 per cent.

Due to the economic recession that followed the fall of the Soviet Union, the Russian Federation has experienced a significant reduction in its energy intensity levels as well as greenhouse gas emissions since 1990.

Similar to the case of the Czech Republic, international financing institutions established funds and credit lines dedicated to renewable energy and energy efficiency, i.e. the Russian Sustainable Energy and Carbon Finance Facility from the European Bank of Reconstruction and Development or the Russia Sustainable Energy Finance Programme operated the International Finance Corporation (IFC).

On June 27, 2009, the Russian legal framework on energy efficiency and climate change was supplemented by Russian Government Decree No. 884-r. Decree appoints Sberbank to participate in pilot projects involving carbon trading (Article 17) Sberbank is tasked to draft a domestic methodology for trading credits and to conduct environmental project financing.[xlvii] Thus, preparations for a Green Investment Scheme are ongoing in the Russian Federation.

Barriers in the Russian Federation

In the Russian Federation, the main institutional barrier appears to be the lack of a clear policy framework: The regulatory framework for renewable energy sources is not defined, while the regulatory framework for energy efficiency is outdated and was never effectively implemented. Lack of incentives and support instruments for energy efficiency and renewable energy provided by national funds are obviously strong barriers for the development of projects as well as the current progress in market development. Given the surplus of CO2 emission certificates and the lack of dedicated national funds, the situation is similar to the Czech Republic before implementation of the Case Study. Thus the prompt implementation of the planned Green Investment Scheme as foreseen in Russian Government Decree No. 884-r following the concept presented in the Case Study is highly recommended.

Recommendations for the Russian Federation

With the approval of the Russian Government Decree No. 884-r in June 2009, the Russian Federation set the first steps towards successful replication of the Case study. The Decree is the first document specifically concerning the carbon trading mechanism under Article 17 of the Kyoto Protocol in the Russian Federation. The Decree appoints Sberbank to participate in pilot projects involving carbon trading and to draft a domestic methodology for trading credits and to conduct environmental project financing.

The next steps should be carried out for successful replication of the Case study:

- The Ministry of Economic Development and Trade in cooperation with Sberbank shall identify and contact likely buyer(s) and establish general guidelines for the sale of CO_2 emission reductions and define an appropriate Green Investment Scheme structure with sufficient details (e.g. candidate projects, timing/phasing, costs and financing, emission reduction schedule, implementing agencies/parties, consistency with applicable regulations such as State Aid rules under the EU, etc.);
- The Ministry of Economic Development and Trade in cooperation with Sberbank should prepare and finalize an Information Memorandum for consideration by buyers of the Russian

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[xlvii] http://www.bakernet.com/NR/rdonlyres/7B95783B-BF5D-4F3C-9660-2EB893F5C90B/0/english_russia_kyotoprotocolnewrules_ca_jul09.pdf

Green Investment Scheme and circulate it along with a request for proposal on the offer of certain volume of CO_2 emission reduction certificates. The package would have to include monitoring and reporting procedures on the implementation of the Green Investment Scheme, including any proposals for additional capital mobilization and risk mitigation to specific parties (e.g. commercial lenders to the Green Investment Scheme);

- The Ministry of Economic Development and Trade in cooperation with Sberbank should discuss and negotiate with each buyer on the request for proposal and conclude final agreements.

Recommendations for replication Ukraine

General situation in Ukraine

Despite having significant resources of coal and gas, Ukraine is a net importer of energy with an energy dependency of 41 per cent. To reduce Ukraine's dependence on energy imports, the government is planning to increase share of coal as primary supply for thermal power plants by 150 per cent until 2030, while the use of gas should be reduced by 50 per cent. Additionally, the construction of nuclear power plants and the development of renewable energy sources are under consideration.

Although the energy intensity has been decreasing in recent years (45 per cent since 1997), Ukraine is still one of the least energy-efficient countries in the world. Decrease in energy intensity was accompanied by a drop in CO_2 emissions. For example, in 1999, the country's emissions were 43 percent below the 1990 level.[xlviii] A drop in CO_2 emissions and the availability of dedicated funds for energy efficiency, e.g. Ukraine Energy Efficiency Programme-2, resemble the situation of the Czech Republic before the implementation of the Case Study.

Barriers in Ukraine

Ukraine faces serious institutional barriers for investments not only in the energy sector, as currently can be seen by the impact of the financial crisis. The legal framework for the energy sector in general and more in particular referring to energy efficiency and renewable energy sources is complex and partly fragmented, partly outdated. The Ukrainian Energy Strategy until 2030 focuses on the further development of traditional fuels (coal, nuclear power) rather than on a significant increase of domestic energy consumption and enhanced deployment of renewable energy sources.

Commercial banking sector should gain an increased awareness on the business opportunities in the financing of energy efficiency and the renewable energy projects, which as the moment is assumed to be very limited, since most activities have been so far financed by state funds or by international assistance programmes. These national funds lack transparency on the available financing volume and on the criteria for allocation of support to energy efficiency and renewable energy projects. The implementation of the Case Study as described could provide additional funding for sustainable energy projects.

Recommendations for Ukraine

In March 2009, the Government of Japan and the Government of Ukraine signed guidelines for the implementation of a Green Investment Scheme under the Kyoto Protocol and concluded an agreement to purchase 30 million CO_2 emission reduction certificates.

Following the signing of a memorandum in July 2008, both governments developed guidelines that stipulate specific procedures and conditions for ensuring that Japan's payment to the Ukrainian side for transfer of CO_2 emission reduction certificates is used to finance specific measures to reduce greenhouse gas emissions and other environmental projects. National Environmental Investment Agency of Ukraine is designated Central Management Unit.

[xlviii] Ukraine. Options for Designing a Green Investment Scheme under the Kyoto Protocol, World Bank, (2006)

The next step should be carried out for successful replication of the Case study:

- The Ministry of Environmental Protection in Cooperation with the National Environmental Investment Agency should establish a new or nominate an existing fund e.g. the Ukraine Energy Efficiency Programme Management as an independent entity wholly owned by the Government, created under Ukrainian law (corporation, non-profit-organization or governmental organization). It would be professionally managed by a fund manager, with a distinct investment committee that decides on funding and related matters.

16.8. *Market Transformation on Solar Water Heating – Case Study of Albania (recommendations for replication in Belarus, Bosnia and Herzegovina, Kazakhstan, Republic of Moldova, Serbia and the former Yugoslav Republic of Macedonia)*

Box 20: Market Tranformation on Solar Water Heating

The presented Case Study contributes in removing barriers related to lack of financial incentives for renewable energy sources by means of support to market formation.

The Case Study refers to the establishment of a project to build-up a market for solar water heating. The aim is to achieve the level of 75,000 m^2 of installed solar water heating capacity by the end of the project and facilitate the sustainable growth of the market at the average annual rate of 20 per cent after the project has ended. By this, the project will reduce the use of electricity for hot water preparation with the estimated, cumulative GHG reduction potential of 1.5 million tons over the next 20 years. Key indicators of success are also the adoption of a national system for adequate product standards, labeling, and quality control scheme, an enhanced capacity of the supply chain to offer their products and services, and customer satisfaction.

The Case Study was implemented between April 2005 and October 2006.

Recommended countries for replication of Case Study are Belarus, Bosnia and Herzegovina, Kazakhstan, the Republic of Moldova, Serbia and the former Yugoslav Republic of Macedonia. These countries have developed feed-in tariffs to support renewable energy sources, but these tariffs are either not fully implemented or operational, or not sufficient to attract foreign investments.

16.8.1. Background to the Case Study

General situation in Albania

Albania has a typical Mediterranean climate, with preferential conditions for utilizing solar water heating with estimated annual yield of standard solar water heating systems around 500 to 650 kWh/m^2 per year. However, the majority of domestic water boilers in Albania use electricity, while demand for hot water in Albania is projected to grow from 600 GWh in 2000 to 875 GWh in 2015, in the residential sector alone.

In 2005 an Energy Efficiency Law was approved to improve the overall energy situation in Albania, and subsequent plans to improve the energy efficiency situation were published. Up to now, those plans were barely set in force in Albania. Furthermore, according to the Ministry of Finance, there are currently no incentives for energy efficiency in Albania. Only two specialized institutions work in the energy efficiency and renewable energy fields (the Albania-EU Energy Efficiency Centre (EEC) and the Albanian National Agency of Natural Resources (AKBN)), but both agencies do not provide ESCO services.

A primary objective of the National Energy Strategy (NES) is to improve Albania's energy security position. In relation to the electricity-generating sector, while installed capacity is 1,659 MW (2003), and peak load demand is 1,200 MW, the country must import significant amounts of electricity in dry years. For instance, in 1991 Albania imported 1.7 TWh from Bulgaria and Bosnia and Herzegovina. This is because over 90 per cent of domestic generating capacity comes from hydropower. No new power plant has been built since 1988 and the electricity demand is increasing at a yearly growth rate of 8.3 per cent. Over 80 per cent of domestic hot water is produced with electricity, and the highest demand for electricity (67 per cent of the total) comes from the household sector especially for space heating and domestic hot water. The NES estimated the demand for electricity to grow from 6.0 TWh in 1999 to 9.6 TWh by 2015. The strategy proposes both demand and supply side responses to the growing disparity between domestic electricity generating and demand. On the demand-side, the NES proposes a number of measures in order to reduce the growth rate of energy consumption, including:

- Thermal insulation of dwellings that will contribute to reduce the energy demand for space heating;

- Promotion of liquefied petroleum gas (LPG) that can reduce the quantity of electricity used for cooking and space heating and substitute fuel wood;
- Promotion of central and district heating schemes to serve space heating and domestic hot water preparation needs, especially in new blocks of multi store dwellings;
- Promotion of solar water heating systems for domestic hot water preparation, thereby reducing the amount of electricity used for this purpose;
- Promotion of energy efficient light bulbs to reduce the quantity of electricity used for lighting.

The Case Study has been formulated in collaboration with the Albanian National Agency for Energy (NAE) to support the National Energy Strategy implementation in the area of transforming the market for hot water preparation in the residential and services sectors from the currently used electric boilers to a predominance of solar water heated boilers.

Barriers in Albania

One major economic and financial barrier to the development of energy efficiency and renewable projects is the difficult economic situation of Albania, which causes the absence of public funding in the energy sector. Commercial banks have no experience in financing projects in energy efficiency and renewable energy projects and technical and financial support from international programmes are not utilized at the moment.

16.8.2. Description of the Case Study

In accordance with Albania's National Energy Strategy adopted in 2004, GEF/UNDP has supported the Government of Albania to accelerate the market development of Solar Water Heating (SWH) as one of the measures to reduce the growing electricity consumption and disparity between demand and the domestic power generation capacity, while simultaneously addressing the commitments of the Government of Albania under the United Nations Framework Convention on Climate Change to formulate programmes for the reduction of greenhouse gas emissions. The Project was financed partly by the Global Environment Facility through the United Nations Development Programme, together with cost sharing from the Government of Albania as well as from other donors and the private sector.

The Case Study aims at accelerating the market development of solar water heating in Albania with an objective to facilitate the installation of 75,000 m^2 of new installed collector area over the duration of the Project, an annual sale of 20,000 m^2 reached by the end of the Project, and with expected continuing growth to reach the set target of 540,000 m^2 of total installed SWH capacity by 2020. This has been estimated to correspond to over 300 MW of avoided, new fossil fuel power capacity by using solar electricity for water heating, and estimated cumulative GHG reduction potential of over 1 million tonnes of CO_2 by the end of 2020.

16.8.3. Approach of the Case Study

The project design has used the relatively well-documented experiences and lessons learned from other solar thermal markets. Sustainability aspects have been addressed by building on the experiences and best practices from other countries in promoting the solar water heating market, including the creation of a certification and quality control system and a fiscal and financial incentive package, and a regulative environment that is predictable, transparent, and long term enough to enable sustainable market growth. The Albanian Government has committed itself to a long and stable Programme to stimulate investment in solar thermal. The Programme will be designed to give investors a three to five year payback period on their investment, which, is expected to be a rate of return that this attractive enough for the purchase of solar water heating systems. Sometimes making long term financing available or creating new service and delivery models will reach the same target with longer acceptable payback periods, thereby reducing the need for direct investment subsidies.

The Case Study components are summarized below.

Component 1: *Raising awareness of the target audiences of the technical possibilities, costs and benefits of solar thermal technologies as well as of the available public support and purchasing modalities.*

This component includes activities needed to make consumers (and policymakers if necessary), aware of the benefits of a technology not known to them. The intention is to make Albanians receptive or cognizant of technology and its benefits. It will complement the marketing efforts of the private sector by implementing activities to raise the awareness among the targeted consumers, policymakers, local government, and business decision makers about the environmental and cost benefits of solar thermal technology, as well as practical, from commercial ties independent information about suppliers, installers, and public support available. The campaign will include TV, radio and printed media information campaigns, events leaflets, and booklets.

In most countries, solar thermal is not yet perceived as a standard option. Raising awareness among potential users is decisive for market development. Although one could argue that it is the interest of manufacturers to promote (through advertising) their own technologies, the industry is still too small to launch systematic promotion campaigns itself. It can also be argued that the market neutral position of public entities makes them better placed to promote impartial trustworthy information.

There is no need to start the preparation of public awareness material from the scratch, but useful materials should be available from places such as Solar Thermal Industry Associations, the Southern Europe Initiative (www.soltherm.org) and from other projects, together with the results, experiences, and best practices from other countries with more mature markets, which can be used after their adaptation to national conditions.

Component 2: *Facilitating the financing of Solar Water Heating investments by supporting the Government of Albania in establishing a supportive and sustainable fiscal and financial incentive policy and programme to encourage the investments and by supporting commercial entities dealing with manufacturing or distributing Solar Water Heating systems to come up with specific delivery, service and financing models that meet the clients needs in purchasing SWH systems.*

Component two is designed to generate demand for the technology through consumer financing and, as applicable, financial support schemes. As mentioned before, while the countries with the highest penetration rates have introduced regulations making installation of solar water heating systems mandatory for selected types of buildings, most other countries have continued to trust voluntary action. The disadvantage of the latter is that in the absence of strong regulations, there are more needs for some fiscal and financial incentives, such as tax breaks, investment grants, low interest loans etc. to make the Solar Water Heating systems more attractive to the customers, especially as regards the initial market stage. While purchasing Solar Water Heating systems in many countries can already be viewed as an economically cost-effective investment with a pay-back less than ten years, the incremental cost rationale is raising from the fact typical also for other energy efficiency and renewable energy technologies that the higher up- front costs of Solar Water Heating systems still present a significant barrier to effective market transformation. The experiences from other countries are indicating that a payback period of 3-5 years can still be considered as attractive to the consumers. Otherwise they are likely to favour solutions with lower up- front costs and higher operating costs. Also, there are consumer groups that may have difficulties to finance the higher up- front costs of Solar Water Heating systems even under the conditions of 3-5 year payback period. There are basically two ways of addressing this barrier, which are: 1) to lower the purchasing costs of Solar Water Heating systems by targeted subsidies of fiscal incentives (such as tax breaks) and 2) to offer new business models and financing schemes for the purchase of the Solar Water Heating systems that distribute the higher up- front costs over the time and allow the consumers to pay about the same or less than they are currently spending for operating their electric or gas heaters. While the available public support from the Government is typically directed to the first category, the GEF is envisaged to have a role in promoting activities in the second category, primarily in the form of TA and risk sharing. This has been taken as the incremental rationality for the envisaged GEF support also for this project.

Component 3: *Building the consumer confidence and creating a more transparent market for different kind and differently priced solar water heating systems through the development and implementation of a certification, labeling and quality control system applicable for the Albanian conditions.*

After creating the demand for the technology, the component three is about ensuring that consumers have a satisfactory experience with the technology. Certification and quality assurance contribute to this trouble free experience. Given the nature of the global solar water heating market with a number of different, small manufacturers and different kind of products with different quality, it is essential for the sustainable development of the market that the customers have a credible and verifiable source of information on what are they actually buying in terms of the characteristics (efficiency etc.) and quality of the system under consideration compared to other, domestic or imported products in the market, and that there are some minimum quality and safety standards to maintain the reputation of solar water heating as a reliable source of energy.

The project will also explore the possibility to apply the "Guaranteed Solar Results" scheme in Albania, which has been piloted in a few countries so far. The principle is similar to the performance contracts and ESCO operations in the energy efficiency field.

Component 4: *Supporting and, as applicable, building the capacity of the Solar Water Heating manufacturers, distributors and installers to offer products, delivery models (including financing) as well as installation and after sale services that are conducive to the overall market transformation goals of the project.*

By building on more detailed recommendations of project preparation phase, this component will provide technical assistance for creating conditions that the growing demand can be met by professional supply, installation and maintenance services responding to the market needs and promoting its overall, sustainable growth. The support is not limited to local manufacturers, but can also facilitate the access of international manufacturers to enter the market, either alone or through joint ventures, so as to promote competition and, as applicable, technology transfer.

Component 5: *Documenting and sharing the experiences and lessons learnt promoting the adoption of best practices and their effective replication in Albania and in other countries.*

Component five is designed to support next generation project designers and governments with experience and recommendations from the project on how to better implement a market transformation initiative in other countries.

The Case Study has involved the following key players and partners:

- The Global Environment Facility;
- The United Nations Development Programme will be the GEF Implementing Agency and its Country Office provided project support. UNDP Albania will monitor progress towards intended results the through regular contacts with the Project Implementation Unit and monitoring visits on implementation matters and problem solving. It also provided administrative support upon request and ensured financial oversight. The project implemented following the standard UNDP National Execution Guidelines;
- The Project will be executed by the Ministry of Energy and Industry under the UNDP National execution modality. The Project National Executing Agency will delegate the execution of the project to the National Energy Agency (NEA) who will appoint a senior level official to act as National Project Director (NPD);
- The Government of Albania (e.g. Ministry of Environment, Forestry and Water Administration and the Ministry of Finance), in a number of different capacities:
  - drafting and approving new legislation as needed to activate the solar thermal programme;
  - financing and implementing selected project components, including a programme of fiscal and financial incentives to stimulate demand for solar thermal technology and a business advice bureau;
  - managing the project and facilitating the co-ordination with the associated Government funded activities through NEA representing the Ministry of Industry and Energy and the Climate Change Unit of the Ministry of Environment, in co-operation with UNDP;
  - allocating public funds for establishing, monitoring, and enforcing compliance with production standards and labels;
- The targeted consumers, manufacturers, distributors, installers, and financiers from the private sector.

16.8.4. Impact of Case Study implementation

Compared to the number of systems sold prior to the project and at the end of the project, the number of annually sold systems nearly doubled from 560 systems in 2004 to 1,093 in 2008. The average annual market growth rate for solar thermal systems at the participating companies was 18 per cent during the duration of the project.

This market growth could be achieved due to the following activities performed in the framework of the programme:

- Four technical training seminars and three courses for political decision makers as well as for architects were carried out. In total 125 persons attended these training seminars;
- A market analysis was performed based on 250 questionnaires concerning the solar market in the residential sector, and 150 questionnaires concerning the solar market in hotels, public buildings, industry and other businesses;
- Improvement of the existing curriculum for solar thermal training courses was elaborated in cooperation with the vocational training centres;
- Based on the requests of the vocational schools a comprehensive training manual and a power point based slide show in Albanian language was prepared;
- Three demonstration plants were installed at vocational schools;
- Know-how transfer missions for Albanian companies and decision makers to Greece and Austria;
- Monitoring of six solar thermal plants including equipment with data monitoring systems. Based on the monitoring results and three series of company visits the solar thermal systems were optimized and improved;
- Installation of seven demonstration plants;
- Implementation of a national labelling scheme and foundation of the Albanian Solar Test Centre at the area of the Harry Fultz Institute in Tirana;
- Implementation of an awareness and public relation campaign comprising the preparation and dissemination of promotional materials, articles in newspapers, and trhee leaflets with 3,000 copies in Albanian language.

The economic and financial benefits of the Case Study are as follows:

- Facilitating the financing of Solar Water Heating investments through a supportive and sustainable fiscal and financial incentive policy and programme;
- Building the consumer confidence and creating a more transparent market for different kind and differently priced solar water heating systems;
- Support of new capacity of Solar Water Heating manufacturers, distributors, and installers to offer products, delivery models (including financing), installation and after sale services that are conducive to the overall market transformation goals of the project.

The Case Study was successful in realizing many social benefits by:

- Raising awareness of the target audiences of the technical possibilities, costs, and benefits of Solar Water Heating technologies as well as of the available public support and purchasing modalities

16.8.5. Costs for implementation

The project costs were financed by the Global Environment Facility, the Government of Albania, and private sector investments.

- Global Environment Facility:
    - USD 1.65 million approved in pipeline entry;
    - Additional USD one million approved for full project.
- Government of Albania:
    - EUR one million is the contribution through Energy Efficiency Fund resources;
    - USD 1.4-1.75 million as additional contribution from the Government through exemptions from custom duties of Solar Water Heating manufacturers;
    - USD 150,000 as in kind contribution from the Government.

- Private Sector:
  - Up to USD 15 millions as guaranteed in Letters of Intent from manufacturers, installers, hotels association etc.

16.8.6. Regulatory preconditions

For the successful implementation of the Case Study, the following points are relevant:

- Drafting and approving new legislation as needed to activate the solar thermal programme;
- Developing the necessary legal framework for fiscal and financial incentives to stimulate demand for solar thermal technology;
- Coordination of associated Government activities through purposeful appointment of competences and roles to involved national institution;
- Allocation of public funds for establishing, monitoring, and enforcing compliance with production standards and labels.

16.8.7. Critical success factors

The following key success factors contributed to the successful implementation of the Case Study:

- The financial incentive mechanisms to be introduced have to be transparent, predictable, and long term enough. Frequently changing support schemes and unpredictable decisions made on a project-by-project basis do not promote sustainable market transformation;
- In some cases, structuring consumer financing programmes can be equally useful for market promotion as direct financial incentives. These financing programmes can consist of: a) utility based delivery models (purchasing and delivering SWH units through state, municipal or private owned energy utility and collecting the costs back e.g. through electricity bills); b) partial guarantees for the financial sector to integrate lending for SWH into normal consumer financing practices; c) different vendor financing schemes/leasing; d) financing through Energy Service Companies and/or third party financing schemes, connected, as applicable, with “Guaranteed Solar Results” scheme introduced in a few pilot projects in Europe; e) specific Solar Energy Service Companies (SESCO) or Municipal Solar Utilities. Also the use of municipal bonds for the capitalization of such utility could at least in some countries be an option to be explored further;
- Ensuring customer satisfaction and confidence through applicable quality control, certification, labeling (connection between the quality and price), professional installation, after sale services, and guarantee requirements is critical for the long-term development of the market;
- Highly visible demonstration projects, often with public authorities serving as model;
- Availability of motivated and specifically skilled installers: Installers, which are experienced with solar water heating systems are likely to be more motivated to recommend solar thermal systems to customers, while the installers, who have not yet acquired the necessary skills tend to recommend more conventional heating systems;
- Availability of standard products and applications, explaining the success of solar thermal particularly in small residential buildings.

The following points must be taken into account as “lessons learned” to replicate the implementation of the case.

- In each country, where Solar Water Heating use has increased significantly, there has been a partnership between the government and industry to address the issues of quality standards, promotion, and public perception;
- National targets are very important, and the funding assistance (fiscal and/or financial) from the Government is very common;
- Fiscal measures are often necessary to stimulate the market;
- Improving building regulations to stimulate uptake of Solar Water Heating;
- Conduction of Information and promotion programmes.

16.8.8. Risks

The following factors may represent a risk to the successful implementation and continuation of the Case Study:

- Risk of subsidies: a) subsidies can be considered detrimental to fair competition unless there is an open choice in terms of material and installation (without compromising quality); b) wrong signals in terms of encouraging further price reduction and system optimisation;
- Investments in available technology exhibit high upfront costs and relatively long payback times;
- Solar Water Heating technologies are not yet perceived as a standard option for heating, therefore decision makers must be specially motivated to implement planned actions;
- New technology suffers from higher transaction costs (information, procurement, installation works) compared with conventional heating systems (default option);
- Public suffers from low awareness of energy savings and environment in general;
- Lack of availability of motivated and specifically skilled installers;
- Harmonized standards, certification, and quality labels not yet widely recognized in the market and by public authorities;
- Applications with high potential not yet available in standard solutions (combisystems) or still in demonstration phase (solar cooling, process heat).

16.8.9. Conclusion and recommendations for replication

This Case Study aims to assist the Government of Albania to formulate a full size GEF project that will accelerate the market development for solar water heating in Albania with the objective to achieve the level of 50,000 m^2 of installed solar water heating capacity by the end of the project. The full size project will facilitate the sustainable growth of the market at the average annual rate of 20 per cent after the project has ended. By this, the project will reduce the use of electricity for hot water preparation with the estimated, cumulative GHG reduction potential of 1.5 million tonnes over the next 20 years.

The presented Case Study contributes in removing barriers related to lack of financial incentives for renewable energy sources by means of support to market formation. Its implementation is therefore recommended in countries which lack awareness and capacities as well as financial incentives promoting small scale renewable energy technologies (biomass and solar) such as Belarus, Bosnia and Herzegovina, Kazakhstan, the Republic of Moldova, Serbia and the former Yugoslav Republic of Macedonia.

Recommendations for replication in Belarus

General situation in Belarus

Belarus is a strong net energy importer, mainly for crude oil and gas that generate an energy dependency of more than 86 per cent. Most of the demand for primary energy is covered with imports from the Russian Federation. Fossil fuels, including their use for petroleum derivates, represent altogether a share of 95 per cent of country's primary energy. In 2006, 96 per cent of electricity generation derived from natural gas.

The market for renewable energy sources in Belarus is still in an early stage. Hydro energy accounts for only 0.1 per cent of total electricity generation. Combustible renewables and waste accounting for five per cent of the total energy supply is the renewable energy source with the most significant technical potential of around 1,000 MW. In addition, some small wind projects and some hydropower projects within the range of 5 to 50 MW are currently under development.

A Special Purpose Programme provides that not less than 25 per cent of electricity and heat are generated from local resources for the period until 2012. A law on renewable energy sources is under development.

Barriers in Belarus

The Presidential Decree No. 399/2005 and the programmes relating to the development of energy efficiency and renewable energy sources set ambitious targets for both sectors; however, there is no information available regarding implementation plans or on how these targets are going to be achieved. Low, state-subsidized domestic tariffs for electricity and heat endanger the profitability of bankable renewable energy and energy efficiency projects.

The feed-in tariff for renewable electricity, introduced in 1994, provides an attractive premium. However, low subsidized energy tariffs hamper the profitability of renewable energy projects.

Similar to the situation in Albania before implementation of the case study, the very low development of market structures and of private business in the Belarussian economy indicates a general lack of awareness on the importance of financial mechanisms and instruments for private investment projects and subsequently also the lack of understanding of this kind of instruments on behalf of the state administration and the management of state-owned companies.

Recommendations for Belarus

The following steps should be carried out for successful replication of the Case Study:

- The Ministry of Energy, as the main institutional policymaker in the Belarussian energy sector, in cooperation with the Ministry of Housing and Communal Services, which is e.g. responsible for replacement of heating systems, should assign a National Executing Agency e.g. the Department for Energy Efficiency of the State Committee for Standardization as implementing agency for the Market Transformation Programme;
- The Ministry of Energy should nominate a National Coordination Body consisted of representatives from different Ministries, representatives of Producers, Banks, Chamber of Commerce and end user association as project steering committee;
- The Ministry of Energy in cooperation with the Ministry of Housing and Communal Services should define policy objectives and establish policy instrument promoting renewable heat applications to establish a general framework for the implementation of the Case Study;
- The National Executing Agency to be established resp. nominated should take over the overall project organization and work out a business plan for the implementation of the Case Study comprising definition of targets and instruments, estimation of budget, elaboration of timetable and monitoring procedures;
- Awareness-raising is a key factor of success for the implementation of the Case Study. Thus, the National Executing Agency should elaborate and implement an awareness-raising campaign on technical possibilities as well as available support instruments. The target group should comprise consumers, local governments and business decision makers;
- The Ministry of Energy in cooperation with the Ministry of Finance and the National Executing Agency shall establish supportive and sustainable fiscal and financial incentive schemes and programmes to encourage investments. Cooperation with banks and/or international donors is highly recommended;
- The National Executing Agency in cooperation with the Department for Energy Efficiency of the State Committee for Standardization should develop and implement a certification, labeling and quality control system applicable for the conditions in Belarus;
- The National Executing Agency in cooperation with the Department for Energy Efficiency of the State Committee for Standardization shall provide technical assistance to manufacturers, distributors and installers to offer products, delivery models including financing as well as installation and after sale service as described in the Case Study;
- Regular monitoring of the market transformation programme shall be provided by an independent entity to be nominated by the Ministry of Energy. Based on the monitoring results the programme shall be further developed and improved;
- As described in the case study for Albania, the Ministry of Energy should cooperate with and ask support from international donors in the framework of programme development and implementation.

Recommendations for replication in Bosnia and Herzegovina

General situation in Bosnia and Herzegovina

The state of Bosnia and Herzegovina is composed by two separate entities: the Federation of Bosnia and Herzegovina and the Republika Srpska, set up by the Dayton Peace Agreement of 14 December 1995. According to the agreement, energy policy is dealt with by the Entities' government, resulting in a lack of overarching energy strategy or policy.

Bosnia and Herzegovina has one of the highest shares of hydropower (44 per cent) in electricity generation. If large hydro power plants are being taken out of consideration, then only an insignificant share is remaining.

Biomass potential is considered significant followed by wind, solar and geothermal. Wood biomass is traditionally used in rural and sub-urban areas as the primary source for heating and cooking. The total potential of solar thermal energy in Bosnia and Herzegovina is estimated at 67,200 TWh. In order to promote the development of these resources it is necessary to overcome the lack of comprehensive assessment and underdeveloped legislative and regulatory framework.

Barriers in Bosnia and Herzegovina

There is a good level of expertise and know-how in the Bosnian private sector regarding renewable energy project development. The main economic and financial barriers for investments in energy efficiency and renewable energy sources in Bosnia and Herzegovina lie mainly in the low price level and in the limited availability of incentives or financing mechanisms.

The only support mechanism existing up to date is based on two laws at entity levels that set the minimum electricity purchase price to be paid to renewable electricity producers with an installed capacity up to five MW in small hydro power plants, biomass, wind, geothermal, solar PV. The electricity prices and tariffs are too low to ensure and adequate return on investment.

Comparable to the situation in Albania before the implementation of the case study, lack of awareness on customers' side do not provide an incentive for consumers to change their consumption behavior towards a more rational use of energy or the deployment of renewable energy sources.

Recommendations for Bosnia and Herzegovina

The following steps should be carried out for successful replication of the Case Study:

- The Ministry of Foreign Trade and Economic Relations (MoFTER), as the main institution in charge of energy policy at the state level, should assign a National Executing Agency in charge of the implementation of the Market Transformation Programme;
- The Ministry of Foreign Trade and Economic Relations should nominate a National Coordination Body consisted of representatives from different Ministries, representatives of producers, banks, Chamber of Commerce and end user association as project steering committee;
- The Ministry of Foreign Trade and Economic Relations in cooperation with Ministry of Industry, Energy and Mining in the Republika Srpska, and the Federal Ministry of Energy, Mining and Industry (MEMI) in the Federation of Bosnia and Herzegovina should define policy objectives and establish policy instrument promoting renewable heat applications to establish a general framework for the implementation of the Case Study;
- The National Executing Agency to be established should take over the overall project organization and work out a business plan for the implementation of the Case Study comprising definition of targets and instruments, estimation of budget, elaboration of timetable and monitoring procedures;
- Awareness-raising is a key factor of success for the implementation of the Case Study. Thus, the National Executing Agency should elaborate and implement an awareness-raising campaign on technical possibilities as well as available support instruments. The target group should comprise consumers, local governments and business decision makers;
- The Ministry of Foreign Trade and Economic Relations in cooperation with the Ministry of Finance and the National Executing Agency shall establish supportive and sustainable fiscal

and financial incentive schemes and programmes to encourage investments. Cooperation with banks and/or international donors is highly recommended;

- The National Executing Agency in cooperation with a specialized institution e.g. technical university or a research institute should develop and implement a certification, labeling and quality control system applicable for the conditions in Bosnia and Herzegovina;
- The National Executing Agency in cooperation with above mentioned research or training institution shall provide technical assistance to manufacturers, distributors and installers to offer products, delivery models including financing as well as installation and after sale service as described in the Case Study;
- Regular monitoring of the market transformation programme shall be provided by an independent entity to be nominated by the Ministry of Foreign Trade and Economic Relations. Based on the monitoring results the programme shall be further developed and improved;
- As described in the case study for Albania, the Ministry of Foreign Trade and Economic Relations should cooperate with and ask support from international donors in the framework of programme development and implementation.

Recommendations for replication in Kazakhstan

General situation in Kazakhstan

Kazakhstan is rich in fossil fuel resources. As such, the low price of electricity creates a barrier for the development of renewable energy resources. However, Kazakhstan has a plentiful supply of hydro, wind, solar, biomass, and geothermal energy.

Hydro is of significant importance to Kazakhstan in that it provides for over 11 per cent of the country’s electricity generation. Due to its large agricultural base, Kazakhstan has significant theoretical potential for biomass energy resources. However, the large area of the country may limit the practical applications of biomass utilization to small systems. Kazakhstan is characterized by its significant solar energy resources. Annually, it receives 2,200-3,000 hours of sun.

The Law ”On support of the renewable energy sources use”, adopted in July 2009, provides incentives exclusively to renewable electricity generation. Renewable heat currently receives no financial support in Kazakhstan.

Barriers in Kazakhstan

Increase in energy efficiency and in the deployment of renewable energy sources appear to have a moderate role in the National Energy Programme of Kazakhstan. Incentives for renewable energy sources have been introduced recently by the adoption of the new law on renewables electricity. Off-grid solutions and renewable heat are not covered by this law.

Incentives for renewable energy sources have been introduced recently by the adoption of the new law on renewables in July 2009. The tariffs for electricity from renewable energy sources are established bilaterally between the respective project developers and the Ministry of Energy and Mineral Resources, thus opening the door to discrimination and corruption.

The huge availability of fossil fuels has so far prevented the public administration, the financial sector and the final customers in Kazakhstan to develop an awareness on the relevance and also on the potential benefits from energy efficiency and renewable energy projects.

Recommendations for Kazakhstan

In July 2003 Kazakhstan launched its first solar energy project in Almaty, funded by United Nations Development Programme and the Canadian International Development Agency. As part of the initial scheme, 1’500 residents are to benefit from the programme. Considering this experience from the implementation of this programme, the following steps should be carried out for successful replication of the Case Study:

- The Ministry of Energy and Mineral Resources of the Republic of Kazakhstan coordinates the country's fuel and energy complex and ensures the implementation of the state energy policy. Among the functions of the Ministry is the elaboration of programmes for strategic development of the energy sector. Thus it should assign a National Executing Agency for the implementation of the Market Transformation Programme;

- The Ministry of Energy and Mineral Resources should nominate a National Coordination Body consisted of representatives from different ministries, representatives of producers, banks, Chamber of Commerce, and end user association as project steering committee;
- The Ministry of Energy and Mineral Resources in cooperation with the Republican Energy Saving Centre should define policy objectives and establish policy instrument promoting renewable heat applications to establish a general framework for the implementation of the Case Study;
- The National Executing Agency to be established should take over the overall project organization and work out a business plan for the implementation of the Case Study comprising definition of targets and instruments, estimation of budget, elaboration of timetable and monitoring procedures;
- Awareness-raising is a key factor of success for the implementation of the Case Study. Thus, the National Executing Agency should elaborate and implement an awareness raising campaign on technical possibilities as well as available support instruments. The target group should comprise consumers, local governments and business decision makers;
- The Ministry of Energy and Mineral Resources in cooperation with the Ministry of Finance and the National Executing Agency shall establish supportive and sustainable fiscal and financial incentive schemes and programmes to encourage investments. Cooperation with banks and/or international donors is highly recommended;
- The National Executing Agency in cooperation with a specialised institution e.g. Research Institute of Power Engineering should develop and implement a certification, labeling and quality control system applicable for the local conditions;
- The National Executing Agency in cooperation with above mentioned research or training institution shall provide technical assistance to manufacturers, distributors and installers to offer products, delivery models including financing as well as installation and after sale service as described in the Case Study;
- Regular monitoring of the Market Transformation Programme shall be provided by an independent entity to be nominated by the Ministry of Energy and Mineral Resources. Based on the monitoring results the programme shall be further developed and improved;
- As described in the Case Study, the Ministry of Energy and Mineral Resources should cooperate with and ask support from international donors in the framework of programme development and implementation.

Recommendations for replication in the Republic of Moldova

General situation in the Republic of Moldova

The period following independence in 1991 brought changes in the fuel mix of energy supply and a decrease of energy consumption in the Republic of Moldova. Final energy consumption in 2005 was still 77 per cent lower than in 1990. Coal consumption has substantially decreased, while natural gas has become the main fuel for the power stations and boiler houses and has reached a share of 67 per cent of primary energy supply. 97 per cent of total energy consumption is imported (mainly from the Russian Federation and Ukraine).

The market for renewable energy sources in the Republic of Moldova is still in an early stage, despite the considerable potential for biomass, hydropower, wind, and solar. Hydro power accounts for only two per cent of electricity generation in the Republic of Moldova, while biomass and waste represent also than two per cent of the heat generation.

The Energy Strategy of the Republic of Moldova until 2020 (Government Decision No. 958 of August 21, 2007*)* foresees to increase the share of renewable energy sources in the country's energy balance up to six per cent in 2010 and 20 per cent in 2020. In order to achieve these goals, about one million m^2 of solar installations for water heating and 80'000 m^2 of solar installations for the drying of agricultural products, such as tobacco, are required up to 2010. The potential for fuel wood and agricultural and forestry waste in the Republic of Moldova is estimated to be 820'000 toe, while the biogas potential is estimated to be 3.7 million m^3.

Given the economic situation of the Republic of Moldova, it is evident that economic and financial barriers are of fundamental relevance for the development of investments.

Barriers in the Republic of Moldova

A new feed-in law has been developed in early 2009, but has not yet become operation yet. National and municipal governments lack availability of funds supporting renewable energy projects. Furthermore, high interest rates applied by commercial Moldovan banks for loans to private investors obviously don't support the private investments in renewables.

Technical skills appear to be reasonably well developed in the Republic of Moldova but they appear to be concentrated in public institutions. Furthermore, as the current projects are financed through credit lines of international financial institutions (e.g. the World Bank), very likely there are not enough skills available regarding business development and the preparation of bankable project proposals.

Recommendations for the Republic of Moldova

The following steps should be carried out for successful replication of the Case Study:

- The Ministry of Economy and Commerce (MEC) in cooperation with the Ministry of Environment and Natural Resources of the Republic of Moldova (MENR) should assign a National Executing Agency in charge of the implementation of the Market Transformation Programme;
- MEC and MENR shall nominate a National Coordination Body consisted of representatives from different ministries, representatives of producers, banks, Chamber of Commerce and end user association as project steering committee;
- MEC and MENR should define policy objectives and establish policy instrument promoting renewable heat applications to establish a general framework for the implementation of the Case Study;
- The National Executing Agency to be established should take over the overall project organization and work out a business plan for the implementation of the Case Study comprising definition of targets and instruments, estimation of budget, elaboration of timetable and monitoring procedures;
- Awareness-raising is a key factor of success for the implementation of the Case Study. Thus, the National Executing Agency should elaborate and implement an awareness-raising campaign on technical possibilities as well as available support instruments. The target group should comprise consumers, local governments and business decision makers;
- MEC and MENR in cooperation with the Ministry of Finance and the National Executing Agency shall establish supportive and sustainable fiscal and financial incentive schemes and programmes to encourage investments. Cooperation with Banks and/or international donors is highly recommended;
- The National Executing Agency in cooperation with a specialized institution e.g. Academy of Sciences of Moldova or the Technical University of Moldova (TUM) should develop and implement a certification, labeling and quality control system applicable for the conditions in the Republic of Moldova;
- The National Executive Agency in cooperation with above mentioned research or training institution shall provide technical assistance to manufacturers, distributors and installers to offer products, delivery models including financing as well as installation and after sale service as described in the Case Study;
- Regular monitoring of the market transformation programme shall be provided by an independent entity to be nominated by MEC and MENR. Based on the monitoring results the programme shall be further developed and improved;
- As described in the case study for Albania, the national government should cooperate with and ask support from international donors in the framework of programme development and implementation.

Recommendations for replication in Serbia

General situation in Serbia

Serbia has extensive unused potential for renewable energy resources with biomass and hydropower leading the list.

Renewable energy sources currently make up about 11 per cent of the total primary energy supply of Serbia. The Energy Sector Development Strategy by 2015 emphasizes the importance of new renewable energy sources utilization for decentralized heat production (by biomass combustion and capture of solar radiation) as well as for decentralized power production (by constructing small hydropower plants with an installed capacity of up to ten MW), in order to meet the needs of local consumers and deliver surplus power to the local network within the Serbian power system.

Current market and regulatory conditions do not favor production of renewable energy. The Energy Law (OJ 84/04) entitled renewable energy and combined heat and power producers with subsidies, tax and custom relieves and incentive measures. However, these provisions have not been sufficient so far to introduce proper incentive mechanism schemes.

Project developers could benefit from dedicated credit lines provided by World Bank or the European Bank for Reconstruction and Development for projects in the Balkan region. Limited technical capacity hampers adequate use of financing opportunities.

Barriers in Serbia

The Serbian government shows a strong commitment towards the development of renewable energy sources, as is witnessed by the priorities in the National Energy Strategy. However, dedicated laws supporting renewable energy sources are still under development. From the economic point of view, the primary barrier to successful project realization is the lack of monetary incentives linked with low energy tariffs.

The support scheme based on feed-in tariffs, the rules for the privileged producers as well as the market model for integration of renewable energy, including framework agreements for power purchase are envisaged to be approved through three governmental decrees.

Furthermore, there is a general lack of engineering and financial competences in the energy sector, which hits more hardly the small, independent companies, which are not able to provide attractive salaries and employment conditions to high-skilled professionals.

Recommendations for Serbia

The following steps should be carried out for successful replication of the Case Study:

- The Ministry of Mining and Energy in cooperation with the Serbian Energy Agency should assign a National Executing Agency in charge of the implementation of the Market Transformation Programme;
- The Ministry of Mining and Energy shall nominate a National Coordination Body consisting of representatives from different Ministries, representatives of producers, banks, Chamber of Commerce and end user associations as project steering committee;
- The Ministry of Mining and Energy in cooperation with the Serbian Energy Agency should define policy objectives and establish policy instrument promoting renewable heat applications to establish a general framework for the implementation of the Case Study;
- The National Executing Agency to be established should take over the overall project organization and work out a business plan for the implementation of the Case Study comprising definition of targets and instruments, estimation of budget, elaboration of timetable and monitoring procedures;
- Awareness-raising is a key factor of success for the implementation of the case study. Thus, the National Executing Agency should elaborate and implement an awareness-raising campaign on technical possibilities as well as available support instruments. The target group should comprise consumers, local governments and business decision makers;
- The Ministry of Mining and Energy in cooperation with the Ministry of Finance and the National Executing Agency shall establish supportive and sustainable fiscal and financial incentive schemes and programmes to encourage investments. Cooperation with banks and/or international donors is highly recommended;
- The National Executing Agency in cooperation with a specialised research or training institution should develop and implement a certification, labeling and quality control system applicable for the conditions in Serbia;

- The National Executing Agency in cooperation with above mentioned research or training institution shall provide technical assistance to manufacturers, distributors and installers to offer products, delivery models including financing as well as installation and after sale service as described in the Case Study;
- Regular monitoring of the Market Transformation Programme shall be provided by an independent entity to be nominated by Ministry of Mining and Energy. Based on the monitoring results the programme shall be further developed and improved;
- As described in the case study for Albania, the national government should cooperate with and ask support from international donors in the framework of programme development and implementation in Serbia.

Recommendations for replication in the former Yugoslav Republic of Macedonia

General situation in the former Yugoslav Republic of Macedonia

Around 12 per cent of the primary energy supply in the former Yugoslav Republic of Macedonia is based on renewable energy sources: hydro energy, fuel wood and geothermal energy (the latter currently accounts for 2.4 per cent of the heat produced in the country). In the residential sector alone, combustible renewables and waste account for 29 per cent of the energy consumption.

Currently a National Strategy for Renewable Energy Sources and a Law on Renewable Energy are under development. For the time being, the regulatory framework for renewable energy sources is set by the provisions relating to the Government's obligations to develop and implement a renewable energy strategy for a period of ten years included in the Energy Law of 2006.

The geographical position and climate in the former Yugoslav Republic of Macedonia offer a very good perspective to intensify the use of solar collectors for heating. However, solar energy is being used at a symbolic level for domestic water heating, although with Solar Tubes, the former Yugoslav Republic of Macedonia disposes of a company that produces significant amounts of solar collectors and solar boilers for hot water heating.

Barriers in the former Yugoslav Republic of Macedonia

The former Yugoslav Republic of Macedonia has promising local resources of renewable energy. The national Government is undertaking a strong effort to develop policies for the development of energy efficiency and renewable energy sources, motivated by the target of full compliance with EU regulation, e.g. the National Strategy for Renewable Energy Sources is currently being developed.

Lack of economic incentives in combination with low energy prices is a major barrier to the development of energy efficiency and renewable energy projects in the former Yugoslav Republic of Macedonia. The only incentive currently available is a VAT-exemption for equipment for solar heat production and photovoltaic cells. Combined with lack of technical capacity and awareness related to renewable energies, the situation is comparable to Albania before implementation of the Case Study.

Besides the Energy Law of 2006, the government has drafted most of the secondary legislation needed to promote electricity production from renewable energy, e.g. the rulebooks on the method and procedure for establishing approving the use of feed-in tariffs for electricity produced from biomass, small hydropower, wind power and photovoltaic systems. The feed-in tariff is not yet operational, thus hampering the promotion of renewable energy generation.

In 2006 the World Bank announced the creation of the Sustainable Energy Project, with the aim to develop a sustainable market for energy efficiency and renewable energy sources by supporting the development of an enabling framework, institutional capacity, and necessary financing mechanisms. The Case Study on Albania outlines the necessary steps to implement such a project.

Recommendations for the former Yugoslav Republic of Macedonia

The following steps should be carried out for successful replication of the Case Study:

- The Ministry of Economy in cooperation with the Energy Agency of the Republic of Macedonia should assign a National Executing Agency in charge of the implementation of the Market Transformation Programme;

- The Ministry of Economy shall nominate a National Coordination Body consisting of representatives from different ministries, representatives of producers, banks, Chamber of Commerce and end user associations as project steering committee;
- The Ministry of Economy in cooperation with the National Energy Agency should define policy objectives and establish policy instrument promoting renewable heat applications to establish a general framework for the implementation of the Case Study;
- The National Executing Agency to be established should take over the overall project organization and work out a business plan for the implementation of the Case Study comprising definition of targets and instruments, estimation of budget, elaboration of timetable and monitoring procedures;
- Awareness-raising is a key factor of success for the implementation of the Case Study. Thus, the National Executing Agency should elaborate and implement an awareness-raising campaign on technical possibilities as well as available support instruments. The target group should comprise consumers, local governments and business decision makers;
- The Ministry of Economy in cooperation with the Ministry of Finance and the National Executing Agency shall establish supportive and sustainable fiscal and financial incentive schemes and programmes to encourage investments. Cooperation with banks and/or international donors is highly recommended;
- The National Executing Agency in cooperation with a specialized research or training institution should develop and implement a certification, labeling and quality control system applicable for the conditions in the former Yugoslav Republic of Macedonia;
- The National Executing Agency in cooperation with above mentioned research or training institution shall provide technical assistance to manufacturers, distributors and installers to offer products, delivery models including financing as well as installation and after sale service as described in the Case Study;
- Regular monitoring of the Market Transformation Programme shall be provided by an independent entity to be nominated by Ministry of Economy. Based on the monitoring results the programme shall be further developed and improved;
- As described in the Case Study for Albania, the national Government should cooperate with and ask support from international donors in the framework of programme development and implementation in the former Yugoslav Republic of Macedonia.

16.9. *Establishment of an ESCO – Case Study of Croatia (recommendations for replication in Albania, Belarus, Bosnia and Herzegovina, the Republic of Moldova and Serbia)*

Box 21: Establishment of an Energy Service Company

The presented Case Study contributes in removing barriers to energy efficiency projects such as a limited or underdeveloped market for energy efficiency services and the absence of Energy Service Companies (ESCOs) to prepare, finance, and implement energy efficiency projects on a commercial basis.

Hrvatska Elektropriveda (HEP), a national Croatian utility supplying electricity, district heating and natural gas, formed an Energy Service Company (HEP ESCO) as a wholly owned subsidiary in 2002, as recommended in the World Bank's Energy Efficiency Project in Croatia. The establishment aimed at making Croatia's economy less energy intensive by creating an economically and environmentally sustainable market for energy efficiency projects and services. It did so by founding a core developer of energy efficiency projects within HEP. The new ESCO focuses on the promotion, development, and the financing of energy efficiency projects. It works under a performance contract turnkey installation approach and other types of agreements with local businesses. End-users immediately benefited from facility improvements resulting from energy efficiency investments. End-users have to pay for investments from the energy cost savings that the ESCO guaranteed. The Energy Efficiency Project implementation period is six years (2003-2008), and expected closing date is 30 June 2010. The cost and benefits of the project were assessed over a 20 year period.

In 2008, HEP ESCO won the European Energy Services Initiative's Best Energy Service Provider Award for 2007. HEP ESCO was selected for its outstanding efforts and achievements in the development and success of energy services for energy efficiency in Europe.

Recommended Countries for replication of the Case Study are Albania, Belarus, Bosnia and Herzegovina, the Republic of Moldova, and Serbia. These countries are facing similar barriers as Croatia, before the implementation of the Case Study: lack of a market for energy efficiency services and absence of ESCOs working on a commercial basis.

16.9.1. Background to the Case Study

General situation in Croatia

Croatian economic policy supports the transition to a market economy, the reconstruction of areas destroyed during the war, privatization, greater integration into the international economy, the restructuring and orientation of the economy towards secondary and tertiary industries, as well as increases in production and a rise in employment. Overall decline of economic activities and energy consumption in the period 1991-1995, which was mainly the consequence of the war in Croatia, had directly caused the decline in total emissions of greenhouse gases in that period. With the entire national economy in transition process, some energy intensive industries reduced their activities or phased out certain productions, which was considerably reflected in GHG emissions. Emissions have started to increase in the period 1996-2003 in average of 3.3 per cent per year because of revitalization of economy.

In July 2001, the Parliament passed a package of laws (Official Gazette 68/01) for the reform of the energy sectors in line with the EU legislation. They are: The Energy Act, Law on Electricity Market, Law on Gas Market, Law on Oil and Oil Derivatives, and Law on Regulation of Energy Business. This package of energy laws will introduce market relations and allow gradual liberalization of the energy market. It will also define a transparent relation between the energy entities and the customers. The new regulations have created a legislative framework for restructuring and then for privatization of the two most important companies of the Croatian energy sector: Croatian Electricity Utility Company (HEP) and Oil Industry (INA). The Energy Act is an umbrella law in the energy law package because it addresses elementary questions in the energy sector. The law determines the Energy Development Strategy of the Republic of Croatia and provides the basis for the energy policy and energy development plans. Based on the Development Strategy the Government of the Republic of Croatia creates an Implementation

Programme of the Energy Development Strategy for a period of at least three years. In line with the Strategy and the Programme the national energy programmes, which will ensure long-term development objectives and orientation of the energy sector as well as investments in the energy efficiency and renewable energy sources, will also be launched.

Barriers in Croatia

The main barrier to the development of energy efficiency projects in Croatia are capital constraints, i.e. high upfront costs and long payback periods. At the same time, however, several credit lines for energy efficiency are available in Croatia and many financial resources remain unused, pointing out the necessity of a further economic stimulation of the demand for energy services and energy efficiency projects. Furthermore, commercial banks appear to have a rather low level of awareness of and expertise in energy efficiency and renewable energy projects, as these are – despite the availability of credit lines from the government and from international financing institutions – still considered to be “no business as usual”.

Lack of human capacities to develop bankable energy efficiency project proposals also appears to be a major barrier for investments. While a training programme for energy auditors has been put in place recently by the Croatian Government, the need for energy auditors in buildings has been estimated in the Master Plan for Energy Efficiency at approximately 500 professionals and is therefore unlikely to be covered in the short-term. Until the end of 2009 around 300 experts have finished training programmes for energy auditors and certificators.[326]

16.9.2. Description of the Case Study

In 2002 the Global Environment Facility participated in Croatia in the establishment of a utility based ESCO within HEP to develop a market for energy efficiency projects and services. HEP ESCO was created as part of and is the implementing agency for the Energy Efficiency Project in Croatia, which was initiated by the World Bank and the Global Environment Facility in cooperation with HEP and the Croatian Bank for Reconstruction and Development (HBOR). The company was founded with the aim of becoming the key creator of the market for energy efficiency projects in Croatia.

HEP ESCO will promote, develop, and finance energy efficiency projects. The services provided by the company include modernization, reconstruction, and renewal of existing plants and facilities with the aim of improving the efficiency of energy use and the funds invested being paid back through energy savings. HEP ESCO, depending on the type of the project, assumes the risk of and guarantees for savings being achieved over the investment payback period. End users will be able to pay for the investments from the energy cost savings that the ESCO guarantees. Since the funds invested under ESCO project implementation model are paid back through savings, the client – owner of equipment or facility does not have to secure financing in advance.

The utility based and utility owned ESCO approach has been chosen because HEP owns and manages many of the assets which can benefit from energy efficiency activities, so that the utility ESCO model will attract private partners to serve the projects that will be developed (to provide equipment, technical and engineering services, etc.).

The HEP utility based ESCO attracts private sector partners that can serve ESCO project needs for equipment, technical services, and engineering. The HEP ESCO project transfers skills and know-how to project partners who can pursue independent initiatives thereafter and thus aims at creating a market for energy efficiency services. Unlike other ESCOs the HEP ESCO does not engage the private sector in providing on a commercial basis technical performance and energy management guarantees under an EPC with potential clients.

16.9.3. Approach for implementation of the Case Study

The establishment of HEP ESCO was part of the World Bank’s Energy Efficiency Project in Croatia, with the purpose of making Croatia's economy less energy intensive by creating an economically and environmentally sustainable market for energy efficiency goods and services. The Project has established the utility-based HEP ESCO to guide the development of this market. HEP ESCO relies on domestic partners – including service providers, banks, and equipment manufacturers – to exploit project opportunities. By creating such an energy efficiency market, the Project also aims at reducing greenhouse gas emissions in Croatia. The Project focuses on reducing two barriers to commercial energy efficiency projects and services:

- Lack of funding, due to perceived risks among lenders and investors; and
- Lack of know-how among key stakeholders.

The Project supports the objectives laid out in the World Bank's Country Assistance Strategy for Croatia. The first is making the institutional changes and investments needed to ensure an efficient energy supply in an environmentally sustainable manner at realistic but socially acceptable prices. The second is achieving financial sustainability and efficient operations for public enterprises. The Project supports both objectives by addressing market and institutional failures to promote the development and financing of energy efficiency projects and protect the environment. This is achieved by:

- Establishing a utility-based Energy Service Company (HEP ESCO) to develop the market for energy efficiency projects, finance their implementation, and create business opportunities for private providers of energy efficiency goods and services as partners to HEP ESCO;
- Maximizing local co-financing of energy efficiency projects by using innovative financing mechanisms that reduce some of the perceived high risks of those projects and mitigate the rigid collateral requirements imposed on these projects by local financiers;
- Creating a framework for other emerging service providers to capture some of the energy efficiency market potential.

The Project focuses on reducing two barriers to commercially sustainable energy efficiency projects and services: a lack of funding, due to perceived risks among lenders and investors, and a lack of know-how among key stakeholders. The project addresses these barriers through a Loan of the International Bank for Reconstruction and Development (IBRD), an institution of the World Bank Group, and a blend of grant and non-grant financing from the Global Environment Facility. The four main components of the project are listed below.

- An IBRD loan to the national power utility, HEP, to purchase goods and services that support ESCO activities and establish HEP ESCO;
- A GEF contingent grant, which will cover preparation costs for and early investment in the first pipeline of projects;
- A GEF partial risk guarantee, which will leverage commercial bank lending to the ESCO and its projects; and
- A GEF technical assistance grant, which will support training, monitoring, and evaluation, and information and dissemination related to overall market development.

HEP is the borrower of the IBRD loan. HEP and HEP ESCO are the recipients of the GEF contingent grant and part of the GEF technical assistance. HEP is coordinating project activities and assumes all fiduciary responsibilities for the use of IBRD and GEF funds. HEP ESCO is responsible for implementing energy efficiency capital investments, assisted by external consultants, and a strategic partner that can help build its capacity.

The Case Study has involved the following key players and partners:

- Hrvatska Elektropriveda (HEP), the national Croatian power utility, which has formed HEP ESCO as a wholly owned subsidiary in 2002;
- The World Bank and the IBRD for granting the loan to establish HEP ESCO;
- The Global Environment Facility, offering a contingent grant and technical assistance to HEP and HEP ESCO;
- The Ministry of Finance will be represented in HEP ESCO's Supervisory Board, to oversee the execution of the GEF grant during and after implementation of projects.

16.9.4. Impact of Case Study implementation

In the HEP work programme are currently more than 50 projects in different stages of preparation or implementation across Croatia. Six public lighting projects in cities have been completed and currently there are four projects in implementation status. In the business area of buildings, three projects in hospitals have been completed as well as in 38 schools in five cities and counties. Until now, a total of 16 million USD has been invested in energy efficiency projects.

The economic and financial benefits of these projects are as follows:

- Saving electricity and heating energy by financing the reconstruction and modernization of facilities and by financing projects aimed at improving production and use of energy;
- Development of a market for goods and services needed for the implementation of energy efficiency projects;
- Reduction of the emission of greenhouse gases as a contribution of the Republic of Croatia to the sustainable development at the local and the global level;
- Reduction of energy imports;
- Reduction of state expenses by saving energy and rationalizing the use of energy, particularly in the public sector;
- Reduction of the burden of tariff reforms in the energy sector on consumers by lower electricity and heating bills;
- Increase in competitiveness of domestic manufacturers through the reduction of manufacturing costs by means of energy saving;
- Promotion of small- and medium-sized enterprises in the energy services sector through the development of a market for energy efficiency projects;
- Creation of new jobs;
- Introduction of a new concept based on commercial banks focusing only on the credit risk and specialized agencies of the energy services sector dealing with technical issues.

16.9.5. Cost for implementation

The total project investment cost is USD 30.4 million, including funding for HEP ESCO and the market at large:

- The total cost of the GEF project, including initial costs for technical assistance, the contingent grant and guarantee fund operation were USD seven million;
- The IBRD loan amounted to USD five million;
- Foreign private commercial sources have provided USD 17.4 million.

16.9.6. Regulatory preconditions

For the successful implementation of the Case Study, the following points are relevant:

- An adequate regulatory and legal framework for Energy Service Companies and public-private partnerships;
- Authorization procedures and procedures for the development of energy efficiency or renewable energy projects have to be simplified;
- Adequate legislative framework regarding connection to the grid for cogeneration and energy efficiency.

16.9.7. Critical success factors

The following key success factors contributed to the successful implementation of the Case Study:

- HEP ESCO and the Energy Efficiency Project will contribute to the sustainability of energy efficiency services in Croatia by creating new and better services, removing barriers, increasing the number and size of commercially viable projects, and reducing the risks associated with energy efficiency activities.

The following point must be taken into account as “lessons learned” to replicate the implementation of the case:

- The Project is sustainable because it requires participation by independent actors – financial institutions, energy service and equipment providers, project sponsors, and users – who are pursuing commercially viable development of the energy efficiency market, with each actor retaining and adjudicating the specific project risk within its core business competency. Project activity in Croatia will be replicated on a commercial basis after the GEF programme ends. Lending to users should continue to grow as financial intermediaries gain experience with the performing loans in their portfolios.

16.9.8. Risks

The following factors may represent a risk to the successful implementation and continuation of the Case Study:

- The market monopoly of HEP in the power sector constitutes a barrier for new market entrants in the energy sector; this situation might be worsened with the recent entry of HEP in the market for renewable energy project development: without adequate measures to stimulate market competition and support new market entrants, a quick consolidation of this dynamic market could take place;
- The lack of awareness among final energy consumers is probably the highest hurdle to the realization of energy efficiency projects: the absence of an obligation to perform energy audits and the lack of information regarding ESCO business models for performance contracting have so far prevented private companies from developing energy efficiency projects;
- Budgets in municipalities and state owned organizations are based on past years consumption. Therefore there are no incentives to invest into energy efficiency measures.

16.9.9. Conclusion and recommendations for replication

This Case Study aims at establishing a utility-based Energy Service Company (HEP ESCO) to develop the market for energy efficiency projects, finance their implementation, and create business opportunities for private providers of energy efficiency goods and services as partners of HEP ESCO.

The presented Case Study contributes in removing barriers related to lack of market for energy services and absence of ESCOs working on a commercial basis. Its implementation is therefore recommended for Albania, Belarus, Bosnia and Herzegovina, the Republic of Moldova and Serbia, since those countries are facing similar barriers.

Recommendations for replication in Albania

General situation in Albania

The primary objective of the National Strategy for Energy approved in June 2003 is to restructure the energy sector based on market economy principles and to develop a modern energy policy.

Albania is a net energy importer with a share of 47 per cent imports of the total primary energy supply. The energy intensity of the GDP at Purchasing Power Parities for Albania in 2007 is considerably lower than the average of the project region. The main cause of the low Albanian energy intensity levels are more related to the growth in GDP based on foreign aid and income from Albanians working abroad, and the collapse of heavy industries than to improvements of energy efficiency.

Despite a strong political will, currently no Energy Service Companies are operative in Albania. The Albania-EU Energy Efficiency Centre (EEC) is one service company that may have the potential to develop as an Energy Service Company. So far it has been carrying out international and national programmes for energy conservation and has engaged in energy audits.

Barriers in Albania

In April 2005 the Albanian Parliament approved an Energy Efficiency Law. The main goals are the reduction of transmission and distribution losses, enhanced enforcement of the energy provisions of the Building Code (2002), greater use of solar hot water as well as the improved use of decentralized heating and hot water systems, and it is establishing the ground for Energy Service Companies as well.

The Energy Efficiency Law has barely been set in force. The Building Code approved in 2002 is implemented to a very low degree even in public buildings. The market for energy services is virtually inexistent in Albania, despite the availability of international programmes for technical assistance and financial support.

Since lack of equity is the main barrier to the development of energy efficiency projects in Albania, the situation resembles that in Croatia before the implementation of the Case Study. Furthermore, a general lack of awareness about the cost benefits from energy efficiency can also be perceived in Albania. The concept presented in the Case Study helps to overcome also this barrier.

Recommendations for Albania

The following steps are recommended for successful replication of the Case Study:

- The Albanian Ministry of Economy, Trade and Energy (METE) should contract a consultant to elaborate a business plan covering the following items: scope and potential for energy service companies, obstacles towards the realisation of such potential, methodologies and financing approaches which would work best in Albania and a proposal for a model contract document for the ESCO business. The Albanian government might apply for co-financing from an international donor;
- The Ministry of Economy, Trade and Energy, with support of the Albania-EU Energy Efficiency Centre (EEC), as well as the Albanian National Agency of Natural Resources (AKBN) should identify a project pipeline. Therefore, the Ministry of Economy, Trade and Energy should identify in cooperation with the National Economic Chamber and/or the Industry Association energy-intensive companies and offer energy audits to those companies. The energy audits could be performed by the Albania-EU Energy Efficiency Centre and/or the Albanian National agency of Natural Resources;
- With the support of international donors, the Ministry of Economy, Trade and Energy should establish an ESCO. A consultant should be contracted supporting the start up of the ESCO providing support and guide all ESCO activities related to selling, marketing, client contract negotiation, project engineering, M&V of savings, project management, commercial bank negotiation, management reporting (internal and to owner), management review of ESCO performance, development of appropriate manual or computer based systems for sales, project or corporate management, hiring staff, subcontracting/partnering with local firms, and purchasing goods. This international consultant should be given a two-year mandate to support the development of the new ESCO and to assist it with the business plan implementation;
- The Ministry of Economy, Trade and Energy shall seek support from an international donor to address lack of funding, due to perceived risks among lenders and investors, and lack of know-how among key stakeholders. The international donor shall provide (i) a loan to purchase goods and services that support ESCO activities, (ii) a blend of grant to cover preparation costs for and early investments in the project pipeline, (iii) a partial risk guarantee to leverage commercial bank lending to the ESCO and its projects, and (iv) a non-grant financing to support training, monitoring and evaluation, and information and dissemination related to overall market development. Aim of this support from international donors is to add credibility to local banks and private investors to increase energy efficiency.

Recommendations for replication in Belarus

General situation in Belarus

Belarus is a strong net energy importer, mainly for crude oil and gas that generate an energy dependency of more than 86 per cent. Most of the demand for primary energy is covered with imports from the Russian Federation. The largest share in energy consumption in Belarus is represented by the residential sector, with a share of 31 per cent of the total final energy consumption, followed by the industry sector with 27 per cent.

The Strategy of Energy Security and Raising Energy Independence of the Republic of Belarus has been adopted in August 2005. The strategy aims at upgrading the basic production assets, energy conservation and the broader usage of domestic fuels and energy sources.

The first ESCO in Belarus started operation in early 2005. The market size of the energy efficiency market for ESCO is calculated that at least 20-25 per cent of the current energy demand can be saved in the industrial and municipal sectors, though external finances will be necessary for this.[xlix]

[xlix] Latest Development of Energy Service Companies across Europe – A European ESCO Update, (2007), Joint Research Centre, European Commission

Barriers in Belarus

Although Belarus already achieved considerable energy savings by halving its energy intensity over the past decade, there is still considerable potential for energy savings in the country. The mid- and long-term goals to realize energy saving potentials were set in The Basic Principles of the Republic of Belarus Energy Security. Three national Republic programmes for energy savings were adopted covering the periods 1996-2000, 2001-2005 and 2006-2010.

Barriers to ESCO operations are numerous and essentially overcoming them would require changes at legal, administrative and ownership level. Nevertheless, a positive development is the presence of certain ESCOs, namely BelinvestESCO, Vneshenergoservice and Gmmotory.

In the industrial sector as well as in state-funded organizations current accounting rules and taxation systems do not take into consideration benefits from energy savings in the overall cash flow of the company, rather discouraging energy conservation.[l] On the other hand, the banking sector is also limited and faces a number of barriers. Most potential ESCO projects are long-term, while commercial bank loans are only available for up to seven years, and the interest rate is relatively high. Thus, Belarus faces similar problems as Croatia before the implementation of the Case Study.

Recommendations for Belarus

The following steps should be carried out for successful replication of the Case Study:

- The Department for Energy Efficiency of the State Committee for Standardization shall create a core developer of energy efficiency projects e.g. BelinvestESCO. This ESCO shall develop, finance and implement energy efficiency projects on a commercial, for-profit basis, using local businesses as key delivery agents;
- The national Government of Belarus should define and establish adequate framework conditions to allow growth of the market for energy services. Legal changes on a number of issues are necessary, such as regarding banks, which should be allowed to finance longer projects than seven years. Also, the public sector procurement and tendering rules should be reconsidered to allow ESCO operation. Finally, the adoption of a model ESCO contract is needed;
- The Department for Energy Efficiency of the State Committee for Standardization shall seek support from an international donor such as the European Bank for Reconstruction and Development to address lack of funding, due to perceived risks among local lenders and investors, and lack of know-how among local key stakeholders. The international donor shall provide (i) blend of grant to e.g. to BelinvestESCO to cover preparation costs for and early investments in the project pipeline, as well as a partial risk guarantee to leverage commercial bank lending to the ESCO and its projects. Aim of this support from international donors is to add credibility to local banks and private investors to increase energy efficiency. Additionally a non-grant financing could support training, monitoring and evaluation, and information and dissemination related to overall market development.

Recommendations for replication in Bosnia and Herzegovina

General situation in Bosnia and Herzegovina

The state of Bosnia and Herzegovina is composed of two entities: the Federation of Bosnia and Herzegovina and the Republika Srpska, set up by the Dayton Peace Agreement of 14 December 1995. According to the agreement, energy policy is dealt with by the entities' government, resulting in a lack of overarching energy strategy or policy.

Besides the structural barriers, training and information dissemination are strongly needed in order to raise awareness of the potential offered by energy services., e.g. in the residential sector. Considering that space heating has the largest share of energy use in buildings and that specific energy consumption for heating is considerably higher than in EU countries, it is clear that there is a very significant potential for energy efficiency improvement.

In the services sector, through the construction of new buildings by 2020, and a likely increase in the required equipment standards of heaters and air-conditioners, it could be possible to achieve a

[l] Latest Development of Energy Service Companies across Europe – A European ESCO Update, (2007), Joint Research Centre, European Commission

decrease in thermal needs of up to ten per cent, and in the non-thermal needs of up to five per cent.

Barriers in Bosnia and Herzegovina

In Bosnia and Herzegovina, a Law on Energy Efficiency has been proposed on entity level. However, no energy efficiency law is yet in place at national level. Existing legal regulations and tax policy in the civil engineering, construction and building industry do not encourage energy saving.

ESCO activity is limited, although not absolutely unknown. There are no ESCOs offering energy performance contracting in Bosnia and Herzegovina, though there is at least one company using the ESCO concept in implementing a small-scale boiler biomass heating project, and a number of other ESCO projects have taken place.

Beside strong structural barriers, including unclear authority, lack of data and legislation, training and information dissemination, availability of incentives or financing mechanisms dedicated to energy efficiency is limited. Thus, a third-party financing scheme is considered as an appropriate means to seize energy saving opportunities as outlined in the Case Study.

Recommendations for Bosnia and Herzegovina

The following steps should be carried out for successful replication of the Case Study:

- The Ministry of Foreign Trade and Economic Relations (MoFTER) should contract a consultant to perform an in-depth analysis and research on the ESCO market potentials in Bosnia and Herzegovina comprising scope and potential for energy services, obstacles towards the realisation of such potential, methodologies and financing approaches which would work best in Bosnia and Herzegovina and a proposal for a model contract document for the ESCO business. The government of Bosnia and Herzegovina might apply for co-financing from an international donor to perform this analysis;
- The Ministry of Foreign Trade and Economic Relations in cooperation with the Ministry of Industry, Energy and Mining in the Republika Srpska and the Federal Ministry of Energy, Mining and Industry (MEMI) in the Federation of Bosnia and Herzegovina should establish an overall energy efficiency legislation and the institutional framework for energy services;
- The Ministry of Foreign Trade and Economic Relations with support of the Ministry of Industry, Energy and Mining in the Republika Srpska, and the Federal Ministry of Energy, Mining and Industry (MEMI) in the Federation of Bosnia and Herzegovina as well as a consultant should identify a project pipeline. Starting point are energy audits in energy intensive industry;
- With the support of international donors, the Ministry of Foreign Trade and Economic Relations should establish an ESCO. A consultant should be contracted supporting the start up of the ESCO providing support and guide all ESCO activities related to selling, marketing, client contract negotiation, project engineering, monitoring and verification of savings, project management, commercial bank negotiation, management reporting (internal and to owner), management review of ESCO performance, development of appropriate manual or computer based systems for sales, project or corporate management, hiring staff, subcontracting/partnering with local firms, purchasing goods. This international consultant should be given a two-year mandate to support the development of the new ESCO and to assist it with the business plan implementation;
- Additionally, the Ministry of Foreign Trade and Economic Relations shall seek support from an international donor to address lack of funding, due to perceived risks among lenders and investors, and lack of know-how among key stakeholders. The international donor shall provide (i) a loan to purchase goods and services that support ESCO activities, (ii) a blend of grant to cover preparation costs for and early investments in the project pipeline, (iii) a partial risk guarantee to leverage commercial bank lending to the ESCO and its projects, and (iv) a non-grant financing to support training, monitoring and evaluation, and information and dissemination related to overall market development. Aim of this support from international donors is to add credibility to local banks and private investors to increase energy efficiency.

Recommendations for replication in the Republic of Moldova

General situation in the Republic of Moldova

The period following independence in 1991 brought about changes in the fuel mix of energy supply and a decrease of energy consumption in the Republic of Moldova. Final energy consumption in 2005 was still 77 per cent lower than in 1990. This reduction is due to many factors inherent to the transitional period, including production crisis, financial difficulties and irregular energy supply. Coal consumption has substantially decreased, while natural gas has become the main fuel for the power stations and boiler houses and has reached a share of 67 per cent of primary energy supply. 97 per cent of total energy consumption is imported (mainly from the Russian Federation and Ukraine).

According to the Energy Strategy 2020, it is estimated that the implementation of an energy efficiency programme could reduce the financial impact of the energy sector on the GDP by 1.6 - 1.7 per cent per year, starting with 2008. However, lack of financing limits the demand for energy efficiency in general and energy services in particular.

Barriers in the Republic of Moldova

According to the Energy Strategy of the Republic of Moldova to the year 2020, it is estimated that a well-planned and concerted implementation of an energy efficiency programme in the Republic of Moldova could reduce the financial impact of the energy sector on the GDP by 1.6 to 1.7 per cent per year, starting with 2008.

Moldova has an ambitious Law on Energy Conservation that was adopted in 2000. Unfortunately there is no real mechanism to provide for incentives for conservation that could make the Law effective similar to the situation in Croatia before the implementation of the Case Study. The relative instability of the economic level affects potential ESCOs' trust and willingness to engage in a guaranteed long-term contract. No real ESCO have been created but there are engineering companies that have worked on donor-financed turn-key con-tracts in the range of USD 50,000 to USD 150,000.

The lack of private project developers is an indicator for the lack of financial resources and for the lack of awareness on the possibilities of energy efficiency, despite the highest energy tariffs in the entire project region.

Recommendations for the Republic of Moldova

The following steps should be carried out for successful replication of the Case Study:

- The Ministry of Economy and Commerce in cooperation with the Agency for Energy Efficiency should contract a consultant to elaborate a business plan covering the following items: scope and potential for energy service companies, obstacles towards the realisation of such potential, methodologies and financing approaches which would work best in the Republic of Moldova and a proposal for a model contract document for the ESCO business. The national government might apply for co-financing from an international donor;
- The Ministry of Economy and Commerce with support of Agency for Energy Efficiency in cooperation with an industry association should identify a project pipeline. Start point are energy audits performed by the Agency for Energy Efficiency;
- The Ministry of Economy and Commerce should establish an Energy Service Company. A consultant should be contracted supporting the start up of the ESCO providing support and guide all ESCO activities related to selling, marketing, client contract negotiation, project engineering, monitoring and valuation of energy savings, project management, commercial bank negotiation, management reporting (internal and to owner), management review of ESCO performance, development of appropriate manual or computer based systems for sales, project or corporate management, hiring staff, subcontracting/partnering with local firms, purchasing goods. This international consultant should be given a two-year mandate to support the development of the new ESCO and to assist it with the business plan implementation;
- The Ministry of Economy and Commerce shall seek support from an international donor to address lack of funding, due to perceived risks among lenders and investors, and lack of know-how among key stakeholders. According to the implementation of the Case Study in Croatia, the international donor shall provide (i) a loan to purchase goods and services that support ESCO activities, (ii) a blend of grant to cover preparation costs for and early investments in the project pipeline, (iii) a partial risk guarantee to leverage commercial bank

lending to the ESCO and its projects, and (iv) a non-grant financing to support training, monitoring and evaluation, and information and dissemination related to overall market development. Aim of this support from international donors is to add credibility to local banks and private investors to increase energy efficiency.

Recommendations for replication in Serbia

General situation in Serbia

The energy intensity indicators reveal that Serbia is using 3.8 times more energy units to produce one dollar of GDP than the world average. Within the last ten years, production activities in the industry declined while energy intensity has increased. The potential for energy saving the industrial sector have been evaluated to be around 20 per cent of the final energy consumption in the industry sector. The introduction of energy management could add to another 10-15 per cent of decrease in energy consumption.

Currently there are no Energy Service Companies active in the Serbian market, mainly due to lack of a dedicated support mechanism. Legal framework for running ESCOs is also missing. However, important changes have already occurred, which can be supportive of a potentially emerging ESCO market.

The New Energy Law of 2004 in Serbia foresees new responsibilities for municipalities: energy balancing, energy strategic planning and establishment of local energy markets. Further legal and capacity advancement are still necessary in order to fully enable the development of third party financing schemes.

Barriers in Serbia

A Law on the rational use of energy is currently being prepared and should be ready by the end of 2010. The law addresses all energy sectors and will launch the Serbian Energy Efficiency Fund (SEEF), which will provide capital grants for projects concerning energy efficiency and renewable energy sources. This fund will be financed by additional taxation of electricity and fuels. The law will introduce compulsory energy audits, thus preparing ground for the development of activities for Energy Services Companies.

In Serbia, there are only few isolated actions related to private companies in terms of preparation of business plans and dissemination of information on the energy service concept, but there is no active ESCO industry. The most critical issue for the uptake of this sector is claimed to be wide-scale awareness-raising and capacity-building which are necessary to overcome the very primary hurdles to the ESCO sector foundation. The situation is similar to Croatia before the implementation of the Case Study.

Recommendations for Serbia

The following steps should be carried out for successful replication of the Case Study:

- The Ministry of Mining and Energy in cooperation with the Serbian Energy Efficiency Agency (SEEA) should contract a consultant to elaborate an in-depth analysis of the energy service market in Serbia estimating the potential for energy services, identify obstacles towards the realisation of the energy service potential, elaborate financing approaches in cooperation with the Fund for Environmental Protection and Energy Efficiency or the National Investment Programme, and propose a model contract document for the ESCO business;
- The Ministry of Mining and Energy should establish an institutional framework for energy services and perform wide-scale awareness-raising and capacity building based on the outcome of the in-depth analysis of the energy service market in Serbia;
- The Ministry of Mining and Energy with support of SEEA should identify a project pipeline. Starting point are energy audits to be performed by SEEA;
- With the support of international donors, the Ministry of Mining and Energy should establish an ESCO. A consultant should be contracted supporting the start up of the ESCO providing support and guide all ESCO activities related to selling, marketing, client contract negotiation, project engineering, M&V of savings, project management, commercial bank negotiation, management reporting (internal and to owner), management review of ESCO performance, development of appropriate manual or computer based systems for sales, project or corporate management, hiring staff, subcontracting/partnering with local firms, purchasing goods. This international consultant should be given a two-year mandate to

support the development of the new ESCO and to assist it with the business plan implementation;

- The Ministry of Mining and Energy shall seek support from an international donor to address lack of funding, due to perceived risks among lenders and investors, and lack of know-how among key stakeholders. The international donor shall provide (i) a loan to purchase goods and services that support ESCO activities, (ii) a blend of grant to cover preparation costs for and early investments in the project pipeline, (iii) a partial risk guarantee to leverage commercial bank lending to the ESCO and its projects, and (iv) a non-grant financing to support training, monitoring and evaluation, and information and dissemination related to overall market development. Aim of this support from international donors is to add credibility to local banks and private investors to increase energy efficiency.

16.10. *Ukraine Energy Efficiency Programme for Banks (UKEEP) – Case Study of Ukraine (recommendations for replication in Albania, Bosnia and Herzegovina and the former Yugoslav Republic of Macedonia)*

Box 22: Ukraine Energy Efficiency Programme for Banks

One of the main barriers towards the realization of energy efficiency potentials in Ukraine before the implementation of the Case Study was the lack of long-term financing mechanisms. Until recently long term financing, was hardly available for energy efficiency projects in Ukraine. Project developers could only get short term financing and usually trade related or working capital financing rather than investment or project financing.

This Case Study refers to the Ukraine Energy Efficiency Programme, which was implemented as a dedicated credit line by the European Bank for Reconstruction and Development. The Ukraine Energy Efficiency Programme aims at increasing energy efficiency in Ukrainian private companies by onlending energy efficiency project financing via local banks. Within the Ukraine Energy Efficiency Programme, each project proposed for financing is screened from a financial, technical, and environmental point of view as an important part of the project evaluation process.

The Case Study is recommended for replication in Albania, Bosnia and Herzegovina, the Russian Federation and the former Yugoslav Republic of Macedonia, since these countries are facing similar barriers as Ukraine, before the implementation of the Case Study: The lack of dedicated financing promoting energy efficiency measures in industry is complemented by lack of technical capacity to prepare respectively evaluate bankable projects.

16.10.1. Background to the Case Study

General situation in Ukraine

Ukraine has seen impressive economic growth from 2000 to 2006 in spite of the government's slow progress in facilitating market-oriented reforms. Growth was fuelled by low energy costs and low wages relative to the rest of Europe. Ukraine has developed a large energy intensive industrial sector mainly because energy has been available at relatively low prices. Currently the general economic situation in Ukraine is changing towards open markets with increased energy prices and the need for private companies to develop more efficient ways of production.[li]

On average Ukrainian companies use approximately three times more energy to produce the same output as companies in the European Union. The potential for energy efficiency gains in Ukrainian companies is huge, but the market for such investments is still in its infancy. By investing in energy efficiency Ukrainian companies can ensure future competitiveness even with increasing energy prices and more demanding environmental regulations.[lii]

Furthermore, Ukraine imports 70 per cent of its gas supply, mainly from Russia and Turkmenistan. The ongoing dispute over gas prices between Kiev and Moscow highlights the importance of this gas supply and the urgent need for energy efficiency in Ukraine.

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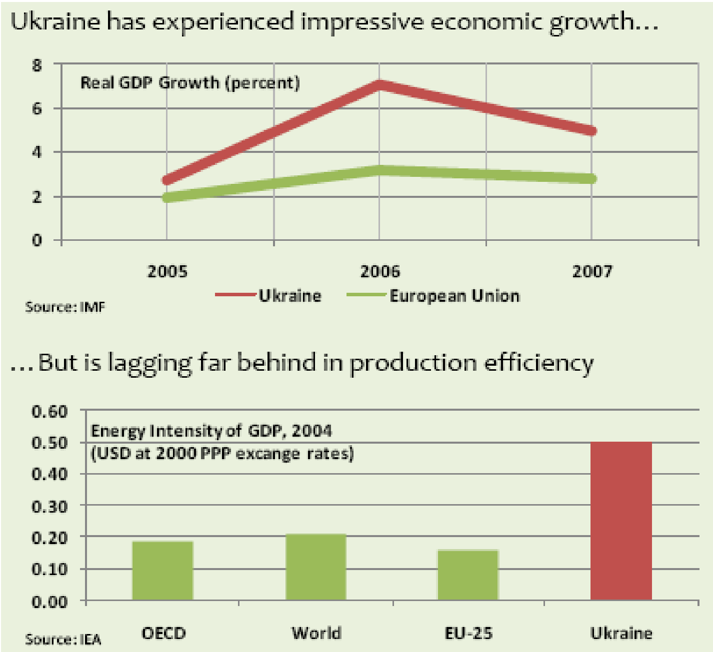
li The Best Investment is to Save Energy Now! (2007), http://www.ukeep.org

lii Brochure "UKEEP-Ukraine Energy Efficiency Programme" (2009), http://www.ukeep.org

Figure 16.3: Development of Energy Intensity of Gross Domestic Product in Ukraine



Source: The Best Investment is to Save Energy Now! (2007), http://www.ukeep.org

Barriers in Ukraine

One of the main barriers towards the realization of energy efficiency potentials in Ukraine before the implementation of the Case Study was the lack of long term financing mechanisms. Until recently long-term financing, which is important to finance energy efficiency investments, was hardly available for energy efficiency projects in Ukraine. Project developers could only get short-term financing and usually trade related or working capital financing rather than investment or project financing.[liii]

Furthermore, in Ukraine it is difficult to convince companies of the need for energy efficiency. Many companies do not know how to calculate the true cost of the energy that they use and are not aware of the impact on the company's account. As such, the lack of awareness with regard to energy efficiency particularly before the implementation of the Case Study was a major barrier to the implementation of energy efficiency measures.

16.10.2. Description of the Case Study

This Case Study refers to the Ukraine Energy Efficiency Programme, which was implemented as a dedicated credit line by the European Bank for Reconstruction and Development (EBRD). The Ukraine Energy Efficiency Programme aims at increasing energy efficiency in Ukrainian private companies by onlending energy efficiency project financing via local banks. Within the Ukraine Energy Efficiency Programme, each project proposed for financing is screened from a financial, technical, and environmental point of view as an important part of the project evaluation process.

Key objective of the Case Study is to increase energy efficiency and the utilization of renewable energy resources in the Ukrainian private industry by providing financial and technical support. The Case Study contributes in removing financial barriers and strengthening financial capabilities of industrial companies to develop bankable energy efficiency and renewable energy projects.

16.10.3. Approach for implementation of the Case Study

The Ukrainian Energy Efficiency Programme for banks in Ukraine is a framework facility under which the EBRD extends credit lines to participating banks for onlending to private sector companies for industrial energy efficiency and renewable energy projects. Currently, there are three banks participating in the programme.

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liii EBRD, Annual Report 2008

The Case Study described is designed to help overcome market imperfections that hold back the smooth functioning of the energy conservation market in Ukraine. Immediate results of the Case Study are a) demonstration of the benefits of rational energy usage, b) building expertise and capacity among the participating banks and the subborrowers, and c) increased financial intermediation targeted at rational energy utilization which will also improve operating efficiency.[liv]

Eligible companies applying for financing via the UKEEP facility can receive free assistance from international energy efficiency experts, who will assess the company's energy savings potential and prepare an investment programme to be presented to the banks. This technical assistance comprehends initial project assessment including a) financial assessment to find out if the project is profitable and if UKEEP can finance it at all, b) an energy survey including the most profitable and best fitting investment programme for the company applying for funding, c) advice on additional sources of funding for large projects.

The loans have competitive terms and conditions, but the precise levels depend on the borrower and the negotiations with each participating bank and during the application process the participating banks develop an in-depth understanding of the project and the needs of the applying company. The participating banks support the applying companies with preparing high standard project proposals.

The process for loan application itself depends on the estimated project volume:

- Small project – Fast track (financing volume smaller than 1.7 million EUR, usually about 50,000 EUR) – Application is sent to one of the participating banks, project approval is done automatically according to defined lists of pre-approved equipment;
- Medium sized projects (financing volume between two and five million EUR) – Application is sent to one of the participating banks or to the Ukrainian Energy Efficiency Programme (UKEEP), project approval is prepared and handled by UKEEP (eligibility check) and if necessary an energy survey is carried out;
- Large projects (financing volume more than five million EUR) – Application is sent to one of the participating banks (reduced list) or to the Ukrainian Energy Efficiency Programme, project approval is prepared and handled by UKEEP (eligibility check) and if necessary an energy survey is carried out.

The standard application process for UKEEP applications basically consists of six steps:

- Step one: The project idea and project application is sent to the participating bank or UKEEP;
- Step two: The consultant assigned by the EBRD makes the first assessment of the project resulting in a preliminary assessment;
- Step three: The participating bank assesses the company's financial standing resulting in the bank credit analysis;
- Step four: The consultant makes a detailed assessment of the project resulting in the final project assessment;
- Step five (optional): The consultant visits the company for an energy audit or more detailed project documentation resulting in the completion of the project documentation or an energy audit;
- Step six: The decision about the loan is made resulting in UKEEP or participating bank approval (or rejection) and the according loan agreement.

The Case Study has involved the following key players and partners:

- The EBRD, which is responsible for the establishment of the dedicated credit line and the procurement of the financing for the Ukrainian Energy Efficiency Programme;
- Participating banks, which are responsible for onlending to private sector companies such as e.g. Forum Bank, OTP Bank, Ukrexim Bank;

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liv Project Summary Document, UKEEP (2006), http://www.ebrd.com

- Consulting companies, which are responsible for providing consultants for the overall project coordination and the training for the participating banks (e.g. Vattenfall, SEK Advisory Services);
- Consulting companies, which are responsible for providing international energy efficiency experts (e.g. Allplan, IC Consulenten, Kommunal Kredit – Public Consulting);
- The Austrian and Swedish Governments, which are responsible for providing funding for technical cooperation essential for the Case Study, more precisely the Swedish International Development Cooperation Agency and the Austrian Federal Ministry of Finance;
- Subborrowers, which are project developers or private industry companies applying for project financing via one of the participating banks.

Beneficiaries of the implementation of the Case Study are private industry companies and energy efficiency and renewable energy projects and programmes receiving funds from the Ukrainian Energy Efficiency Programme.

The proposed areas of support primarily include energy saving and energy efficiency investments in the industrial sector as well as renewable energy investments[lv]:

- Industrial energy efficiency investments
  - On-site cogeneration of heat and electricity;
  - Rehabilitation of boilers, steam distribution systems, compressed air systems, and power distribution systems;
  - Replacement of old gas boilers with condensing boilers;
  - Switch from electricity heating to fuel-based direct heating;
  - Process improvements including enhanced controls;
  - Installation of heat recovery from processes;
  - Installation of absorption chillers/new chillers;
  - Energy management systems or building management systems;
  - Installation of variable speed drive on selected electric motors.
- Renewable energy investments
  - Wind power plants;
  - Run-of-river hydro plants;
  - Solar hot water generation systems;
  - Biomass generation of heat and/or electricity;
  - Biogas and biodiesel fuelled engines.

The Case Study has been implemented using the following steps:

Step one: Establishment of credit line with EBRD

The project was proposed to the EBRD in 2006 and a dedicated credit line was approved soon after.

Step two: Choice of participating banks

The implementation of the Case Study included discussions and initial negotiations with five Ukrainian local banks to handle onlending to the project developers in 2006 (State Export Import Bank of Ukraine, Kreditprombank, Forum Bank, OTP Bank, Ukrexim Bank). Until January 2008, three of those joined the Ukrainian Energy Efficiency Programme, namely Ukrexim Bank, OTP Bank, and Forum Bank.

[lv] http://www.ukeep.org

Step three: Role of consultants and capacity building for participating banks

In order to implement the Case Study two roles have to be filled out by consultants:

- The coordinator is responsible for: Overall project coordination, initial training for participating banks, identification of a pipeline of potential projects, promoting the UKEEP through marketing campaigns, and monitor the performance of the UKEEP and subborrowers;
- The energy efficiency expert is represented by one or more consulting firms that assists subborrowers in the screening and preparation of sustainable energy projects in the industrial sector, the aim is to
    - Identify individual opportunities through a dedicated energy audit comprising site visits, energy performance assessment, cost-benefit analysis of technically feasible investments;
    - Assess compliance of each proposed project or set of projects with applicable environmental and health and safety laws and standards;
    - Prepare an energy audit report to support the loan application participating banks.

Procurement of consultants happened via the EBRD or via a dedicated homepage used for marketing the Ukrainian Energy Efficiency Programme.

Step four: Promotion of UKEEP through marketing campaigns

The Ukrainian Energy Efficiency Programme is being actively promoted through marketing campaigns (including press releases, spreading of information during conferences etc.) and an internet platform, providing information regarding the programme, the application requirements, contact addresses etc. Responsibilities for such campaigns are assigned to the coordinator consultant company.

Step five: Identification and screening of projects in the industrial sector

The projects to be supported by the Ukrainian Energy Efficiency Programme are either proposed by the coordinator consultant or by project developers through applying via one of the participating banks.

Example projects supported within the UKEEP are:

- Tsyurupinsk Paper Mill, Kherson: The company is a producer of filter paper with an annual production of 3,000 tonnes of industrial use filters. The proposed project included modernization of production equipment, air preparation, and electricity and steam supply investments. The investment costs are approximately three million EUR, to be paid back in seven years, annual savings achieved by the modernization are more than half a million EUR;
- Yarychiv Bakery, Lviv: The company is a producer of crackers, cookies and cakes with an annual production of 15,000 tonnes of pastries. The proposed project included energy efficiency improvements by replacement of boiler stations, investment in new thermal pumps for baking ovens, replacement of the wastewater treatment plant, and thermal insulation of buildings. The investment costs are approximately 1.5 million EUR, to be paid back in seven years, annual savings achieved by the modernization are more than 250,000 EUR;
- Nyva Pereyaslavschyny, Kyiv: The company is an agricultural enterprise mainly focused on crops production. The proposed project is designed to enable the company to use straw as fuel instead of natural gas for their heat generation. The straw boilers replace gas boilers and fully satisfy heating needs of the company’s pig farms. The investment costs are approximately 600,000 EUR, to be paid back in less than three years, annual savings achieved by the modernization are more than 200,000 EUR.

Step six: Monitor the performance of UKEEP and its sub projects

Monitoring of the performance of the progress and compliance with the EBRD requirements of supported projects is carried out by the coordinator consult (or consultant company), herein the compliance with national requirements for environment, health and safety plays a major part. Monitoring results are forwarded to the according participating bank and annual monitoring reports are created by the participating banks and provided to the EBRD.

The implementation of the Case Study started in 2006 with a project proposal to the EBRD. The onlending of loans to subborrowers started in 2007. As such, the implementation time is estimated as one to two years. Furthermore, the Ukrainian Energy Efficiency Programme is planned to run until 2011, credit amounts are expanded eventually.

Taking into account the application procedures of international donor institutions such as the EBRD and the negotiations with local banks to find the right terms for onlending to the subborrowers, as well as the international consulting companies to take over a large part of tasks within the implementation phase of the project, it is unlikely that the timeframe for implementation can be substantially shortened. However, by concentrating on the cooperation with one local bank and one international consultant company in the initial phase of the Case Study implementation the implementation time might be reduced to approximately 12 to 18 months.

16.10.4. Impact of case study implementation

The implementation of the Case Study has an impact at regional and municipal level, since programmes supported under the Ukrainian Energy Efficiency Programme are aimed at concrete energy efficiency and renewable energy measures such as the replacement of outdated boilers, modern insulation of buildings and other energy efficiency measures. Furthermore, generation of electricity or heat by the use of renewable energy sources is supported, such as the installation of biomass ovens etc. Since the supported projects are spread all over the country, the impact of the Case Study is on a national level as well.

In general, increased efficiency in heat generation, reduction of heat transmission losses and improved efficiency in the use of heat and energy leads to a reduction of air pollutants (e.g. SO_2, NO_x, CO_2, particulates) resulting from heat and electricity generation. This is a clear and quantifiable environmental benefit on which the participating banks will provide details in an annual environmental report to the EBRD.

As of August 2009, UKEEP has committed approximately 63 million EUR to more than 170 energy efficiency or renewable energy projects in various sectors (Pulp and Paper, Food and Beverages, Energy, Construction Materials, Machine Building, Chemicals). The main economic and environmental impact is caused by an estimated energy saving of more than 1,850 GWh per year – equivalent to the household electricity consumption of more than 450,000 households. As a result, CO_2 emissions decreased by more than 450,000 tonnes per year – equivalent to the annual emissions of more than 200,000 passenger cars. The total CO_2 savings during the project lifecycle are estimated as 6.5 million tonnes.[lvi]

16.10.5. Cost for implementation

Information about implementation costs are not published by the EBRD or participating banks. Yet, the defined credit line for the Ukrainian Energy Efficiency Programme meant for on-lending to sub-borrowers is 100 million EUR, provided by EBRD and the Swedish and Austrian Governments. The second phase of the programme (UKEEP 2), starting in January 2009 and prolonging the UKEEP until 2011 additionally provides 50 million EUR.[lvii]

Although there is no upper limit for project support, the funds paid out for energy efficiency or renewable energy projects are approximately two to five million EUR in average. A parallel credit line particularly appointed to support smaller projects and investments is the fast track application procedure, which is already pre-approved by the Ukrainian Energy Efficiency Programme. This credit line is supposed to support projects with a funding volume smaller than 1.7 million EUR.[lviii]

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lvi Brochure “UKEEP-Ukraine Energy Efficiency Programme” (2009), http://www.ukeep.org
lvii “Financial Resources for Increasing Energy Efficiency are Available” (2009), http://www.ukeep.org
lviii Presentation “UKEEP-Ukraine Energy Efficiency Programme” (2009), http://www.ukeep.org

Estimated costs for the implementation of the Case Study are approximately 500,000 EUR including the preparation of a project proposal for an international donor organization (Case Study step one), the negotiations with potential participating local banks and choice of such banks as on-lenders (step two), employing consultants for the initial Case Study implementation (step three), identification and screening of projects in the industrial sector (step five), and monitoring of the supported projects (step six). Costs were borne by the EBRD for credit lines, by the Austrian and Swedish Governments for technical cooperation (provision of consultants), and by the participating banks (internal implementation of application procedures).

Not included in this estimation are the costs for marketing campaigns and setup of the homepage acting as a platform for information exchange (step four), for which we estimate another 100,000 to 200,000 EUR.

A suggestion to shorten the implementation costs when replicating the Case Study in other countries is to assign more organizational tasks to domestic agencies or institutions. As such capacity is build and costs for international consulting companies are reduced.

16.10.6. Regulatory preconditions

The following policies or regulations are beneficial for successful implementation of the Case Study:

- A national Energy Strategy to set the general framework until e.g. 2030;
- A national law providing a minimum of environmental and energy saving requirements combined with incentives such as e.g. tax exemptions;
- A national law providing procedures and documentation requirements for development and financing of environmental and energy efficiency projects.

16.10.7. Critical success factors

The following key success factors contribute to the successful implementation of the Case Study:

- A national energy tariff policy with cost based tariffs, ensuring energy cost savings after implementation of energy efficiency measures to enable payback of loans;
- Implementation of incentives for utilization of renewable energies, e.g. tax exemptions or tax reductions, helping to pay back loans;
- Monitoring of the performance of the supported projects and monitoring of the compliance with national regulation as well as international donor institutions' requirements.

The following points are relevant for an efficient replication of the Case Study:

- Choice of experienced consulting companies to support the initial Case Study implementation;
- Choice of appropriate local banks, which provide enough resources to implement internal application procedures and are able to build capacity;
- Well-placed marketing campaigns to increase general awareness with regard to energy efficiency and the credit lines available.

16.10.8. Risks

The following possible factors may represent a risk to the successful implementation of the Case Study:

- Participating banks are not acting in compliance with the programmes' requirements;

- Potential costs savings by implementation of energy efficiency measures are overestimated and pay back of loans is not possible;
- Consulting companies responsible for large parts of the Case Study implementation are not acting in line with the requirements of the international donor organizations;
- Promotion campaigns are not placed well enough or are not appropriate to reach project developers;
- Standard application procedures are too complex and lack transparency and straightforwardness;
- Availability of equipment e.g. for installation of energy efficiency measures is restricted (e.g. new ovens need to be ordered abroad or delivery takes very long).

The following possible risks should be considered as a consequence of the implementation of the Case Study in the originating country as well as in the countries, in which the Case Study may be replicated:

- Consultant companies take over too much responsibility during the initial phases of the Case Study, so that no or not enough capacity is build by the participating banks;
- Participating banks try to add margins or additional interest rates to the loans to cover internal costs;
- Measures already planned are delayed if the credit lines are exhausted and energy efficiency and renewable energy projects are no longer supported, once the funding by the international donor company is closed.

Due to corruption the funding provided is not used for the targeted energy efficiency or renewable energy measures or annual reports about monitoring and progress of the projects are not reliable.

16.10.9. Conclusion and recommendations for replication

In general, the Case Study presents an approach to overcome the lack of financial support and funding for energy efficiency and renewable energy projects with the overall goal of reducing energy waste and greenhouse gas emissions. However, to implement a programme such as the Ukrainian Energy Efficiency Programme means to assign a large part of organizational tasks to external consultants. This might lead to reduced transparency of the implementation status and might increase implementation costs.

The Case Study is recommended for replication in Albania, Bosnia and Herzegovina, the Russian Federation and the former Yugoslav Republic of Macedonia.

Recommendations for replication in Albania

General situation in Albania

Sustainable energy is on the political agenda of Albania. In June 2003 the Government approved the National Strategy for Energy with the primary objective of restructuring the energy sector based on market economy principles and developing a modern energy policy.

Albania is a net energy importer: 47 per cent of total primary energy supply and 16 per cent of total electricity consumption is imported. The energy intensity of the GDP at Purchasing Power Parities for Albania in 2007 is considerably lower than the EU-27 average and the average of the project region.

The main causes of the low Albanian energy intensity levels are related to the growth in GDP based on foreign aid and income from Albanians working abroad, and the collapse of heavy industries. Main sources of energy inefficiency are the outdated technologies and non-contemporary equipment and standards in industry, inadequate building insulation and low-efficiency appliances, particularly stoves and boilers in the household and service sector. Since Albania is a net energy importer and energy efficiency potential amounts to 26 per cent according to the Energy Efficiency Law 2005, which is not harnessed due to lack of support instruments, the situation is similar to Ukraine before the implementation of the case study.

Barriers in Albania

The absence of public funding is one major economic and financial barrier to the development of energy efficiency. Furthermore, lack of a dedicated instrument supporting energy efficiency in the industry hampers the implementation of industrial energy efficiency projects. Due to the presence of price subsidies in the energy sectors, it is very unlikely to yield profitable and financially attractive energy efficiency projects in the industrial sector.

At the same time, lack of experience and of technical capacity to prepare, respectively evaluate bankable energy efficiency projects hampers energy efficiency in industry. As such, the overall situation of Albania resembles that in Ukraine before the implementation of the Case Study.

The establishment of an Industrial Energy Efficiency Programme in combination with the provision of technical support is necessary to enhance energy efficiency in Albania. Therefore an implementation of the concept presented in the Case Study is recommended.

Recommendations for Albania

The following steps should be carried out for successful replication of the Case Study:

- The Albanian Government in cooperation with an international donor such as the EBRD should contract a consultant to perform a preparatory study evaluating cost benefits of different industrial energy efficiency measures, identify suitable financing criteria as well as the resulting budget for the credit line;
- The Albanian Government should establish with the support of an international donor the dedicated credit line;
- The Albanian Government should select participating banks. This step involves the identification of suitable banks and the negotiation of criteria (e.g. min/max. amount of lending, payback period, internal rate of return) for participation until conclusion of a contract;
- Participating banks require capacity building on evaluation of bankable energy efficiency projects. Thus, the Albanian Government in cooperation with the international donor should contract a consultant. According to the Ukrainian Case Study, it involves the selection of a coordinator in charge of the organizational set up of the credit line and an energy efficiency expert responsible for technical issues;
- The international donor in cooperation with the participating bank promotes the credit line through a marketing campaign dedicated to Albanian industry;
- Simultaneously with the marketing campaign, the identification and screening of suitable projects will start. The task is to be performed by the coordinating consultant and energy efficiency expert, both mentioned above. The consultants will support the participating banks in identifying suitable projects as well as the project developers in preparing bankable projects;
- The performance of the credit line and its sub projects should be monitored regularly. Monitoring of the performance is carried out by the coordinator consultant. Based on the results provided by the coordinator to the participating banks, a monitoring report will be elaborated by the banks and provided to the international donor.

Recommendations for replication in Bosnia and Herzegovina

General situation in Bosnia and Herzegovina

Similar to Ukraine, Bosnia and Herzegovina is a net primary energy importer with an overall import dependency of around 26 per cent. Oil, petroleum products and gas are imported from the Russian Federation. Coal and electricity are exported. Coal and peat account for 60 per cent of the total energy supply of the country in Bosnia and Herzegovina. Industry, commercial and public sector account for 25 per cent of final energy consumption in Bosnia and Herzegovina. Those sectors consume more than 45 per cent of final electricity consumption and 82 per cent of gas consumption.

Energy efficiency is only indirectly covered by legislation, e.g. regulators have the responsibility of considering both environmental and energy efficiency issues in their tariff making and investment approval regulations and decisions. There is no national energy efficiency strategy. There are no energy efficiency targets in place at the national level.

Similar to the situation in Ukraine before the implementation of the Case Study, in Bosnia and Herzegovina the financing environment for energy efficiency and renewable energy sources is still at its preliminary stage and no existing operational funds are accessible at the State or entity levels.

Barriers in Bosnia and Herzegovina

Bosnia and Herzegovina faces limited availability of incentives or financing mechanisms for energy efficiency projects in combination with a low price level. Currently, there are no operational incentives or credit lines dedicated to energy efficiency, except for the commercial loans proposed by Raiffeisen Bank.

Lack of awareness and of capacities to successfully develop energy efficiency and renewable energy projects can be perceived at all administrative levels as well as among energy customers and financing institutions. The concept presented in the Case Study helps to overcome both barriers of lack of dedicated financing and lack of technical capacity regarding industrial energy efficiency projects.

Recommendations for Bosnia and Herzegovina

The following steps should be carried out for successful replication of the Case Study:

- The Government of Bosnia and Herzegovina and both entities in cooperation with an international donor such as the EBRD should contract a consultant to perform a preparatory study evaluating cost benefits of different industrial energy efficiency measures, identify suitable financing criteria as well as the resulting budget for the credit line in Bosnia and Herzegovina;
- The Government of Bosnia and Herzegovina should establish with the support of an international donor the dedicated credit line;
- The Government of Bosnia and Herzegovina should select participating banks. This step involves the identification of suitable banks and the negotiation of criteria for participation until conclusion of a contract;
- Participating banks require capacity building on evaluation of bankable energy efficiency projects. Thus, the Government of Bosnia and Herzegovina in cooperation with the international donor should contract a consultant. According to the Ukrainian Case Study, it involves the selection of a coordinator in charge of the organizational set up of the credit line and an energy efficiency expert responsible for technical issues;
- The international donor in cooperation with the participating bank promotes the credit line through a marketing campaign dedicated to the industrial sector in Bosnia and Herzegovina;
- Simultaneously with the marketing campaign, the identification and screening of suitable projects will start. The task is to be performed by the coordinating consultant and energy efficiency expert, both mentioned above. The consultants will support the participating banks in identifying suitable projects as well as the project developers in preparing bankable projects;
- The performance of the credit line and its sub projects should be monitored regularly. Monitoring of the performance is carried out by the coordinator consultant. Based on the results provided by the coordinator to the participating banks, a monitoring report will be elaborated by the banks and provided to the international donor.

Recommendations for replication in the former Yugoslav Republic of Macedonia

General situation in the former Yugoslav Republic of Macedonia

Similar to Ukraine, the former Yugoslav Republic of Macedonia is a net energy importer. The energy import dependency of the former Yugoslav Republic of Macedonia amounts to around 48 per cent, Import is dominated by coal and crude oil, with shares of 40 per cent and 34 per cent respectively. Energy efficiency is included in the new Energy Law of 2006. The law calls, among others, for the provision of energy audits, the application of technical specifications and standards for efficient use of fuels in energy intensive industry.

Similar to the situation in Ukraine before the implementation of the Case Study, in industry there is a high potential for energy savings: The industry is the first consumer of primary energy sources, representing 34 per cent of the total consumption. Within the industry sector, metallurgy accounts for 60 per cent of the sectors' energy needs. This includes consumption of a quarter of the total electricity supply in the country.

Financing instruments dedicated to energy efficiency are available in the former Yugoslav Republic of Macedonia. However, lack of technical and entrepreneurial know-how and expertise hamper realization of bankable energy efficiency projects.

Barriers in the former Yugoslav Republic of Macedonia

The economic and financial barriers to the development of industrial energy projects in the former Yugoslav Republic of Macedonia is mainly related to lack of equity of project developers. Dedicated credit lines have been launched by international financing institutions such as the credit line of the Macedonian Bank for Development Promotion or the EU/EBRD Western Balkans Sustainable Energy Credit Line Facility both providing loans to energy efficiency and assistance from technical consultants to help develop projects.

When implementing the credit lines, it is recommended to follow the concept presented in this Case Study with focus on the project evaluation procedure for industrial energy efficiency project.

Recommendations for the former Yugoslav Republic of Macedonia

Dedicated credit lines for industrial energy efficiency have been launched recently by international financing institutions such as the credit line promoted by the World Bank in cooperation with the Macedonian Bank for Development or the EU/EBRD Western Balkans Sustainable Energy Credit Line Facility.

Thus, focus for the successful replication of the Case Study in Macedonia is on capacity-building and awareness-raising. The following steps should be carried out:

- Participating Banks require capacity-building on evaluation of bankable energy efficiency projects. Thus, the Government of the former Yugoslav Republic of Macedonia in cooperation with a financing institutions e.g. the Macedonian Bank for Development and/or international donors mentioned above should contract a consultant. According to the Ukrainian Case Study, it involves the selection of a coordinator in charge of the organizational set up of the credit line and an energy efficiency expert responsible for technical issues. Technical capacity building should focus on the establishment of evaluation criteria for energy efficiency projects as well as the preparation of a guideline for project developers including the preparation of standardized forms and tools e.g. for the economic evaluation;
- The financing institutions e.g. Macedonian Bank for Development and/or the international donor in cooperation with the participating bank should promote the credit line through a marketing campaign dedicated to the industrial sector in the former Yugoslav Republic of Macedonia;
- External Consultants – one coordinating consultant in charge of organizational and financing issues and one with expertise in energy efficiency – should support the participating banks in identifying suitable projects as well as the project developers in preparing bankable projects;
- The coordinating consulting should perform a regular monitoring of the performance of the credit line and its sub projects Based on the results provided by the coordinator to the participating banks, a monitoring report will be elaborated by the banks and provided to the fund manager.

16.11. *Municipal Finance Facility – Case Study of Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic and Slovenia (recommendations for replication in Kazakhstan, Republic of Moldova and Romania)*

Box 23: Municipal Finance Facility

One of the main barriers towards the realization of energy efficiency and renewable energy projects in the origin countries is the lack of medium- and long-term financing for small- and medium-sized municipalities and their utility companies through commercial banks. Municipalities and their utility companies suffered from financing problems for small infrastructure investments.

This Case study refers to the Municipal Finance Facility initiative of the European Bank for Reconstruction and Development and the European Commission to develop and stimulate commercial bank lending to small- and medium-sized municipalities. The Programme was established for the banking sector in the EU Accession countries that joined the EU in 2004. This includes Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic and Slovenia. The facility combines EBRD finance in the form of long-term loans and risk sharing with support in the form of a maturity enhancement fee and technical cooperation for partner banks and municipalities. Through the finance facility, the EBRD is helping to strengthen the capacity of local banks to lend to smaller municipalities. As a result, smaller cities are investing in energy efficiency and infrastructure projects and therefore help attracting additional investments in the country.

The Case Study is recommended for replication in Kazakhstan, Republic of Moldova and Romania, since the small- and medium-sized municipalities in these countries face lack of funds dedicated to energy efficiency and renewable energy.

16.11.1. Background to the Case Study

General situation of the origin countries

General situation in the Czech Republic

The Czech Republic has a population of 10.5 million and there are over 6,200 municipalities in the country.

The energy system of the Czech Republic is characterized to a great extent by coal production, reliance on nuclear power for a significant share of electricity production, and high energy intensity compared to the EU-average. The Czech Republic has one of the lowest energy import dependencies in the European Union, mainly due to its domestically produced solid fuels.[lix]

The energy intensity of GDP at Purchasing Power Parities for the Czech Republic in 2007 was 0.22 kgoe/USD of 2000 at PPP. It has decreased by 32 per cent between 1991 and 2006, similar to the magnitude of the decreases in other eastern European countries. The National Energy Savings Plan emphasizes the households and industry sectors. They account for 31 per cent and 25 per cent of the expected savings by 2016.[lx]

Renewable energy amounted to four per cent of primary energy supply in 2006, with a share of 90 per cent of biomass. According to the EU Directive 2009/28/EC ("on the promotion of the use of energy from renewable sources"), the Czech target for renewable energy sources amounts to 13 per cent of final consumption in 2020.[lxi] Support for renewable energy includes a system in which market actors can receive a feed-in tariff or a "green bonus" depending on whether the supply is done to a distributor or to a trader or supplier.[lxii] There are also tax exemptions and a system of reduced interest rates.

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lix Renewable Energy Policy Review - The Czech Republic - EREC (2009)
lx Czech Republic, Energy Efficiency Action Plan -2006/32/EC (2007)
lxi Directive 2009/28/EC of the European Parliament and of the Council (2009)
lxii Country Profile - Czech Republic - Black & Veatch (2009)

General situation in Estonia

Estonia has a population of approximately 1.3 million. There are more than 240 municipalities in the country.

Estonian economy is highly dependent on fossil fuels. Approximately 90 per cent of Estonia's energy derives from combustion of fossil fuels (mainly oil shale). The remaining ten per cent comes from renewable energy sources, such as biomass, hydropower and wind.

The energy intensity of GDP at Purchasing Power Parities in 2007 for Estonia was 0.26 kgoe/USD of 2000. One cause quoted for the enduring high energy intensity are the low energy prices in Estonia, which have consistently been among the lowest in the EU for both households and industry. The national energy efficiency plan calls for behavioral changes linked to energy pricing/taxation policy.[lxiii]

Estonia's largest renewable energy source potential is to be found in the biomass sector, but potentials also exist in the areas of wind power and small hydro power.[lxiv]

General situation in Hungary

Hungary has a population of approximately ten million. There are more than 3,100 municipalities in the country.

The Hungarian energy system has evolved somewhat differently compared to its neighbouring countries: although it faced economic restructuring issues that were similar to other Eastern European countries, it underwent a number of reforms earlier, namely the shift towards natural gas and the decrease of energy demand in the industry sector. Industry accounted for just 19 per cent of final demand in 2006, compared to 30 per cent in 1991.

The energy intensity of GDP at purchasing power parities for Hungary in 2007 was 0.16 kgoe/US$ of 2000. It has decreased considerably since 1991. There have also been structural shifts away from energy-intensive industries. Energy efficiency is seen as an important contribution to energy security, given the steadily rising demand for imported natural gas and oil.

Hungarian Renewable Energy electricity target in the Directive 2001/77/EC for 2010 (3,6 per cent contribution of electricity from Renewables to total Electricity Consumption) has been already achieved in 2005 especially due to the biomass contribution[lxv] Its target for 2020 (Directive 2009/28/EC) is 13 per cent share of RES in the gross final energy consumption, which is expected to be met from hydro, wind, biomass and geothermal, each of which has a feed-in tariff.[lxvi] Investment subsidies are provided for renewable heating and cooling, and tax exemptions are given for biofuels.[lxvii]

General situation in Latvia

Latvia has a population of approximately 2.2 million. The country has more than 110 municipalities.

After 1991, the newly formed government immediately initiated a comprehensive package of reforms including price and trade liberalization, small-scale privatization, and macroeconomic stabilization. Many of these initiatives were successfully implemented and in the later part of the decade, Latvia experienced strong economic growth, single-digit unemployment, and increasing government stability. Lacking fossil resources, it has a high level of import dependency, with oil and gas imported mainly from Russia.[lxviii]

The energy intensity of GDP at Purchasing Power Parities for Latvia in 2007 was 0.13 kgoe/USD of 2000. It has decreased significantly since the early 1990s. The timber and wood industry in Latvia is both a major source of energy and a major consumer; it is therefore part of the energy savings programmes that are now being implemented. However, the major target of energy

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lxiii Energy Efficiency Plan, 2007-2013, Approved by Government Order No 485 (2007)
lxiv Renewable Energy Policy Review - Estonia - EREC (2009)
lxv Directive 2001/77/EC targets for Accession States (Treaty to Accession, Annex II, Part 12, page EN1802) (2001)
lxvi Panorama of Energy - Eurostat (2009)
lxvii RES2020,"Monitoring and Evaluation of the RES Directive implementation in EU27 (2008)
lxviii Country Profile - Latvia - Black & Veatch (2009)

efficiency efforts in meeting EU goals is the residential sector; 75 per cent of the expected annual savings will be in housing.[lxix]

Latvia has the highest share of renewable energy in the EU, due mainly to the significant role of hydropower and the large amount of biomass used in the residential sector. Hydro and gas provide nearly all of the domestic supply of electricity, with wind and biomass added to the mix in recent years.[lxx]

General situation in Lithuania

Lithuania has a population of approximately 3.5 million. The country has more than 115 municipalities.

Lithuania is the largest of the three Baltic countries and disposes of an industrial infrastructure that is lacking elsewhere in the Baltic region, such as oil refining and chemicals. Like in Estonia and Latvia, it has a high level of import dependency, based on oil and gas from Russia. However, the energy supply in Lithuania is different from that in the two other Baltic countries in two aspects. First, there is no interconnection with Western European energy systems and second, the former main power resource, the Ignalina NPP, was decommissioned at the end of 2009.[lxxi]

The energy intensity of GDP at Purchasing Power Parities for Lithuania in 2007 was 0.18 kgoe/USD of 2000. It has decreased significantly since the early 1990s and is now less than half its value in 1991-92, but it significantly higher than the EU-27 average (0.14 kgoe/USD of 2000 at PPP). The energy intensity is explained in part by its large chemicals industry and in part by other factors such as the housing stock and infrastructure. Their refurbishment and retrofitting of commercial buildings will be a major component of the expected energy savings resulting from the current action plan for 2008- 2016.[lxxii]

Renewable Energy Sources in 2007 account for about eight per cent of Lithuania's primary energy final consumption. In the Directive 2009/28/EC, the commission has set a very ambitious target of 23 per cent share of energy from renewable sources in gross final energy consumption to be reached by Lithuania in 2020.

General situation in Poland

Poland has a population of approximately 38 million. The country has more than 2,450 municipalities.

Poland is the largest hard coal producer in the EU. Consequently, it relies on coal and lignite for 92 per cent of its electricity production. At the same time, its domestic coal and lignite resources makes it one of the most energy-independent member states of the European Union.

The energy intensity of GDP at Purchasing Power Parities for Poland in 2007 was 0,18 kgoe/USD of 2000. It has decreased significantly since the early 1990s, but is well above the EU-27 average (0.14 kgoe/USD of 2000 at PPP). The Energy Policy of Poland by the year 2025, approved by the Polish Government on 4th January 2005, is a formal document in force. Following the changes in the economic and political circumstances the Polish Ministry of Economy issued in September 2007 the project The Energy Policy of Poland by the year 2030. The targeted decrease for energy intensity until the year 2030 is 38.9 per cent.

Targets for renewable energy sources were set in the Development Strategy of Renewable Energy Sector (endorsed by the Parliament in 2001) and amount to a share of 7.5 per cent renewable energy sources among primary energy supply by 2010 and 14 per cent by 2020. At present, the largest share of renewable energy is actually the use of wood-based biomass for heating purposes in the household sector. The revised Polish Energy Law Act, which was adopted on 4 March 2005, introduced a range of rules which strengthen the mechanisms for promoting the development of renewable energy. In the Directive 2009/28/EC, the commission has set the target of 15 per cent share of energy from renewable sources in gross final energy consumption to be reached by Poland in 2020.

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lxix Latvian Cabinet of Ministers, Latvia's First National Energy Efficiency Action Plan 2008-2010.
lxx Member States Reports in the framework of the Directive 2001/77/EC on renewable electricity (2007)
lxxi Renewable Energy Policy Review - Poland - EREC (2009)
lxxii Order regarding approval of Energy Efficiency Action Plan - Lithuanian Ministry of Economy (2007)

General situation in the Slovak Republic

The Slovak Republic has a population of approximately 5.4 million. The country has more than 2,800 municipalities.

The energy system in the Slovak Republic is characterized by an a high dependence on fossil fuels, a significant share of nuclear in the electricity mix (approximately 70 per cent) and its importance as a transit route for both gas – especially from Russia – and electricity. The Slovak government's energy policy is largely in line with EU regulations on market liberalization and much of the privatization process of assets and public companies has taken place.[lxxiii]

The energy intensity of GDP at Purchasing Power Parities for the Slovak Republic in 2007 was 0.20 kgoe/USD of 2000. It is quite high compared to the EU-27 average (0.14 kgoe/USD of 2000 at PPP), due mainly to the significant role of energy-intensive industries, including paper and chemicals as well as the iron/steel sector. The government places high priority on improving energy efficiency, given the significant reliance on imported fossil fuels. The National Energy Efficiency Action Plan (approved by the Slovakian Government in the resolution No. 576/2007 in July 2007) includes detailed measures that are integrated across different sectors.[lxxiv]

High dependence on imported oil, natural gas, and coal has raised concerns on the security of energy sourcing in the future. Therefore the increased use of renewable energy sources is meant to enhance future independency. In the Directive 2009/28/EC, the commission has set the target of 14 per cent share of energy from renewable sources in gross final energy consumption to be reached by the Slovak Republic in 2020. The renewables roadmap for 2015 in the Strategy of Higher Utilization of RES in the Slovak Republic, which was approved by the government in April 2007, indicates that wind is expected to account for half of the increase in energy production. Feed-in tariffs and targeted subsidies are in place.

General situation in Slovenia

Slovenia has a population of approximately 2 million. The country is divided in more than 210 municipalities.

The energy system of Slovenia is based in part on its geographical location at the crossroads of gas and power markets in Southern and Eastern Europe; the confluence of energy markets contributes to a high level of regional electricity trade and increasing imports of gas. Its domestically available primary energy resources include nuclear power, lignite and a significant potential supply of biomass, since more than half of the country is covered by forests. In addition to biomass, support is provided to a variety of renewable energy sources, including small hydro, geothermal, solar thermal, wind, and solar photovoltaic.

The energy intensity of GDP at Purchasing Power Parities for Slovenia in 2007 was 0,16 kgoe/USD of 2000. It has been decreasing steadily during the past ten years. The indicative target for energy efficiency is a nine per cent reduction during 2008-2016. The measures cover all the different aspects associated with energy efficiency and conservation - product standards, buildings performance, energy management systems, information measures, and a variety of cross-cutting measures.[lxxv]

In Slovenia the only notable renewable energy source is Hydro Power, which amounts to approximately 22 per cent of Slovenia’s gross electric power generation in 2006.

Barriers in the Origin Countries

One of the main barriers towards the realization of energy efficiency potentials in the origin countries is the fact that small- and medium-sized municipalities have traditionally found it difficult to obtain medium- and long-term financing through commercial banks. Even if commercial banks offer this kind of loans, the interest rates for municipalities are normally on a very high level. This derives from factors that relate to financial markets and from the rather low level of experience of commercial banks in most origin countries in financing energy efficiency projects. Therefore energy efficiency projects are – despite the availability of credit lines from governments and international financing institutions – still considered to be more complex and therefore riskier than

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lxxiii Renewable Energy Policy Review – Slovak Republic - EREC (2009)
lxxiv Slovak, Energy Efficiency Action Plan - (2006/32/EC) (2007)
lxxv National Energy Efficiency Action Plan 2008–2016 – Gov. of Slovenia (2008)

other loans. Therefore small- and medium-sized municipalities depend heavily upon central government funding for infrastructure investments and energy efficiency projects.

On the other side, small- and medium-sized municipalities are often not well informed about existing financing programmes and available credit opportunities. Furthermore, the lack of expertise in the preparation of bankable project proposals increases the inhibition threshold to go through the whole financing process.

16.11.2. Description of the Case Study

This Case study refers to the Municipal Finance Facility initiative of the European Bank for Reconstruction and Development and the European Commission to develop and stimulate commercial bank lending to small and medium sized municipalities and their utility companies.[lxxvi] The Programme was established for the banking sector in the EU Accession countries that joined the EU in 2004. This includes Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic and Slovenia. The facility offers EBRD finance in the form of long-term loans, credit risk sharing and a maturity enhancement fee. The latter should encourage longer-term lending and is paid on a good faith basis at a rate depending on the tenor of the loan. Besides the financial support, the programme offers support in the form of technical cooperation for partner banks (mainly to improve their capacity to appraise municipal infrastructure projects, assess risks and manage portfolios) and municipalities (mainly to improve their capacities in project preparation, loan application and project implementation). After the first disclosure of the programme in 2002, it provided support for financing of infrastructure projects (water supply, public transports, roads, sewerage and waste). In 2008, the programme was extended and since then includes the support of financing of energy efficiency projects. The programme has the potential to eliminate the commercial banking sector's entry-risk and thus catalyzes municipal credit market development.

Key objective of the initiative is to stimulate the willingness of banks to lend to small- and medium-sized municipalities which have limited access to funding. To achieve this objective, the EBRD helps banks to assess risks of small- and medium-sized municipalities and to manage their loans in the sector by providing short-term technical cooperation and assisting in the training of personnel or the creation of a specialized municipal financing units. Furthermore the programme assists small- and medium-sized municipalities to prepare and implement feasible and financially sound infrastructure and energy efficiency investments by making municipal finance and engineering experts available.

16.11.3. Approach for implementation of the Case Study

The programme Municipal Finance Facility was first introduced in 2002 by the EBRD and the European Commission. Until 2008 the programme's ambition was the improvement of financing conditions for infrastructure projects (such as water supply, public transports, roads, sewerage or waste) of small- and medium-sized municipalities. In 2008 the EBRD and the European Commission decided to expand the framework of supported projects. Since then the programme – besides the infrastructure projects – supports energy efficiency investments by small- and medium-sized municipalities. This upgrade was conducted in order to improve the levels of overall energy efficiency in the origin countries.

The initial introduction of the programme was motivated by the fact that small- and medium-sized municipalities have traditionally found it difficult to obtain medium- and long-term financing for this kind of projects. The programme therefore addresses the two main reasons for the limited access to financing for small- and medium-sized municipalities: Firstly the weak financial capacities of the local banking sector and secondly the difficult risk assessment due to technical reasons.

Therefore the programme measures can be divided in two subprogrammes: the first group of measures includes EBRD credit lines and financial support in the form of long-term loans, credit risk sharing and maturity enhancement fees. These instruments have in common that they aim at an improvement of the financial capacity of local banks to lend to smaller municipalities. To achieve this effect the instruments are directly addressing the factors risk and maturity. The loans for partner banks have a maturity of at least ten years and partner banks have to make loans available to small- and medium-sized municipalities with a maturity of at least five years. The same issue is addressed by the maturity enhancement fee that should improve the chances for municipalities to rollover a loan. The risk factor is addressed by the chance for partner banks to

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[lxxvi] Project summary „Municipal finance facility" (http://www.ebrd.com)

limit the risk on a portfolio of loans so small- and medium-sized municipalities. The EBRD provides up to 35 per cent risk-sharing on these portfolios.

The second group of measures includes operational support for both banks and municipalities. For partner banks short-term technical cooperation is provided in order to improve their capacity to appraise municipal infrastructure projects, assess risks and manage portfolios. Furthermore banks can benefit from the expertise of EBRD municipal finance experts. For small- and medium-sized municipalities experts of the EBRD provide support not only for the whole project process (including preparation, loan application and implementation) but also for comprehensive issues such as creditworthiness.

Instruments

In order to reach these objectives, the project provides loans and risk-sharing facilities to partner banks in the origin countries for lending to small municipalities and utility companies. The different instruments of the facility are the following:

- The EBRD provides up to 75 million EUR in long-term lines of credit from 10 to 15 years to partner banks for on-lending to small- and medium-sized municipalities in EUR or local currency. Loan amounts are 10 to 20 million EUR per bank. Pricing reflects the credit risk of the partner bank. Partner banks make loans up to five million EUR with a maturity of 5 to 15 years available to small- and medium-sized municipalities for investment in infrastructure;
- The EBRD provides up to 25 million EUR for risk sharing on up to 35 per cent of the partner bank's risk on a portfolio of loans to small- and medium-sized municipalities. The EBRD's support acts like a guarantee, and the EBRD will provide funding only in the event that a municipal loan defaults. The EBRD receives a pro rata share of the margin for the portion of the loan made by the partner bank. This reflects the risk the EBRD is taking. The EBRD pays an agency fee to the partner bank to off-set loan processing costs;
- To encourage longer-term lending, the EU provides a maturity enhancement fee to partner banks. The fee is paid on a good faith basis at a rate depending on the tenor of the loan. In the event of loan cancellation, prepayment or default within five years, partner banks are required to repay the fee in full.

Except the financial facilities, in the programme technical cooperation for partner banks and Small- and medium-sized municipalities is provided:

- For banks, the EU PHARE funds[lxxvii] provide short-term technical cooperation to banks to upgrade their capacity to appraise municipal infrastructure projects, assess risks and manage portfolios. The EBRD makes municipal finance experts available to partner banks if requested to help establish specialized municipal finance units and to assist in developing lending practices of partner banks to the sector. This can include training of loan officers and credit personnel and preparing/adapting lending manuals;
- For small- and medium-sized municipalities, the EU funds provide support for project preparation, loan application and project implementation by small- and medium-sized municipalities. In addition, technical cooperation may include creditworthiness support, support for tariff changes or support to revenue enhancement and cost control in utility companies. Support for project preparation is only available upon confirmation by the partner bank to the EBRD that it has initiated due diligence and is considering financing a project. Implementation support is only provided in relation to local loans financed.

Selection criteria

In order to identify adequate projects and to give banks and municipalities a guideline, the EBRD has defined selection criteria for both partner banks and municipalities:

- Banks should have a high degree of creditworthiness and demonstrated commitment to extend long-term financing to small- and medium-sized municipalities and to promote the facility to them. The banks need to have acceptable standards of procedure for the appraisal

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[lxxvii] Council Regulation (EEC) No. 3906/89 on economic aid to certain countries of Central and Eastern Europe (1989)

of municipal credit. They need to show willingness to co-operate with the EBRD regarding technical cooperation support and willingness to provide visibility for the EU through means such as press conferences and featuring the EU logo in marketing materials and public events. Environmental due diligence on proposed investments has to be carried out by the partner bank. Furthermore, partner banks are required to monitor that procurement is carried out on the basis of:

- Works contracts below five million EUR: National procurement regulations, but no domestic preference should be applied;
- Works contracts above five million EUR: EBRD open tender procedures;
- Goods contracts below 200,000 EUR: National procurement regulations, but no domestic preference should be applied;
- Goods contracts above 200,000 EUR: EBRD open tender procedures; Services contracts above 200,000 EUR: EBRD public procurement procedures.

• Municipalities should serve a population of under 100,000 people. Investments can be in energy efficiency or infrastructure sectors such as local transport, district heating, water supply, sewerage, solid waste management, public roads and parking. For the investments it is necessary that they comply with national and EU environmental standards.

16.11.4. Impact of case study implementation

As of the end of June 2009, 42 sub projects for a total financed amount of 41 million EUR have been approved by five partner banks under the Municipal Finance Facility. The average sub-project size is just over 976,000 EUR. The average population of the beneficiary municipality is approximately 29,000, demonstrating that the programme is achieving its objective of improving the provision of financing to smaller municipalities. In addition, the average maturity of approved sub projects is 12.7 years, with the average for new projects signed in 2009 standing at 11.73 years. 57 per cent of sub-loans are provided for ten years or more, showing that the objective of providing longer tenor financing to small- and medium-sized municipalities to match their investment needs is also being achieved. This is particularly impressive in the context of the financial crisis when longer term funding for the partner banks is very scarce. The sub-project portfolio is well diversified across the eligible sectors, including rehabilitation of public roads, lighting, sewerage and water supply, district heating and social infrastructure as indicated in the graph below. The emergence of social infrastructure and sports/recreation sub projects as a sizeable portion of the portfolio (>15 per cent of sub-project cost) demonstrates a progression of focus of municipalities towards improving living standards, since basic services (water, sewerage, lighting etc) are already reaching an acceptable standard in the more advanced accession countries. As energy efficiency projects have just been added in the range of supported projects, there has only been one project approved so far.

In general, the beneficial impacts of the case study can be grouped as followed:

- Market formation: small municipalities have access to long-term funding which enables them to implement infrastructure investments, including energy efficiency investments; this in turn pushes the development of a market for project services and project implementation, with subsequent benefits for the local economy and employment;
- Capacity building: through the technical cooperation programmes, the project increases the level of know-how of both the partner banks and the small municipalities;
- Demonstration effect towards other banks: the lending and extending loan maturities of the partner banks to small municipalities has a demonstration effect in promoting similar lending by other commercial banks outside the facility;
- Demonstration effect among energy consumers: benefits of rational energy usage and raised energy efficiency awareness both in the public and private sector.

16.11.5. Cost for implementation

The total project costs are 90 million EUR in the form of credit lines and/or risk sharing facilities. As of the end of June 2009, 42 sub projects for a total financed amount of 41 million EUR have been approved by five partner banks under the Municipal Finance Facility.

16.11.6. Regulatory preconditions

The most important regulations that are beneficial for a successful implementation of the Case Study relate to the regulatory status of the municipalities:

- The most important prerequisite for successful implementation is the provision of a regulatory status to municipalities that will allow them to act as a legal entity that can pursue an individual investment strategy: this implies that they should have sufficient autonomy in their budget formation process, they should possess enough statutory competences to select, approve and implement an investment programme and they should be allowed to take loans and carry the related risks;
- Municipalities must have the organization and the professional capacity necessary to conduct the whole investment process (from project preparation to loan application and project implementation up to monitoring and evaluating the financial success of the investment);

Municipalities should have sufficient financial incentives to be motivated to take an investment decision, i.e. should necessarily be the direct beneficiaries of the financial return on investment from the investment programme

16.11.7. Critical success factors

The following key success factors contribute to the successful implementation of the Case Study and consequently to the enhancement of the long-term funding access for municipal infrastructure and energy efficiency investments:

- For partner banks it is important to have the ability to make more precise risk assessments of infrastructure and energy efficiency investments. In the past, one of the main reasons for the restrained granting of loans to small- and medium-sized municipalities was the lack of capabilities of a professional risk assessment. Therefore it is important that partner banks not only utilize the financial support of the EBRD but also show willingness to co-operate with the EBRD regarding technical cooperation support. In the long-term the partner banks must build the institutional capacity in municipal finance, in particular with respect to energy efficiency.
- Furthermore, partner banks need to have acceptable standards of procedure for the appraisal of municipal credit. For a comprehensive success of the Municipal Finance Facility in the origin countries it is important that partner banks demonstrate commitment to extend long-term financing and to proactively promote the facility to the municipalities. They also need to show the willingness to provide visibility for the EU through means such as press conferences and featuring the EU logo in marketing materials and public events. Furthermore, partner banks are required to monitor the procurement on the predefined basis.

For small- and medium-sized municipalities in general, it is important to develop a distinct entrepreneurial attitude. Specifically this implies a capacity for professional risk management and controlling. In order to achieve better risk ratings municipalities need to have a sound financial documentation of the individual planned investment and the overall investment strategy. Therefore small- and medium-sized municipalities must show the willingness to accept the support of the EBRD for project preparation, loan application and project implementation. Furthermore, a majority of small- and medium-sized municipalities must improve their creditworthiness and be opened towards the EBRD programmes that aim at an enhancement of creditworthiness.

16.11.8. Risks

The following possible factors may represent a risk to the successful implementation of the Case Study:

- Partner banks are not acting in compliance with the requirements of the Municipal Finance Facility and use the provided loans by the EBRD for projects and/or municipalities that are actually not supported by the programme;
- Small- and medium-sized municipalities are not acting in compliance with the programmes requirements and for example do not apply a professional procurement process for the

projects. Furthermore a lack of sound risk management and project controlling could increase the risks of financial failure;

- The failure of projects could decrease the confidence of commercial banks and municipalities in similar initiatives;
- As a consequence of the need for extensive partner counseling, the success of the Municipal Finance Facility also depends on the successful implementation of a network of local intermediaries such as surveyors or Energy Service Companies. These partners must be trustworthy and competent otherwise the provided capital by the EBRD could be misdirected;
- Promotion campaigns are not placed well enough and potential partner banks are not informed about the chances of the Municipal Finance Facility.

16.11.9. Conclusion and recommendations for replication

This Case study refers to the Municipal Finance Facility initiative of the European Bank for Reconstruction and Development and the European Commission to develop and stimulate commercial bank lending to small and medium sized municipalities and their utility companies. As the mechanisms of this programme aim at resolving a grievance that exist not only in the programme origin countries but other countries as well, municipalities in these countries could benefit from an implementation of this programme.

Recommendations for replication in Kazakhstan

General situation in Kazakhstan

Kazakhstan is the second largest producer of oil and coal among the Commonwealth of Independent States countries after the Russian Federation. Kazakhstan has considerable reserves of oil and gas and is a net energy exporter. Fossil fuels cover almost 100 per cent of the country's energy mix.

On the demand side, the industry sector is the largest consumer of primary energy with a share of 60 per cent of the total consumption of electricity generation (14 per cent residential sector and 13 per cent agriculture sector).

Hydro is the only renewable energy source significantly utilized in Kazakhstan, contributing to 11 per cent of the total electricity generation. The market for new renewable energy sources is still in an early stage.

Kazakhstan has a very energy intensive industrial sector. This is one of the reasons for the high level of energy intensity. Although the energy intensity of the GDP at Purchasing Power Parity for Kazakhstan decreased by 50 per cent since 1997, it was in 2007 (0.430 kgoe/USD of 2005 at PPP) still almost triple the EU-27 (0.150 kgoe/USD of 2005 at PPP) average. There is no Energy Service Company in operation in Kazakhstan, besides the Almaty City Energy Service Company to be established within the UNDP/GEF project Removing barriers to energy efficiency in the municipal heat and hot water supply.

Barriers in Kazakhstan

Regulations on energy efficiency have never been set in force so far and there are neither targets, nor an action plan for the near future. In addition, the inefficient infrastructure from the former fuel and energy complex hinders the rational use of the resources.

Although Kazakhstan recently introduced feed-in-tariffs, the government still has to improve the transparency and the degree of reliance of these tariffs in order to eliminate economic barriers for investments in energy efficiency.

The huge availability of fossil fuels has so far prevented the development of public awareness for energy efficiency and renewable energy sources.

Recommendations for Kazakhstan

The following steps should be carried out for successful replication of the Case Study:

- The Government of Kazakhstan under the leadership of the Committee of Governmental Energetic Surveillance in cooperation with an international donor such as the European Bank for Reconstruction and Development should contract a consultant assisting with the design, launch and successful operation of the facility, as well as the marketing of the facility, the definition of technical eligibility criteria and the appraisal of sub projects against a set of criteria.

- The Government of Kazakhstan should establish the dedicated Municipal Finance Facility with the support of an international donor.

- The Government of Kazakhstan in cooperation with above mentioned consultant and the international donor should select suitable participating banks. This step involves the identification of suitable banks and the negotiation of criteria for participation until conclusion of a contract.

- Participating banks require capacity building on the identification and evaluation of eligible project opportunities. This capacity building is the task of above mentioned consultant.

- The international donor in cooperation with the participating bank promotes the Fund according to the marketing concept elaborated by the consultant.

- Simultaneously with the marketing campaign, the consultant will start with the identification and screening of suitable projects. The consultant will prepare energy audits and rational energy utilization plans applicable for every sub-project. The consultant will support the banks in evaluating suitable project as well as municipalities in preparing bankable projects.

- The performance of the Municipal Finance Facility and its sub projects should be monitored on a regular basis to ensure that the objectives of the Fund are met by checking and confirming that sub projects have been completed in accordance with the relevant invest plans and are on track to achieve the planned energy savings. Monitoring should be performed by an independent Ex-post Monitoring Consultant to be contracted.

Recommendations for replication in the Republic of Moldova

General situation in the Republic of Moldova

The Republic of Moldova has no reserves of coal and gas and only small domestic reserves of crude oil. This has led to a high dependency on energy imports with import levels of 97 per cent of total consumption.

The deployment of renewable energy resources is still on a very low level, with hydro (two per cent of electricity generation) and biomass (less than two per cent of electricity generation) being the only two relevant sources.

Although the final energy consumption decreased by 77 per cent between 1990 and 2005, the energy intensity of GDP at Purchasing Power Parities in 2007 (0.350 kgoe/USD of 2005 at PPP) is still significantly higher than the EU-27 average (0.150 kgoe/USD of 2005 at PPP). The most significant aspects of energy efficiency policy have mainly been defined in the National Programme of Energy Conservation for 2003-2010. This programme is guiding government actions in pursuing energy efficiency of the economy and sets out targets for efficiency improvements. The programme aims at minimizing energy intensity by 2-3 per cent annually. Secondary legislation elements are under development and will play a crucial role in supporting the implementation of energy conservation policy.

Barriers in the Republic of Moldova

The absence of public tendering processes for private project developers is one major administrative barrier for the development of energy efficiency projects. Furthermore, the excessive fragmentation of land ownership and the fact that the national agency for energy efficiency has still not been established represent barriers. The lack of financing limits the demand for energy services and no real ESCO has been created so far.

One of the main financial barriers is the lack of national or municipal funds for the development of renewable energy and energy efficiency projects. Other relevant barriers are the high level of commercial interest rates for private enterprises and the lack of transparency regarding the feed-in-tariff methodology for renewable electricity.

The Lack of awareness on the part of commercial banks and municipalities regarding the economic potential of energy efficiency projects leads to restrained interest in investments.

Recommendations for the Republic of Moldova

In 1999 the Moldova Social Investment Fund (MSIF) was created with the support of the World Bank aiming at empowering poor communities and their institutions to manage their priority development needs providing grant financing and capacity building. Among others, micro projects such as heating systems maintenance in public buildings have been funded.

Thus, based on the experience gained in the framework of the implementation of MSIF, the Government of the Republic of Moldova should implement Municipal Financing Facility dedicated to energy efficiency and renewable energy projects in municipalities.

The following steps should be carried out for successful replication of the Case Study:

- The Government of the Republic of Moldova in cooperation with an international donor should contract a consultant assisting with the design, launch and successful operation of the Facility, as well as the marketing of the facility, the definition of technical eligibility criteria and the appraisal of sub projects against a set of criteria.

- The Government of the Republic of Moldova should establish the dedicated Municipal Finance Facility with the support of an international donor.

- The Government of the Republic of Moldova in cooperation with above mentioned consultant and the international donor should select suitable participating banks. This step involves the identification of banks and the negotiation of criteria for participation until conclusion of a contract.

- Participating banks require capacity building on the identification and evaluation of eligible project opportunities. This capacity building is the task of above mentioned consultant. Experience from the MSIF should be used in preparation of the training modules.

- The international donor in cooperation with the participating bank promotes the Fund according to the marketing concept elaborated by the consultant.

- Simultaneously with the marketing campaign, the consultant will start with the identification and screening of suitable project. Close cooperation with MSIF is highly recommended to use experience from MSIF. The consultant will prepare energy audits and rational energy utilization plans applicable for every sub-project. The consultant will support the banks in evaluating suitable project as well as municipalities in preparing bankable projects.

- The performance of the Municipal Finance Facility and its sub project should be monitored on a regular basis to ensure that the objectives of the Fund are met by checking and confirming that sub projects have been completed in accordance with the relevant invest plans and are on track to achieve the planned energy savings. Monitoring should be performed by an independent ex-post monitoring consultant to be contracted.

Recommendations for replication in Romania

General situation in Romania

The demand for imported energy resources is expected to increase from 38 per cent in 2006 to 50 per cent in 2015. Romania's overall energy supply is well diversified, using the complete range of fossil fuels. Romania has own fossil fuel and hydroelectric resources.

On the demand side the strong demand of electricity in the industry sector (59 per cent) demonstrates an energy intense industrial activity, especially in automotive and machine manufacturing.

Hydro power accounts for 29 per cent of the total electricity generation of Romania and is currently the only renewable source significantly utilized. As several major wind power plans are either planned or under construction, the significance of wind power generation will increase in the future.

The energy intensity of GDP at Purchasing Power Parities for Romania in 2007 (0.180 kgoe/USD of 2005 at PPP) is around 20 per cent higher than the EU-27 average (0.150 kgoe/USD of 2005 at PPP). Since 1997 the energy intensity of GDP decreased by 40 per cent. The fact that there are already three Energy Service Companies operating in Romania indicates that there is an understanding of the economic potential that energy efficiency measures contain. The Romanian Agency for Energy Conservation (ARCE) started several awareness-raising actions in order to present the importance and the role of third-party-financing in the field of energy efficiency investments.

Barriers in Romania

With the adaptation of feed-in-tariffs and the green certificate scheme, there are no major economic and financial barriers to the development of energy efficiency and renewable energy investments. Only at the municipal level, the availability of co-financing on a non-guaranteed basis remains uncertain.

Despite of the existence of dedicated energy agencies and energy service companies, the level of activity outside existing support schemes remains low. This suggests a lack of capacity to fully develop bankable project proposals.

Recommendations for Romania

Romania has experience with funding energy efficiency projects since 2004. The Romanian Energy Efficiency Fund (FREE) started to work effectively in 2004. In January 2008 the EBRD launched its first ever credit facility to finance energy efficiency projects by private industrial companies in Romania under the EU/EBRD Energy Efficiency Facility. Gained country specific experience should be used when designing and implementing the Municipal Finance Facility. Thus, the Government of Romania in close cooperation with the fund managers of the FREE and the EBRD Credit Line should carry out the following steps for successful replication of the Case Study:

- The Government of the Romania in cooperation with an international donor should contract a consultant assisting with the design, launch and successful operation of the Facility, as well as the marketing of the facility, the definition of technical eligibility criteria and the appraisal of sub projects against a set of criteria.

- The Government of the Romania should establish the dedicated Municipal Finance Facility with the support of an international donor.

- The Government of the Romania in cooperation with above mentioned consultant and the international donor should select suitable participating banks. This step involves the identification of banks and the negotiation of criteria for participation until conclusion of a contract. Banks participating in FREE and the EU/EBRD Energy Efficiency Facility could be potentially interested candidates.

- Participating banks require capacity building on the identification and evaluation of eligible project opportunities. This capacity building is the task of above mentioned consultant. Experience from FREE and EU/EBRD Energy Efficiency Facility should be used in preparation of the training modules.

- The international donor in cooperation with the participating bank promotes the Fund according to the marketing concept elaborated by the consultant.

- Simultaneously with the marketing campaign, the consultant will start with the identification and screening of suitable project. The consultant will prepare energy audits and rational energy utilization plans applicable for every sub project. The consultant will support the banks in evaluating suitable project as well as municipalities in preparing bankable projects.

- The performance of the Municipal Finance Facility and its sub project should be monitored on a regular basis to ensure that the objectives of the Fund are met by checking and confirming that sub projects have been completed in accordance with the relevant invest plans and are on track to achieve the planned energy savings. Monitoring should be performed by an independent ex-post monitoring consultant to be contracted.

16.12. *Forest Resources and Technology Project (FOREST) – Case Study Russian Federation (recommendations for replication in Albania, Romania and the former Yugoslav Republic of Macedonia)*

Box 24: Forest Resources and Technology Project

One of the main barriers towards the realization of the energy potential of biomass in the origin countries is the lack of experience with biomass energy systems combined with the lack of sustainable forestry management. Promoting clean biomass energy strengthens the wood processing sector - the target group of this Case Study - while protecting the value of the resource as well as the environment.

This Case Study refers to the Forest Resources and Technology Project (FOREST) initiative of USAID addressing issues threatening the forest ecosystem while balancing the forest industry's important role in Russia's economy and promoting the sustainable energetic use of biomass. The FOREST Project was implemented from July 2000 to July 2005 plus a 10-month contractual extension in Far East Russia and Siberia. Initially the major goals of the project were to reduce the threat of global climate change and preserve biodiversity by promoting sustainable forest management and preserving Russian forests as a globally important carbon sink. The project adapted to a changing environment and the goal shifted to improving economic development through improving natural resource management, comprising the sustainable use of wood resources as energy source. As a result, the FOREST project is exploring and promoting the use of wood waste as a source of energy for wood processing industry and for communities off the electrical grid.

The Case Study is recommended for replication in Albania, Romania and the former Yugoslav Republic of Macedonia, since those countries have a large potential for energy use of biomass both in households and large scale power plants. However, lack of forestry management coupled with extensive cut as well as inefficient use of biomass for energy has led to significant deforestation in the past, with potential long-term impact on climate change.

16.12.1. General description

General situation in the Russian Federation

The Russian Federation is the world's largest exporter of natural gas, the second largest oil exporter and the third largest energy consumer. Due to large domestic production of crude oil, gas, petroleum products and coal, the Russian Federation generates an energy export surplus of 78.5 per cent. Primary energy supply is dominated by gas and crude oil, with shares of 43 per cent and 39 per cent respectively.

The Russian Federation also holds 22 per cent of the worlds' forests and 21 per cent of the world's standing timber. In 2004, the forestry sector accounted for approximately 248 billion Rubles in GDP for the Russian Federation, forestry accounts for 27 per cent of employment in Siberia and over 30 per cent in the Russian Far East, and holds 30 per cent of the exports from both of these regions.

Experience with biomass energy systems in the Russian Federation is limited. According to the EnCharter PEEREA report, the share of heat generation from renewable energy sources in 2004 amounted to around five per cent (a third of which originated from small biomass boilers). If considering large scale heat production only, biomass and waste account for around two per cent of total generation. Installed capacity of biomass fuelled power plants amounts to 1,412 MW in 2005.

According to the Federal Programme Use of renewable sources for energy for raising energy efficiency electric power industry the total federal investments in renewable energy sources in 2009-2012 will amount to RUB 1,407 billion of which RUB 229 billion dedicated to biomass, biogas, coal deposit gas and industrial waste gas.

Barriers in the Russian Federation

One of the major barriers towards increased energetic use of biomass is limited experience. During the Soviet period, the central government subsidized the supply of fossil fuels, providing little incentive for industry to use biomass residues as fuel. Local banks lack expertise in financing biomass energy projects. Consultants lack capacities to develop bankable project proposals. Wood processing industry – the main target group of the FOREST Project – lacks knowhow on the economic benefits of biomass energy and understanding of biomass energy systems. Equipment manufacturers need knowhow to improve designs and performance.

Case Study

This Case Study refers to the Forest Resources and Technology Project (FOREST) initiative of USAID, addressing issues threatening the forest ecosystem while balancing the forest industry's important role in the economy of the Russian Federation and promoting the sustainable energetic use of biomass.

The FOREST Project was implemented from July 2000 to July 2005 plus a 10-month contractual extension (FOREST II) in the Russia Far East and Siberia. Initially, the major goals of the project were to reduce the threat of global climate change and preserve biodiversity by promoting sustainable forest management and preserving Russian forests as a globally important carbon sink and critical habitat for rare and endangered species. The project adapted to a changing environment and the goal shifted to improving economic development through improving natural resource management, comprising the sustainable energetic use of wood resources. As a result, the FOREST project is exploring and promoting the use of wood waste as a source of energy for wood processing industry and for communities off the electrical grid.

The FOREST Project focused on four technical components: forest fire prevention, pest management, non-timber forest products and secondary wood processing, and renewable energy alternatives/biomass. In addition to the four primary components, three crosscutting components (forest policy and legal reform; applied forestry research; and a grant/loan programme in the area of increasing value-added processing of forest products) supported the technical components.

The programme worked in five main regions - Khabarovsk, Sakhalin, Primorye, Irkutsk, and Krasnoyarsk. By the end of the project, activities extended to Khakhassia, Tomsk and several programmes were adopted at the federal level.

The Case Study will focus on the component "Renewable Energy Alternatives/Biomass" aiming at the installation of at least 50 MW (thermal capacity) wood waste-fueled biomass systems by the end of the FOREST Project. In addition, at least one biomass facility would be commercially tested and in full operation by the end of the Project and available to demonstrate the viability of biomass systems in the region. FOREST also aims to increase Russian expertise so that similar biomass energy projects could be replicated in the future once the Project ended.

16.12.2. Approach of the Case Study

Since 2000, the FOREST Project's biomass energy activities have supported national objectives to increase sustainable cost-efficient and reliable energy supply and strengthen the forest products industry.

Primary aims of the "Renewable Energy Alternatives/Biomass" component were

- to evaluate the opportunities for biomass energy systems in the forest products industry;
- show that the utilization of wood-processing by-products – commonly viewed as a waste disposal problem – could enable wood processing companies to reduce waste management costs, replace purchased fuel and electricity with self-generation, and provide reliable energy supplies while reducing the cost of processing facilities and providing local employment opportunities.

Biomass energy use in the five FOREST target regions – Khabarovsk, Sakhalin, Primorye, Irkutsk, and Krasnoyarsk – was promoted by the implementation of the following measures outlined in detail below:

- Assisting in the design, construction and operation of biomass facilities;
- Raising expertise in biomass energy in the region;
- Catalyzing investments in biomass facilities;

- Establishing partnership between Russian manufacturers and forestry companies;
- Civil society strengthening;
- Information dissemination.

Assisting in the design, construction and operation of biomass facilities

Russian and foreign consultants specialized in the engineering and construction of biomass-fired small-scale cogeneration plants provided focused technical and financial assistance in the form of technical evaluations and design recommendations to advance specific projects.

FOREST consultants and volunteers, both Russian and international, helped partner companies prepare bid packages to negotiate better prices from Russian and international equipment suppliers. During the construction and commissioning of the biomass energy systems, Russian and foreign experts assisted partner companies in conducting acceptance tests and in the preparation of operation and maintenance procedures.

Raising expertise in biomass energy in the region

The FOREST consultants conducted design review sessions for partner companies. Bringing together technical specialists to identify key issues and prepare technical reviews for each facility benefits all participants, raises expertise in the region, and reduces the risk of project failure. The design review sessions brought Russian consultants, design firms, company technical personnel, potential equipment suppliers, and foreign experts together to address how to overcome specific technical design problems in installing biomass projects. During the design review sessions, international biomass experts shared experience with design features using biomass fuels to achieve improved performance, increased reliability, and simplified operation and maintenance. These sessions were instrumental in moving biomass energy projects forward and in expanding the skills of Russian specialists in the region through cooperation and collaboration among companies.

FOREST also conducted both regional and international study tours. For instance, partner companies visited Igirma-Tairiku (Irkutsk Oblast), which received FOREST assistance to modify its two boilers, the first of its kind in the region to be able to efficiently burn bark. These modified boilers served as a model for other companies in the region interested in installing similar biomass energy facilities.

FOREST also conducted an international two-week study tour for more focused review of the technical status of biomass energy systems within the forest products industry.

Catalyzing investments in biomass facilities

From the beginning, the FOREST Project included bank representatives in design meetings and training seminars so they could become familiar with costs and revenues associated with bioenergy investments including the critical importance of managing energy costs to achieve overall financial performance. The FOREST Project worked alongside local banks and Russian consultants to improve their ability to conduct due diligence of small companies planning to install dry kilns with biomass energy systems.

Establishing partnership between Russian and U.S. manufacturers and forestry companies

FOREST sought to identify and introduce new approaches for improving and modifying the sale and service of Russian biomass energy equipment. FOREST established a targeted financial assistance programme to encourage Russian manufacturers and project companies in the Russian Far East and Siberia to partner to develop biomass energy systems. For instance, FOREST provided assistance to Russian partner companies in developing bid packages to negotiate equipment prices with Russian or international suppliers (especially from the USA) in potential commercial partnerships.

Awareness raising for communities

One of the largest municipal expenses in the Russian Far East and Siberia is the cost of meeting heat and power needs of remote communities. FOREST recognized that biomass energy systems could meet heat and power demand of remote communities in forest areas at significantly lower costs than systems based on purchased fossil fuels. However, municipal governments lacked the financial means to invest in such systems. Consequently, FOREST focused initial efforts to develop operating examples with private companies that had the financial means to invest.

FOREST convened a civil society workshop of regional and international government representatives and experts to discuss relevant technical, institutional, economic, social, and political needs of providing heat and power to remote settlements in Siberia and the Russian Far East. As a result of the workshop, interest in identifying and developing plans for pilot projects among local and regional governments in the Russian Far East and Siberia increased.

Information Dissemination

FOREST prepared fact sheets and case studies to document the financial and economic benefits of biomass energy projects implemented under the project for dissemination. Data on revenues, jobs, and economic benefits from investment was also collected and discussed with potential partner companies. This data was incorporated into the component's economic models, taking into consideration sensitivity analyses and risk management.

FOREST increased awareness in the region of biomass energy activities through the internet, mass media, publications, members of the Working Group and the Advisory Council. The approach to information dissemination and other outreach continues to generate requests from companies in the region for partnerships.

16.12.3. Impact of case study implementation

The FOREST project successfully demonstrated that biomass energy is a viable, cost-effective alternative for energy supply in the Russian Far East and Siberia:

- FOREST assisted its 19 partners companies in the design, construction, and testing of biomass systems. By the end of the FOREST Project in July 2005, the total amount of MW_{th} under construction or completed have exceeded the target indicator of 50 MW_{th} by 12.5 MW_{th}.

  Since 2020, FOREST partner companies invested USD 11.8 million in biomass energy facilities, with a return on earning of approximately USD 14.6 million.

- From 2000 to 2005, FOREST conducted a total of 73 training events in the form of site visits, focused technical assistance, design review sessions, assistance on bid documents and equipment procurement, performance of acceptance tests, and study tours (both regional and international).

  About 750 specialists, designers, boiler and dry kiln operators, steam engineers, managers, biomass facility manufacturers, and university and research and development specialists took part in the trainings.

- As a result of the civil society workshop, plans for pilot projects were identified and developed. Proposed sites are in Sakhalin (Parusnoye and Byuhukly settlements); Primorye (Plastun settlement); Khabarovsk Krai (Gorin settlement, Amursk and Sovgavan towns); Irkutsk Oblast (Novaya Igirma settlement, Svirsk town); and Krasnoyarski Krai (Taseevo settlement).

- The experience with biomass energy systems developed under the FOREST Project has been used to leverage additional international interest in the creation of mechanisms to help finance community heat and power plants. European funders and the World Bank are working with Winrock International to introduce new financial mechanisms based on potential revenues from the sale of reductions in greenhouse gas emissions that will result from conversion of district heating plants in Khabarovsk and Irkutsk from fossil fuels to biomass fuels.

16.12.4. Cost for implementation

Initiated in 2000, the FOREST Project is a six-year, USD 20 million initiative financed by USAID.

The project was implemented by Winrock International[lxxviii], in partnership with Chemonics[lxxix] and the Heron Group[lxxx].

16.12.5. Regulatory preconditions

For the successful implementation of the Case Study, the following factors are relevant:

- Drafting and approving new legislation as needed to activate the Forest Resources and Technology Project;
- Developing the necessary legal framework for fiscal and financial incentives to stimulate demand for biomass energy systems use in municipalities and wood processing industry;
- Co-ordination of associated government activities through purposeful appointment of competences and roles to involved national institution;
- Allocation of public funds for establishing programme monitoring.

16.12.6. Critical success factors

The following key success factors contribute to the successful implementation of the case study and consequently to the enhancement of sustainable energetic use of biomass resources:

- **Project Design:** Project design must be appropriate to meet the needs of each local and national setting. It is important to review the full range of sectoral and non-sectoral policies that can affect sustainable forest management and the energetic use of biomass resources, identify changes necessary to enable project success, and assess the feasibility of achieving the changes. Project sites must be selected giving priority to areas where the value of biological resources is high, where host government actions indicate a commitment to sustainable forest management and encourage the energetic use of biomass resources, and where significant local participation and opportunities for sustainable economic return from natural resources exist.
- **Costs and Benefits:** Promoting a sense of ownership by maximizing local responsibility and authority for the sustainable forest management and energetic use of its natural resources, as well as ensuring a fair distribution of both the costs and benefits, is essential for success. An assessment of costs and benefits of sustainable forest management in combination with energetic biomass use compared with other energy sources is necessary for planning appropriate interventions. Programmes must address the fact that local participants encounter costs associated with their involvement: funds are needed to buy materials and equipment, and labor.
- **Monitoring and Assessing Impact:** Monitoring is a critical element in evaluation the overall effectiveness of an Energy Wood Programme. Programmes need to establish benchmarks, monitor change and measure impact to determine if adjustments are needed.
- **Level of Commitment:** Such Energy Wood Programmes must budget sufficient time and resources to ensure an activity will be sustainable after funding supports ends, particularly where institutional capacity building and policy reforms are required. Also, community

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lxxviii Winrock International is a global nonprofit organization that addresses rural development and sustainable resource management; http://www.winrock.org/

lxxix Chemonics is an international development consulting firm; http://www.chemonics.com/

lxxx Heron Group, LLC, founded in 1998, is working in international consulting in forestry, agriculture, and natural resource management issues; http://www.herongroupllc.com/

programmes require considerable effort over a period of years to set up new structures, erode bureaucratic resistance, test technical approaches and strengthen existing groups.

16.12.7. Risks

The following possible factors may represent a risk to the successful implementation of the case study:

- Biomass energy systems are not yet perceived as a standard option for energy generation. Therefore, decision-makers must be specially motivated to implement planned actions;
- Investments in available technology exhibit high upfront costs and relatively long payback times, resulting in lack of confidence in the banking sector;
- New technology suffers from higher transaction costs (information, procurement, installation works) compared with conventional systems (default option);
- Target group suffers from low awareness about the economic (and environmental) benefits of biomass energy systems;
- Lack of availability of motivated and specifically skilled project developers;
- Information dissemination is not placed well enough and target group is not informed about the benefits of biomass energy systems.

16.12.8. Recommendations for implementation

This Case study refers to the Forest Resources and Technology (FOREST) Project initiative of USAID to explore and promote the use of wood waste as a source of energy for wood processing industry and for communities.

The Case Study contributes in removing barriers related to (1) lack of awareness about the benefits of biomass energy systems and (2) lack of human capacities to develop as well as finance biomass energy systems. Furthermore, it targets the further technological development of biomass energy systems. As this project initiatives aims at overcome barriers that exist not only in the Russian Federation but other countries as well, forest owners, wood processing industry, equipment supplier or design firms could benefit from the implementation of this project initiative.

Recommendations for replication in Albania

General situation in Albania

Albania is a net energy importer. Imports represent 47 per cent of the total primary energy supply. The large majority of primary energy sources consist of crude oil and derivate petroleum products, followed by hydro and biomass (mainly fuel wood), which accounts for approximately ten per cent (230 ktoe).

Total proven reserves of fuel wood are considered to be approximately six Mtoe. There are uncertainties about the real cutting rate for fuel woods but it is believed to be at a level of 0.25 – 0.35 Mtoe annually.[40]

The National Energy Strategy (2003) identifies the need to improve energy efficiency and enhance the use of renewable energy sources. The Albanian Government has set an ambitious target for increasing the share of renewable energy from about 30 per cent in 2005 to 40 per cent in 2020 focusing on hydropower, biomass and solar thermal.

Barriers in Albania

The Albanian government is currently developing a National Strategy for Renewable Energy Sources and a Law on Renewable Energy Sources[22].

Currently, support for electricity from renewable energy resources is limited to small hydropower. Three financing facilities initiated by the European Bank for Reconstruction and Development, namely the Local Enterprise Facility, the Small and Medium Enterprises Finance Facility and the Sustainable Energy Direct Financing Facility (section 11.1, Country Analysis Albania) provide support for renewable energy projects of small and medium enterprises in the region.

Despite the availability of financing instruments supporting biomass energy systems in communities and wood processing industry, market growth is limited, mainly due to cheap prices for electricity resulting in a substantial use of electricity for residential heating.

Since lack of awareness about the benefits of biomass as energy resource and limited experience are main barriers to the development of biomass energy systems in Albania, the situation resembles the one in the Russian Federation before the implementation of the Case Study. The concept of the Forest Resources and Technology (FOREST) Project helps to overcome these barriers.

Recommendations for Albania

The following steps are recommended for a successful replication of the Case Study:

- The Albanian Ministry of Environment, Forests and Water Administration in cooperation with the Ministry of Economy, Trade and Energy and the National Agency for Natural Resources should elaborate a tailor-made country specific project design. The Ministry might invite international consultants to perform this task.

  The project should comprise:

  - The identification of local partners such as ministries and governmental authorities, universities, forest research institutes, non-governmental organisations, local banks etc;
  - The identification of project companies (e.g. manufacturers, wood processing industry, design firms);
  - The analysis of the sectoral and non-sectoral policies affecting sustainable forest management and the energetic use of biomass resources;
  - The selection of project regions and sites for the realisation of pilot projects;
  - The elaboration of the project design and implementation concept including time table and performance indicators.

  The Albanian government might apply for co-financing from an international donor

- The Albanian Ministry of Environment, Forest and Water Administration should nominate or tender the implementing agency. Suitable national candidates could be the National Agency for Natural Resources or the National Energy Agency.
- The Albanian Ministry of Environment, Forests and Water Administration in cooperation with the implementing agency should install an advisory council. The purpose of the council is to help the implementing agency coordinate with on-going activities in the regions and the government and to engage the local administrations in the project. Members could be ministries, governmental authorities and agencies as well as key organisations in the forestry sector.
- In accordance with the Case Study implemented in the Russian Federation, the project should have the following key components:

  - Capacity building in the design, construction and operation of biomass facilities dedicated to manufacturing and engineering companies, design firms and companies in the wood processing industry.

    Albanian and foreign experts should provide technical evaluations and design recommendations for specific projects, assistance in the preparation of bid packages as well as in conducting acceptance tests and in the preparation of operation and maintenance procedures.

    Other activities could be the organization of regional and international study tours encouraging the knowhow exchange with international experts.

  - Finance capacity building catalyzing investments in biomass facilities dedicated to both local banks and project developers. The implementing agency should include bank representatives in design meetings and training seminars so they can become familiar with the economics of biomass energy projects. Project developers should receive training to improve their ability to conduct due diligences and prepare bankable reports.

- Information dissemination using local expertise and organization specialised in public relations and communication. The implementing agency should conduct information and education campaigns, roundtable discussions and seminars.

  The implementing agency should prepare fact sheets and case studies to document the financial and economic benefits of biomass energy projects.

  Media to be used for the information dissemination might comprise internet, mass media, publications, members of the Advisory Council.

  Dedicated workshops for municipalities are a key element to increase interest of municipalities in biomass energy systems and to mobilize communities in planning and decision making as well as building partnerships.

- Albanian Ministry of Environment, Forests and Water Administration in cooperation with the Ministry of Economy, Trade and Energy should perform a regular monitoring and impact assessment to evaluate the overall performance and effectiveness of project implementation.

Recommendations for replication in Romania

General situation in Romania

Romania is a net importer of energy. The demand of imported energy resources is expected to increase from 38 per cent in 2006 to 49-50 per cent in 2015. Biomass and organic waste account for around eight per cent of the total Romanian primary energy supply, most of it being used directly by households for heating purposes mainly in rural areas, without any intermediary heat generation process. In process heat production, only two per cent derive from renewable energy sources.

The renewable energy sources have an important untapped energy potential in Romania, which can be used at a local as well as national level. Biomass presents the highest potential with 7.6 Mtoe per year.

The Government Decision 1892/2004 introduced a quota system for new renewable energy sources for electricity production (green certificates). The EBRD/EU Romanian Energy Efficiency and Renewable Energy Credit Line as well as the Structural Funds (for further information see the country analysis of Romania) provides incentives for investments in renewable energy projects.

Barriers in Romania

Romania has done much in recent years to increase the share of renewable energy in energy supply. With green certificate scheme, dedicated credit lines and the Structural Fund, there are no major economic and financial barriers to the development of biomass energy projects in Romania. Only at the municipal level, the availability of co-financing on a non-guaranteed basis remains uncertain. These issues are particularly apparent in smaller rural municipalities which to date have not had the benefit of either international or local bank financing.

Furthermore, the relatively low activity in renewable energy outside existing support schemes, suggest that awareness and knowhow on the benefits of biomass energy systems is rather restricted.

Thus, a Forest Resources and Technology Project, as described in the Case study, could raise awareness and provide capacity building to increase the realization of biomass energy projects in wood processing industry and municipalities.

Recommendations for Romania

The following steps are recommended for a successful replication of the Case Study:

- Ministry of Economy and Finance with its responsibility for developing energy strategies and programme should elaborate a Forest Resources and Technology Project taking into consideration the specific framework conditions in Romania.

The project design should comprise:

- The identification of local partners such as ministries and governmental authorities, universities, forest research institutes, non-governmental organisations, local banks etc;
- The identification of project companies (e.g. manufacturers, wood processing industry, design firms);
- The analysis of the sectoral and non-sectoral policies affecting sustainable forest management and the energetic use of biomass resources;
- The selection of project regions and sites for the realisation of pilot projects;
- The elaboration of the project design and implementation concept including time table and performance indicators.

The Romanian government might apply for co-financing from an international donor such as the EBRD. The Ministry might invite international consultants to perform this task.

- The Romanian Ministry of Economy and Finance should nominate or tender the implementing agency. A suitable national candidate could be the National Forest Administration ROMSILVA.
- The Ministry of Economy and Finance in cooperation with the implementing agency should install an advisory council. Members could be ministries, governmental authorities and agencies as well as key organisations in the forestry sector.
- In accordance with the Case Study implemented in the Russian Federation, the project should have the following key components:
  - Capacity building in the design, construction and operation of biomass facilities dedicated to manufacturing and engineering companies, design firms and companies in the wood processing industry.

    Romanian and foreign experts should provide technical evaluations and design recommendations to specific projects, assistance in the preparation of bid packages as well as in conducting acceptance tests and in the preparation of operation and maintenance procedures.

    Other activities could be the organization of regional and international study tours encouraging the knowhow exchange with international experts.
  - Finance Capacity Building catalyzing investments in biomass facilities dedicated to both local banks and project developers in close cooperation with the Romanian Energy Efficiency and Renewable Energy Credit Line as well as the Structural Funds. The implementing agency should include bank representatives in design meetings and training seminars so they can become familiar with the economics of biomass energy projects. Project developers should receive training to improve their ability to conduct due diligences and prepare bankable reports.
  - Information dissemination using local expertise and organization specialised in public relations and communication. The implementing agency should conduct information and education campaigns, roundtable discussions and seminars.

    The implementing agency should prepare fact sheets and case studies to document the financial and economic benefits of biomass energy projects.

    Media to be used for the information dissemination might comprise internet, mass media, publications, members of the Advisory Council.

    Dedicated workshops for municipalities are a key element to increase interest of municipalities in biomass energy systems and to mobilize communities in planning and decision making as well as building partnerships.

- Romanian Ministry of Economy and Finance should perform a regular monitoring and impact assessment to evaluate the overall performance and effectiveness of project implementation.

Recommendations for replication in the former Yugoslav Republic of Macedonia

General situation in the former Yugoslav Republic of Macedonia

Around 12 per cent of the primary energy supply in the former Yugoslav Republic of Macedonia is based on renewable energy sources: hydro energy, fuel wood and geothermal energy. In the residential sector alone, biomass and organic waste account for 29 per cent of the energy.

The total forestall area in the former Yugoslav Republic of Macedonia is 955,300 ha, i.e. 37 per cent of the territory of the country. The estimate of the annual woodcutting mass is about 1.3 million m^3, with a firewood share of 80-85 per cent. In addition, there is relatively high potential in the country for utilizing biogas from animal manure for energy generation purposes, as well as growing crops for production of biofuels consumption.

Currently a National Strategy for Renewable Energy Sources and a Law on Renewable Energy are under development. For the time being, the regulatory framework for renewable energy sources is set by the provisions relating to the government's obligations to develop and implement a renewable energy strategy for a period of ten years included in the Energy Law of 2006.

Barriers in the former Yugoslav Republic of Macedonia

The former Yugoslav Republic of Macedonia has promising biomass resources. The national government is undertaking a strong effort to develop policies for the development of renewable energy sources, motivated by the target of full compliance with EU regulation, e.g. the National Strategy for Renewable Energy Sources is currently being developed.

Lack of economic incentives in combination with low energy prices is a major barrier to the development of biomass energy projects. Combined with lack of technical capacity and lack of awareness related to biomass energy system, the situation is comparable to the situation in the Russian Federation before implementation of the Case Study.

In 2006 the World Bank announced the creation of the Sustainable Energy Project with the aim to develop a sustainable market for energy efficiency and renewable energy sources by supporting the development of an enabling framework, institutional capacity, and necessary financing mechanisms. The Case Study on the Russian Federation outlines the necessary steps to implement a project promoting the use of biomass energy resources.

Recommendations for the former Yugoslav Republic of Macedonia

The following steps are recommended for a successful replication of the Case Study:

- The Macedonian Ministry of Economy in cooperation with the Ministry of Agriculture, Forestry and Water should elaborate a Forest Resources and Technology Project taking into consideration the specific framework conditions in the former Yugoslav Republic of Macedonia.

  The project design should comprise:

  - The identification of local partners such as ministries and governmental authorities, universities, forest research institutes, non-governmental organisations, local banks etc;
  - The identification of project companies (e.g. manufacturers, wood processing industry, design firms);
  - The analysis of the sectoral and non-sectoral policies affecting sustainable forest management and the energetic use of biomass resources;
  - The selection of project regions and sites for the realisation of pilot projects;
  - The elaboration of the project design and implementation concept including time table and performance indicators.

  The national government might apply for co-financing from an international donor such as the European Bank for Reconstruction and Development or USAID. Tendering of the consultancy service might be an option to be considered.

- The Ministry of Economy should nominate or tender the implementing agency. A suitable national candidate could be the National Energy Agency.
- The Macedonian Ministry of Economy in cooperation with the implementing agency should install an Advisory Council. Members could be ministries, governmental authorities and agencies as well as key organisations in the forestry sector.
- In accordance with the Case Study implemented in the Russian Federation, the project should have the following key components:
  - Capacity building in the design, construction and operation of biomass facilities dedicated to manufacturing and engineering companies, design firms and companies in the wood processing industry.

    Macedonian and foreign experts should provide technical evaluations and design recommendations to specific projects, assistance in the preparation of bid packages as well as in conducting acceptance tests and in the preparation of operation and maintenance procedures.

    Other activities could be the organization of regional and international study tours encouraging the knowhow exchange with international experts.
  - Finance Capacity Building catalyzing investments in biomass facilities dedicated to both local banks and projects. The implementing agency should include bank representatives in seminars and workshop so they can become familiar with the economics of biomass energy projects. Project developers should receive training to improve their ability to conduct due diligences and prepare bankable reports.
  - Information dissemination using local expertise and organization specialised in public relations and communication. The implementing agency should conduct information and education campaigns, roundtable discussions and seminars.

    The implementing agency should prepare fact sheets and case studies to document the financial and economic benefits of biomass energy projects. The description of national pilot projects is highly recommended.

    Media to be used for the information dissemination might comprise internet, mass media and publications in dedicated magazines.
  - Dedicated workshops for municipalities are a key element to increase interest of municipalities in biomass energy systems and to mobilize communities in planning and decision making as well as building partnerships.
- The Macedonian Ministry of Economy should perform a regular monitoring and impact assessment to evaluate the overall performance and effectiveness of project implementation and adapt project implementation accordingly.

PART V: CONCLUSIONS AND RECOMMENDATIONS

Chapter 17: Introductory Considerations

The present chapter highlights key policy challenges that need to be addressed to promote energy efficiency and renewable energy investments in the project region. For each policy recommendation, the starting point was the identified barriers to investments in the project country (see Chapter 11: “Country Analyses”). The recommendations build on the twelve case studies on overcoming barriers to enhanced energy efficiency and renewable energy use (see Chapter 16: “Analyses of the Case Studies”) and on extensive Pöyry experience in energy efficiency and renewable energy policy development.

All of the recommendations meet the following criteria:

- Likelihood to save a large amount of energy or generate a large amount of renewable energy at relatively low costs
- Address existing market barriers and a significant gap in existing policy
- Supported by international consensus

Analogous to the Regional Analysis, the set of recommendations are presented and discussed according to a common structure:

- Legal, institutional and administrative barriers
- Economic and financial barriers
- Lack of awareness and human capacities for the preparation of bankable projects

It is important to view the recommendations presented as a cohesive set of measures and instruments, because the barriers to energy efficiency and renewable energy are pervasive, dispersed, and complex. As such, if governments want to significantly enhance energy efficiency and renewable energy, the implementation of the full set of measures is highly recommended.

The first section of this chapter provides conclusions and recommendations for each country and the second section summaries common problems and common recommendations to enhance policy reforms in the project region.

Chapter 18: Conclusions and Recommendations for the Project Countries

18.1. Conclusions and Recommendations for Albania

Box 25: Summary of proposed recommendations for future policy reforms in Albania

As pointed out in the country analysis, Albania's energy system is characterized by high and increasing demand, high import dependency, low energy efficiency, a significant share of renewable energy namely hydropower and fuel wood, and increasing energy prices. Insufficient metering, unpaid bills, and illegal connections result in high losses in the electricity system accompanied by frequent load shedding and black outs. Therefore the implementation of the following recommendations is suggested for Albania:

1. **National Energy Efficiency Program:** In order to successfully develop and implement the outstanding National Energy Efficiency Programme, the Ministry of Economy, Trade and Energy should assign one new or existing authority or agency which will be responsible for the overall control and responsibility for monitoring and reporting the implementation.
2. **Renewable Energy Action Plan:** In order to develop national indicative targets, the Ministry of Economy, Trade and Energy should assign one new or existing agency for the development of a comprehensive Action Plan.
3. **Energy Wood Programme:** In order to contribute to prevent negative impacts on climate and environment and encourage the sustainable use of wood resources, the Ministry of Environment, Forests and Water Administration should assign an authority, e.g. the National Agency for Natural Resources, which will be responsible for the development, implementation and monitoring of an Energy Wood Programme.
4. **Transparent Authorization:** The establishment of one single responsible authorization agency appointed by the government can drastically reduce the administrative burden for the developer related to the authorization of new projects.
5. **Financial Incentives for Energy Efficiency and Renewables in the Industry and Services Sector:** In order to overcome the absence of public funding for the development of energy efficiency and renewable energy projects in the industry and services sector, the Albanian Government and international donors should establish a dedicated fund.
6. **Financial incentives for Energy Efficiency and Renewables in the Residential Sector:** In order to overcome the absence of financial incentives for energy efficiency and renewable energy in the residential sector, it is recommended that the Ministry of Finance of Albania should introduce financial incentives, which are based on least-cost measures.
7. **Financial Incentives for Electricity from Other Renewables**: In order to overcome the absence of a support scheme for renewable electricity other than smally hydro power, the Albanian Energy Regulatory Authority should develop an advance feed-in tariff, which includes other renewable energy sources.
8. **National Education, Training and Public Awareness Programme**: In order to increase the awareness among households, companies and public organizations, the Ministry of Economy, Trade and Energy with participation of local and regional authorities shall develop suitable information, awareness-raising, guidance or training programs in order to inform citizens of the benefits and practicalities of developing and using energy from renewable sources and energy efficiency measures.
9. **Capacity Building for Local Financing Institutions:** In oder to improve the expertise in financing energy efficiency and renewable energy projects, the National Bank of Albania in cooperation with international development banks should provide support to local banks in terms of assistance and training in refining, standardizing and evaluating loan applications and appraisal procedures.

Recommendations to overcome legal, institutional and administrative barriers

Recommendation 1: National Energy Efficiency Program

In 2005, Albania adopted an Energy Efficiency Law, which among other measures foresees the elaboration of a National Energy Efficiency Programme every two years. However, the first programme 2007-2009 has not yet been prepared. The International Energy Agency (IEA) recommends the elaboration and implementation of national programmes or action plans with clear timelines and responsibilities, backed up by national and local energy agencies with adequate human and financial resources as prerequisite for the successful implementation of policy instruments and measures[41].

In order to successfully develop and implement the outstanding National Energy Efficiency Programme, which will be the tool for development, monitoring, evaluation and constant further development of energy efficiency policy in Albania, the Ministry of Economy, Trade and Energy should:

- Develop indicative overall and intermediate targets;
- Provide overview as well as ex-post evaluation of the energy efficiency improvement measures and policies in place (e.g. laws, regulations, support, and financing instruments available on municipal, regional, national, and international level, soft measures such as information campaigns, training and capacity building initiatives etc.);
- Provide a description of new measures including authority in charge for implementation and expected date of implementation;
- Conduct an ex-ante evaluation of the expected contribution of each measure in place and planned to reach the overall and intermediate target in terms of energy saved and socio-economic effects;
- Prepare a timetable for implementation, monitoring and reporting of the programme;
- Define monitoring methodologies;
- Assign within the National Energy Efficiency Programme one or more new or existing authorities or agencies for the overall control and responsibility for monitoring and reporting the implementation;
- Consider a time frame of up to twelve months for the implementation.

Recommendation 2: Renewable Energy Action Plan

In the next three to six years it is expected that the commissioned hydroelectric generation capacity in Albania will amount to 530 MW. Several international developers are engaged in the development of wind power plants as well. Despite this high potential of renewable energy sources in Albania, national indicative targets are not set yet. The elaboration and implementation of an action plan combined with periodic monitoring is the basis for constant and sustainable growth of renewable energy sources.

In order to develop national indicative targets, an action plan should be developed which covers renewable heating/cooling, electricity and biofuels. This Action Plan could be based on the template for national renewable energy action plans, which has been elaborated by the Directorate General for Energy and Transport (DG TREN) of the European Commission[327]. In order to achieve this goal one or more new or existing authorities or agencies, appointed by the Ministry of Economy, Trade and Energy, should:

- Prepare a priori a detailed study of the wind power potential on the Adriatic coast, which is currently missing, resulting in a wind atlas for Albania, which should be developed within six months;
- Develop a summary of national renewable energy policy;
- Elaborate the expected final energy consumption for the target period;
- Define national overall target and sector targets covering electricity, heat, and biofuels based on the expected final energy consumption for the target period;
- Elaborate measures for achieving the targets;

- Elaborate specific measures for the promotion of the use of energy from biomass (see also the Energy Wood Programme further below).

Recommendation 3: Energy Wood Programme

Fuel wood has a large potential for energetic use both in households and large scale power plants in Albania. However, lack of forestry management coupled with extensive cut has led to significant deforestation in the past[41] with potential long-term impact on the climate and on the environment.

The development, implementation, and monitoring of an Energy Wood Programme shall contribute to prevent negative impacts on climate and environment and encourage the sustainable use of wood resources. The Energy Wood Programme shall mobilize so far unused wood energy resources and increase and accelerate the availability of energy wood in Albania. Austria[328] and Finland[329] have implemented successful energy wood programmes. The preparation of the programme could take around six to twelve months, while the duration should be at least three years. For the implementation and monitoring of the Energy Wood Programme, the Ministry of Environment, Forests and Water Administration should assign an authority, e.g. the National Agency for Natural Resources, which in turn should:

- Ensure the promotion of enhanced co-operation and information exchange between market players such as forest owners, wood traders and sales companies, utilities, or wood processing industry;
- Collect data collection on energy wood demand and supply and the price development;
- Provide capacity building on biomass logistics for forest owners and large scale energy wood buyers;
- Calculate the potential of energy wood resources per region;
- Provide a description and evaluation of current energy wood use;
- Establish indicative overall and intermediate targets;
- Provide a description and ex-ante evaluation of measures to accelerate sustainable use of energy wood;
- Define a timetable for implementation, monitoring, and reporting of the programme.

Recommendation 4: Transparent Authorization

Non-transparent regulations and inefficient bureaucracy are further barriers to investments in renewable energy and energy efficiency projects such as installation of cogeneration in industry. Numerous authorities (national, regional, and municipal) are involved in the permitting process. Lack of coordination between authorities often leads to delays, investment uncertainty, and a multiplication of necessary efforts.

One responsible authorization agency appointed by the government can drastically reduce the administrative burden for the developer related to authorization of new projects. The set-up of this authorization agency until start of operation could take between six to twelve months. In particular, this authorization agency should:

- Implement clear guidelines for authorization procedures;
- Introduce obligatory response periods for the authorities involved;
- Set approval rates for checking the streamlining of authorization procedures.

Recommendations to overcome economic and financial barriers

Recommendation 5: Financial Incentives for Energy Efficiency and Renewables in the Industry and Services Sector

The absence of public funding has been identified as economic barrier for the development of energy efficiency and renewable energy projects (excluding renewable electricity) in the industry and services sector. Within the industry sector, the light industry (e.g. food processing) and the construction material sectors show in general a high potential for energy efficiency, in particular for cogeneration and solar thermal. The public sector should set a good example regarding investments, maintenance, and other expenditure in energy efficiency and renewable energy use.

In order to overcome the abovementioned barrier, the establishment of a fund is recommended. The Bulgaria Energy Efficiency and Renewable Energy Credit Line, one of the selected case studies (see section 16.5), is a good example for promoting investments in energy efficiency and renewable energy projects, promoting the development of this market. It is a joint initiative between the Bulgarian government and international donors, namely the European Bank for Reconstruction and Development funds complemented by the Kozloduy International Decommissioning and Support Fund.

Such a fund may provide for grants, loans, financial guarantees and/or other types of financing that guarantee results and shall be open to all providers of sustainable energy measures, such as Energy Service Companies (ESCOs), industry companies, independent energy advisors, utilities and energy distributors, retail energy sales companies and installers. The time frame for the set-up of the fund depends heavily on the political decision making process: but a one year period should be feasible. The duration of the fund should be at least three years in order to provide security to investors.

The fund, which could be established by the Albanian government in cooperation with international donors, should:

- Focus on entrepreneurial biomass central heating systems, cogeneration, solar thermal panels, and energy efficiency measures such as thermal renovation of entrepreneurial buildings, waste-heat recovery as well as process optimization or efficient lighting;
- Promote accompanying measures such as energy audits or the installation of metering devices;
- Consider the bundling of small scale renewable energy and energy efficiency projects as option to reduce transaction costs;
- Select the key areas of support and key sectors based on the available energy savings potential resp. renewable energy potential as well as the cost-benefit ratio to be evaluated when developing the National Energy Efficiency Programme.

Recommendation 6: Financial incentives for Energy Efficiency and Renewables in the Residential Sector

Similarly to the industry and services sector, there are no financial incentives for energy efficiency and renewable energy (excluding renewable electricity) in place in the residential sector.

Analogous to the financial incentives for energy efficiency and renewables in the non-residential sector, the introduction of financial incentives for the residential sector is recommended. The financial incentives, which should be introduced by the Ministry of Finance of Albania, should:

- Focus on least cost-measures such as switch from electricity to central heating (biomass, heat pumps or gas (if applicable), installation of efficient/renewable central heating devices in new buildings, solar thermal, energy efficiency measures in existing buildings such as improving insulation, tightening or changing windows, and energy efficiency measures in new buildings enhancing compliance with the building code.

Recommendation 7: Financial Incentives for Electricity from Other Renewables

A new model for calculation of feed-in tariffs for existing and new small hydro power plants has been established by the Ministry of Economy, Trade and Energy in January 2007, and the Albanian Power Corporation KESH is obliged to buy electricity produced by small hydro power plans with a capacity below 15 MW. However, the absence of a support scheme for renewable electricity other than small hydro power has been identified as key barrier for large scale deployment of renewable energy in Albania.

In order to overcome this barrier, the adoption of a support scheme promoting electricity generation from biomass, wind, geothermal, and photovoltaics is recommended. According to the EU 2008 Progress Report on Support Schemes[330] well-adapted advanced feed-in tariff regimes are generally the most efficient and effective support schemes for promoting renewable electricity. Therefore, the implementation of an advanced feed-in tariff to promote electricity from other renewable energy sources in Albania is highly recommended. Therefore the Ministry of Economy, Trade and Energy in cooperation with the Albanian Energy Regulatory Authority should develop advanced feed-in tariffs, which should:

- Ensure the least cost approach while considering future technology development, changes in market competition, and optimum resource utilization;

- Focus on technology-specific and size specific tariffs supporting different technologies while avoiding windfall profits for cheaper technologies;
- Contain stepped tariffs according to site conditions (e.g. average wind speed);
- Incorporate tariff degression over time for new installations in order to reflect economies of scale and learning;
- Front load the payment stream considering increased tariffs for the first years of a project while decreasing tariffs in the last years, without increasing the total sum of financial support, similarly to a scheme applied e.g. in Germany for wind energy;
- Contain a maximum time period of e.g. ten to 20 years depending on the renewable energy sources;
- Combine an obligation to purchase electricity from renewable energy sources and preferential grid access.

Recommendations to overcome lack of awareness and human capacities for the preparation of bankable projects

Recommendation 8: National Education, Training and Public Awareness Programme

Lack of awareness has been identified to be one of the main bottlenecks for the development of a domestic market for energy efficiency and renewable energy projects in Albania. Households, companies and public organizations need knowhow on the different possibilities for sustainable energy use, economic and environmental advantages, costs and financial support available, and information on best practice examples.

In order to increase the awareness among households, companies, and public organizations, the Albanian government with participation of local and regional authorities shall develop suitable information, awareness-raising, guidance or training programmes in order to inform citizens of the benefits and practicalities of developing and using energy from renewable sources and energy efficiency measures. Information dissemination needs to be tailored to the end user in order to be effective. The preparation of the national awareness raising campaign could take up to twelve months. The duration should be scheduled for a period of minimum three years. Periodic evaluation is highly recommended to enhance and improve the programme. The Ministry of Economy, Trade and Energy and/or Ministry of Environment, Forests and Water Administration should assign a new or existing authority as manager for the development, implementation and monitoring of a national awareness raising and information dissemination campaign. The selected authority should:

- Develop advertising campaigns e.g. dissemination of leaflets, development of internet platforms, round tables, announcement in newspapers;
- Introduce energy labels and standards for lighting, household and industry appliances (e.g. in the European Union refrigerator standards coupled with a labeling programme increased sales of Class A refrigerators from five per cent in 1995 to 61 per cent in 2005;
- Introduce energy performance certificate for buildings ensuring that when buildings are constructed, sold or rented out, an energy performance certificate is made available to the owner or by the owner to the prospective buyer or tenant. In a first step, the focus should be on newly constructed and refurbished buildings, in a second step on sold and rented buildings. Buildings occupied by public authorities and by institutions providing public services to a large number of persons an energy performance certificate shall be placed in a prominent place clearly visible to the public;
- Provide advice on behavioral practices, education at schools, and information dissemination through energy consultants undertaking energy audits;
- Develop capacity building programmes for installers, architects, construction companies etc. supporting the increase of awareness on the possibilities for renewable energy and energy efficiency in buildings as well as in financing the corresponding investments.

Recommendation 9: Capacity Building for Local Financing Institutions

Local financing institutions are reluctant to finance energy efficiency and renewable projects due to lack of experience in financing such type of projects.

In order to improve the expertise in financing energy efficiency and renewable energy projects, the National Bank of Albania in cooperation with development banks, such as the EBRD, which allocates in the framework of the Western Balkans Sustainable Energy Direct Financing Facility long-term credit lines dedicated to energy efficiency and renewable energy investments to local banks in Albania, should:

- Provide support to local banks in terms of assistance and training in refining, standardizing and evaluating loan applications and appraisal procedures. The time frame for the implementation of compact training sessions could be six months, while periodical training accompanying the move from pilot to full operation should cover two to three years.

18.2. *Conclusions and Recommendations for Belarus*

Box 26: Summary of proposed recommendations for future policy reforms in Belarus

As stated in the Country Analysis, Belarus is a strong net energy importer depending heavily from the Russian Federation. However, the Russian Federation's recent actions to introduce market-based prices for its energy exports to the Commonwealth of Independent States (CIS) countries are likely to result in phasing out Russian energy subsidies to Belarus. The need for action has been recognized by the government and has been reflected in a number of strategic programs that outline the government strategy and develop concrete action plans to modernize the energy sector, improve energy efficiency, and increase the use of renewable energy sources. Nevertheless the implementation of the following recommendations is recommended for Belarus:

1. **Monitoring of Policy Implementation:** In order to overcome lack of information on implementation plans or measures, the Belarussian Government shall assign one authority or agency for the overall control and responsibility for monitoring of policy implementation.
2. **Transparent Public Procurement and Tendering Guidelines:** In order to overcome the lack of regulatory framework for private investments, the Ministry of Finance should introduce transparency on procurement opportunities, contract evaluation and award procedures by introducing Standard Bidding Documents.
3. **Budget Flexibility for State-funded Organizations:** In order to allow state-funded organizations to reap the benefit of energy efficiency and renewable energy investments, the Ministry of Finance should ensure that state-funded organizations are able to enter into multi-year contracts and enable that budgeting principles are based on full life-cycle costing.
4. **Statistical Data Gathering:** In order to overcome the lack of systemic and comprehensive data gathering, the Department for Energy Effiency of the State Committee for Standardization should develop a sound statistical system, including a consumption database, in accordance with international standards.
5. **Tariff reform (electricity and heat):** In order to increase the profitability of energy efficiency and renewable energy projects and to decrease the burden on the state budget, the Council of Ministers jointly with the Ministry of Energy should implement a sound tariff reform, which reflects actual costs of energy generation and supply.
6. **Financial incentives for Energy Efficiency and Renewables in the Private Sector (excluding renewable electricity):** In order to overcome the lack of public funding and dedicated operational credit lines for energy efficiency and renewable energy projects the establishment of a public fund supporting sustainbable energy projects, which could be co-funded by international institutions, is recommended.
7. **Adaptation of existing Feed-in Tariff for Electricity from Renewables**: In order to overcome the disadvantage of more expensive technologies, which result due to the unitary feed-in tariff, the Ministry of Economy should consider the revision of the existing feed-in tariff, taking into consideration technology-specific and size specific tariffs.
8. **Capacity Building for Policy Makers**: In order to reinforce energy administrators and policy makers and to ensure that they have the capacity and means to develop strategies and implement policies promoting energy efficiency and renewable energy, the Department for Energy Efficiency of the State Committee for Standardization should provide training for the staff of ministries, regulators, and other agencies with responsibilities in the energy sector of Belarus
9. **Capacity Building and Awareness Programmefor Private Business:** In order to overcome the lack of awareness and capacities among private companies, international institutions jointly with participating local banks should raise awareness and capacity building on the opportunities for energy efficiency and renewable energy, and the preparation of bankable projects.

Recommendations to overcome legal, institutional and administrative barriers

Recommendation 1: Monitoring of Policy Implementation

With the Strategy of Energy Security and Raising Energy Independence and accompanying programmes, Belarus shows a clear commitment towards the promotion of energy efficiency and renewable energy. However, the information on implementation plans or measures to achieve these targets is not always publicly available which may hamper private investments in energy efficiency and renewable energy.

In order to overcome lack of information on implementation plans or measures, the Belarussian Government shall assign one or more new or existing authorities or agencies for the overall control and responsibility for monitoring of policy implementation (as described in detail for Bulgaria in section 18.4). This institutionalization of regular energy policy monitoring aims at developing and clarifying policies, monitoring for compliance, continuous improvement, and appropriate use of funds. The results of the monitoring and recommendations shall be summarized in an evaluation report. The establishment of the responsible agency could take up to six months.

Recommendation 2: Transparent Public Procurement and Tendering Guidelines

Despite the existence of a National Investment Agency in order to facilitate foreign investment in Belarus, there is no regulatory framework supporting private investments (both domestic and foreign) and the massive influence of the state in the Belarussian economy (over 75 per cent of Belarussian economy is state-owned) hinders the development of a private sector, to the extent that some international observers claim that private businesses are being frequently discriminated by public administrations against state-owned businesses.

In order to overcome the lack regulatory framework for private investments, the Ministry of Finance should introduce transparency on procurement opportunities, contract evaluation, and award procedures. Therefore, as described in detail for Bulgaria (see section 18.4), the development of Standard Bidding Documents including documentation of evaluation criteria is highly recommended. Elaboration and implementation of such a standard should not take longer than six months.

Recommendation 3: Budget Flexibility for State-funded Organizations

The current method of budgeting for state-funded organizations does not consider actual energy needs. Expenditures are determined by the government and do not allow to retain or reallocate any savings for long term investments in energy efficiency or renewable energy projects. However, state-funded organizations need more budget flexibility and autonomy to overcome this barrier.

By giving state-funded organizations more budget flexibility, they could encourage the usage of energy service. Energy Service Companies (ESCOs) enter into financing arrangements with banks, take the risk of the loan, while providing energy services to state-funded organizations. In order to allow state-funded organizations to reap the benefit of energy efficiency and renewable energy investments, the Ministry of Finance should:

- Ensure that state-funded organizations are able to enter into multi-year contracts;
- Enable that budgeting principles are based on full life-cycle costing in order to capture the benefits of long term investments;
- Ensure a quick political decision making process in order to be able to implement the above mentioned measures within twelve months.

Recommendation 4: Statistical Data Gathering

Lack of systemic and comprehensive data gathering is one barrier for creating and monitoring energy policy. The availability and quality of energy data in Belarus are still poor and do not meet international standards from the Organization for Economic Co-operation and Development (OECD), EUROSTAT or the United Nations Economic Commission for Europe (UNECE).

In order to overcome the lack of systemic and comprehensive data gathering, the Department for Energy Efficiency of the State Committee for Standardization should:

- Develop a sound statistical system in accordance with international standards;
- Establish a consumption database, including the results obtained from planned energy audits, which would constitute a reliable information base for project developers and support the monitoring of progress in energy efficiency;

- Establish a database for renewable energy projects as well as fuel wood use, which would allow monitoring the progress in renewable energy.

Recommendations to overcome economic and financial barriers

Recommendation 5: Tariff reform (electricity and heat)

Although the electricity tariffs for households have been increased from 46 EUR/MWh (145 BYR/kWh) at the end of 2008 to 54 EUR/MWh (173 BYR/kWh) at the beginning of 2009, they are still at low levels compared to the cost of electricity generation. The same applies to the heat tariffs in Belarus. These low, state-subsidized tariffs for electricity and heat endanger the profitability of energy efficiency and renewable energy projects in Belarus and burden the state budget.

In order to increase the profitability of energy efficiency and renewable energy projects, the Council of Ministers, which is responsible for the pricing of residential users (both for heat and electricity) and the Ministry of Energy, which is responsible for the pricing of industrial users (both for heat and electricity), should:

- Introduce different tariff structures and charges;
- Apply a tariff design reflecting actual costs of energy generation and supply;
- Implement a reform of service cost determination in order to encourage improvements in efficient operation and maintenance.

Recommendation 6: Financial incentives for Energy Efficiency and Renewables in the Private Sector (excluding renewable electricity)

Despite a clear commitment by the Belarussian Government to support energy efficiency, which is witnessed by the remarkable progress in the decrease in energy efficiency over the last ten years and by the several administrative reforms undertaken, the lack of public funding (excluding renewable electricity) and dedicated operational credit lines is an economic barrier for energy efficiency and renewable energy projects in Belarus.

In order to overcome the lack of public funding and dedicated operational credit lines for energy efficiency and renewable energy projects, analogous to Albania, the establishment of a public fund supporting sustainable energy projects is recommended. This fund should be managed by a new or existing authority or agency to be nominated on a national level. Co-funding by international institutions such as the United Nations Economic Commission for Europe, the European Bank for Reconstruction and Development or the World Bank is an option which should be considered. As mentioned for Albania, the time frame for the set-up of the fund depends heavily on the political decision making process but a one year period should be feasible. The duration of the fund should be at least three years in order to provide security to investors. In particular, this public fund should:

- Support renewable heating systems, cogeneration as well as energy efficiency measures and shall be open to private business and households;
- Include the support of accompanying measures such as energy audits and the installation of metering devices;
- Consider the option of project bundling in order to attract investments in small scale projects;
- Select the key areas of support and key sectors based on the available energy savings potential as well as the cost-benefit ratio to be evaluated.

Recommendation 7: Adaptation of existing Feed-in Tariff for Electricity from Renewables

Since 1994, Belarus has a feed-in tariff for electricity generation from renewables in place. However, a unitary feed-in tariff coefficient for all renewable energy sources disadvantage more expensive technologies such as biomass cogeneration or photovoltaics.

In order to overcome the disadvantage of more expensive technologies which result due to the unitary feed-in tariff, the Ministry of Economy should consider the revision of the existing feed-in tariff, taking into consideration technology specific and size specific tariffs. Assuming that there are no major barriers in the political decision making process, the revision of the existing feed-in tariff might be possible within six months. In particular, the Ministry of Economy should:

- Set the tariff sufficiently high to allow for an attractive return on investment by linking the tariff to the price of fuel to avoid, as far as possible, fuel-price risk;
- Provide a sufficiently long duration of the feed-in contract, which is typically ten to 20 years, in order to strengthen investor confidence;
- Consider that the remuneration should as far as possible reflect the environmental, social and network benefits that cogeneration provides.

Recommendations to overcome lack of awareness and human capacities for the preparation of bankable projects

Recommendation 8: Capacity Building for Policy Makers

Lack of implementation of international commitments, such as the Energy Community Treaty or the Energy Charter Treaty, hampers the exchange of regulatory and market know-how and expertise with countries, which implemented successful renewable energy and energy efficiency policy instruments.

Energy administrators and policy makers need to be reinforced to ensure that they have the capacity and means to develop strategies and implement policies promoting energy efficiency and renewable energy. Institutions also need to build capacity and enhance mechanisms to increase transparency and public consultation on strategy and policy development, particularly in seeking input from international institutions and academia. Therefore, in order to fulfill the increasingly complex range of tasks at national, entity, and regional levels, it is necessary to provide adequate funding and training for the staff of ministries, regulators, and other government agencies with responsibilities in the energy sector of Belarus. The timeframe for a compact training should be around six months comprising intensive training sessions of up to one week as well as on the job training. The Department for Energy Efficiency of the State Committee for Standardization would be an ideal institution with the necessary capacities to provide the trainings.

Recommendation 9: Capacity Building and Awareness Programmefor Private Business

Lack of awareness and capacities amongst private companies has been identified to be one of the main bottlenecks for the development of private energy efficiency and renewable energy projects in Belarus. The private business, which is developed to a very limited extent (less than 25 per cent of the national economy) and represented mostly by small and medium enterprises, would probably strongly benefit from training and assistance programmes related to the preparation of bankable projects.

In order to overcome the lack of awareness and capacities among private companies, international institutions such as the European Bank for Reconstruction and Development jointly with participating banks and the Department for Energy Efficiency of the State Committee for Standardization should:

- Raise awareness and capacity building on the opportunities for energy efficiency and renewable energy, financing opportunities and the preparation of bankable projects;
- Provide a credit line for small and medium sized companies mentioned under Recommendation 6.

18.3. *Conclusions and Recommendations for Bosnia and Herzegovina*

Box 27: Summary of proposed recommendations for future policy reforms in Bosnia and Herzegovina

Bosnia and Herzegovina lacks a consistent and coordinated vision of energy reforms, policy and statistics as stated in the Country Analysis. This hampers the development of competitive energy markets at the expenses of investments in energy efficiency and renewable energy projects. Therefore the implementation of the following recommendations is suggested for Bosnia and Herzegovina:

1. **Establishment of Communication Council:** In order to overcome parallel procedures, guidelines and regulatory frameworks, the establishment of Communication Council in charge of energy is recommended.
2. **National Energy Strategy:** In order to overcome the lack of a national energy strategy and insufficient harmonization in the implementation of energy policies, the elaboration and implementation of a national energy strategy based on the relevant energy policy framework of the two autonomous entities by the Communication Council is recommended.
3. **Statistical Data Gathering:** In order to overcome the lack of centralized information sources, the statistics office and line ministries of both entities, under the coordination of the Communication Council should develop in accordance with international standards, uniform and user-friendly methods for recording, reporting and aggregating relevant information.
4. **Public Procurement:** In order to set a good example regarding investments, maintenance and other expenditure in energy efficiency and renewable energy use, the national government should endeavor to use sustainable energy criteria in tendering procedures for public procurement.
5. **Financial Incentives for Energy Efficiency and Renewables in the Industry and Services Sector (excluding renewable electricity):** In order to overcome the limited availability of public funding and dedicated operational credit lines, the establishment of a public fund, which could be created by the Bosnian Government and international donors, supporting sustainable energy projects is recommended..
6. **Financial Incentives for Energy Efficiency and Renewables in the Residential Sector (excluding renewable electricity):** In order to tap the high potential for energy efficiency measures, as well as for renewable heating, in the residential sector, the introduction of financial incentives for the residential sector by the Ministry of Finance is recommended.
7. **Adaptation of existing Feed-in Tariff for Electricity from Renewables**: In order to ensure the most efficient and effective support scheme for promoting renewable electricity, the State Electric Power Commission, jointly with the two regulatory commissions at the entity level should revise the existing feed-in tariff by taking into consideration technology-specific and size specific tariffs.
8. **Tariff Reform (Heat and Electricity)**: In order to ensure an adequate return on investment in sustainable energy projects, the two regulatory commissions at the entity level should introduce a tariff reform which will include different tariff structures and charges and internalization of environmental externalities on energy prices.
9. **National Education, Training and Public Awareness Programme:** In oder to overcome the lack of awareness and of capacities to successfully develop energy efficiency and renewable energy projects, the national government in cooperation with both entities as well as international donors and under supervision of the Communication Council should develop a suitable information, awareness-raising, guidance and training programme.
10. **Capacity Building for Policy Makers:** In oder to be able to fulfill the increasingly complex range of tasks at national and entity levels, the National Government in cooperation with both entities and under supervision of the Communication Council should provide adequate funding and training for the staff of ministries, regulators and other governmental agencies with responsibilities in the energy sector of Bosnia and Herzegovina.

11. **Capacity Building for Local Financing Institutions:** In order to increase the number of commercially funded energy efficiency and renewable energy projects, the Central Bank of Bosnia and Herzegovina in cooperation with international donors should provide support to local banks in terms of assistance and training in refining, standardizing and evaluating loan applications and appraisal procedures.

Recommendations to overcome legal, institutional and administrative barriers

Recommendation 1: Establishment of Communication Council

Bosnia and Herzegovina lacks a consistent and coordinated energy policy. Each entity has its own institutions, procedures, guidelines, and regulatory frameworks.

To overcome the barrier of parallel procedures, guidelines and regulatory frameworks, the establishment of a Communication Council in charge for energy and energy related issues (such as climate change policy and spatial planning) is highly recommended. The Communication Council should:

- Service to increase transparency, and facilitate and promote cooperation between the Federation of Bosnia and Herzegovina and the Republika Srpska, in particular concerning the elaboration and implementation of a national energy strategy, the elaboration of national energy statistic database, and the harmonization of framework for investments;
- Act as transparency platform to make public relevant information, which investors deem to be of key importance for the realization of energy projects.

Recommendation 2: National Energy Strategy

Lack of a national energy strategy and insufficient harmonization in the implementation of energy policies, is a significant barrier towards energy efficiency and renewable energy deployment in Bosnia and Herzegovina.

Therefore, the elaboration and implementation of a national energy strategy based on the relevant energy policy framework of the two autonomous entities is recommended. It will be the tool for development, monitoring, evaluation, and constant further development of a common energy policy in Bosnia and Herzegovina. A maximum time frame of twelve months should be practicable. The Communication Council should be responsible for the elaboration, overall control, monitoring and reporting of the National Energy Strategy and should in particular:

- Establish indicative overall and intermediate target;
- Implement measures for achieving the targets;
- Identify specific targets and measures for the promotion of renewable energy and energy efficiency;
- Define a timetable for implementation, monitoring, and reporting of the strategy.

Recommendation 3: Statistical Data Gathering

The absence of centralized information sources is another consequence of the political division of Bosnia and Herzegovina and thus a barrier towards the realization of sustainable energy projects. However, systematic and comprehensive data gathering is crucial to the adoption of sustainable energy practices and investments in the country as well as for developing benchmarks and best practices to demonstrate the potential benefits.

In order to overcome this barrier, the statistics office and line ministries of both entities under the coordination of the recommended Communication Council should:

- Develop uniform and user-friendly methods for recording, reporting, and aggregating individual, firm, sector-wide, and regional data on energy production, also on a project basis, and consumption;
- Ensure that all data will be aligned to the international standards of the Organization for Economic Co-operation and Development (OECD), EUROSTAT, and United Nations Economic Commission for Europe (UNECE) and thus be internationally comparable;

- Ensure that statistical bodies will receive the capacity to collect, process, and publish comprehensive sets of energy statistics in accordance with the above mentioned international standards.

Recommendation 4: Public Procurement

Historic purchasing policies that favor low-first-cost products, budget constraints and disincentives, and competing policy priorities result in inefficiency energy use at all levels of government. Municipal governments, federal agencies, and other local organizations need support to improve the energy efficiency of the public sector, through energy efficient procurement and overall public sector energy management.

In order to set a good example regarding investments, maintenance and other expenditure in energy efficiency and renewable energy use, the Government of Bosnia and Herzegovina should endeavor to use sustainable energy criteria in tendering procedures for public procurement of e.g. electrical appliances (e.g. light bulbs, computers etc.), heating devices, and energy services, or when renting, purchasing or refurbishing buildings. Sustainable public procurement, once implemented, will contribute to increase the awareness for energy efficiency and renewable energy and to decrease public expenditures in the medium term. The time frame for elaboration and implementation of such criteria might take up to twelve months, depending on the current procurement process and related documentation. A regular update of such criteria, taking into consideration technological development, is highly recommended.

Recommendations to overcome economic and financial barriers

Recommendation 5: Financial Incentives for Energy Efficiency and Renewables in the Industry and Services Sector (excluding renewable electricity)

Limited availability of public funding and/or dedicated operational credit lines is an economic barrier for energy efficiency and renewable energy projects in the industry and service sector of Bosnia and Herzegovina. No public budgets or funds are available at national level, while the two dedicated funds developed in the entities are not yet fully operational.

In order to overcome the limited availability of public funding and dedicated operational credit lines in industry and services sector, analogous to Albania, the establishment of a public fund supporting sustainable energy projects is recommended. The fund, which could be established by the Bosnian Government and international donors, should:

- Support renewable heating systems, cogeneration as well as energy efficiency measures in the industry and service sector;
- Select key areas of support and key sectors based on the available energy savings potential as well as the cost-benefit ratio to be evaluated when developing the National Energy Strategy;
- Be open to industrial companies, utilities and energy distributors, installers, Energy Service Companies as well as public companies (e.g. hospitals, schools, and municipalities);
- Support accompanying measures such as energy audits or the installation of metering devices;
- Consider the bundling of small scale projects to decrease transaction costs.

Recommendation 6: Financial Incentives for Energy Efficiency and Renewables in the Residential Sector (excluding renewable electricity)

There are currently no financial incentives for energy efficiency and renewable energy (excluding renewable electricity) in the residential sector in place. However, with a share of 21 per cent of final energy consumption, the residential sector shows a high potential for energy efficiency measures as well as for renewable heating.

In order to tap the high potential for energy efficiency measures, as well as for renewable heating in the residential sector, the introduction of financial incentives for the residential sector is recommended. The financial incentives, which should be introduced by the Ministry of Housing in cooperation with the Ministry of Energy, Industry and Mining and, the Ministry of Finance, and international donors, should:

- Focus on least cost-measures such as switch from electricity to central heating (biomass, heat pumps or gas (if applicable)), installation of efficient/renewable central heating devices in new buildings, solar thermal, and energy efficiency measures in existing buildings such as improving insulation, tightening or changing windows.

Recommendation 7: Adaptation of existing Feed-in Tariff for Electricity from Renewables

Two of the three power utilities in Bosnia and Herzegovina are obliged to purchase electricity from renewable energy sources. The existing feed-in tariff is rather low in comparison to the technology costs and is considered not to be sufficiently attractive for foreign investors.

In order to ensure the most efficient and effective support scheme for promoting renewable electricity, the State Electric Power Regulatory Commission (SERC), jointly with the two regulatory commissions at the entity level, should:

- Revise the existing feed-in tariff, taking into consideration technology specific and size specific tariffs and ensure the least cost approach while considering future technology development, changes in market competition and optimum resource utilization;
- Evaluate the introduction of a feed-in tariff for high efficiency combined heat and power generation.

Recommendation 8: Tariff Reform (Heat and Electricity)

Low-price policy in the energy sector has been identified to be one of the main economic and financial barriers in Bosnia and Herzegovina. Prices and tariffs are considered too low to ensure an adequate return on investment for renewable energy and energy efficiency projects. Furthermore, Bosnia and Herzegovina does not take into consideration environmental costs (e.g. CO_2, SO_x, or NO_x emissions released) associated with mainly coal-based energy production and consumption. By not accounting the environmental costs, Bosnia and Herzegovina artificially lowers the energy costs.

In order to ensure an adequate return on investment for renewable energy and energy efficiency projects, the two regulatory commissions at the entity level should introduce a tariff reform. In particular, the two regulatory commissions at the entity level should:

- Introduce different tariff structures and charges which specifically encourage energy efficiency and renewable energy;
- Ensure that the tariff level, customer classification, and tariff design must reflect as closely as possible the costs as the utility incurs them;
- Consider that the tariff must internalize environmental externalities on energy prices;
- Introduce reform determination of service cost in order to encourage improvements in operating and maintenance efficiency as well as capital investments.

Recommendations to overcome lack of awareness and human capacities for the preparation of bankable projects

Recommendation 9: National Education, Training and Public Awareness Programme

Lack of awareness and of capacities to successfully develop energy efficiency and renewable energy projects have been identified to be one of the main bottlenecks at all administrative levels as well as among energy customers.

In order to overcome this barrier, the National Government in cooperation with both entities as well as international donors and under supervision of the Communication Council should:

- Develop a suitable information, awareness-raising, guidance, and training programme in order to inform about the benefits and practicalities of developing and using energy from renewable sources and energy efficiency measures;
- Ensure that information dissemination is tailored to the end-user in order to be effective and develop advertising campaigns, energy labels and standards, energy performance certificates for buildings, and capacity building programmes (see section 18.1);
- Implement of a nationwide training and promotion initiative for energy efficiency such as the Energy Efficiency Demonstration Zone described in section 16.1 in order to address the specific need for technical skills on energy saving measures;

- Consider up to twelve months for the preparation of the national awareness raising campaign, while the duration should be scheduled for a period of minimum three years and should be accompanied by periodic evaluation in order to enhance and improve the programme.

Recommendation 10: Capacity Building for Policy Makers

Lack of awareness of the relevance of energy efficiency and renewable energy issues at the state and entity level hampers the introduction of a sustainable energy policy. Formulation, analysis, and enforcement of both sustainable energy strategy and policy depend, in turn, on adequate staff and financial resources, as well as reliable and regular statistical data.

Energy administrators and policy makers need to be reinforced to ensure that they have the capacity and means to develop strategies and implement policies promoting energy efficiency and renewable energy. Employment conditions need to be adequate to attract and retain staff with the required skills and knowledge. Institutions also need to build capacity and enhance mechanisms to increase transparency and public consultation on strategy and policy development, particularly in seeking input from academia and international institutions. Therefore, in order to fulfill the increasingly complex range of tasks at national, entity, and regional levels, the National Government in cooperation with both entities as well as international donors and under supervision of the Communication Council should provide adequate funding and training for the staff of ministries, regulators, and other government agencies with responsibilities in the energy sector of Bosnia and Herzegovina.

Recommendation 11: Capacity Building for Local Financing Institutions

Commercial financing institutions are reluctant to finance energy efficiency and renewable projects due to lack of experience in evaluation such type of projects. Therefore, the number of commercially funded energy efficiency and renewable energy projects in Bosnia and Herzegovina is currently low.

In order to increase the number of commercially funded energy efficiency and renewable energy projects, the Central Bank of Bosnia and Herzegovina in cooperation with international donors, such as the European Bank for Reconstruction and Development, which allocates in the framework of the Western Balkans Sustainable Energy Direct Financing Facility long-term credit lines to local banks in Bosnia and Herzegovina, should:

- Provide support to local banks in terms of assistance and training in refining, standardizing and evaluating loan applications and appraisal procedures;

- Consider a time frame of six months for the implementation of compact training sessions, while periodical training accompanying the move from pilot to full operation should cover two to three years.

18.4. *Conclusions and Recommendations for Bulgaria*

Box 28: Summary of proposed recommendations for future policy reforms in Bulgaria

Bulgaria has made good use of the EU accession process to restructure the energy sector and improve its framework promoting energy efficiency and renewable energy. Bulgaria has advanced substantially with the introduction of a coherent set of medium- to long-term strategies, specific legislation for energy efficiency and renewable energy, and concrete action plans. The challenge for policy makers will be to ensure the efficient implementation of policy measures and coherence among the various sectoral instruments. Therefore the implementation of the following recommendations is suggested for Bulgaria:

1. **Monitoring of Policy Implementation:** In order to ensure an institutionalization of regular energy policy monitoring aiming at developing and clarifying policies, the Ministry of Economy and Energy shall assign one or more new or existing authorities with the overall control and responsibilities for monitoring policy implementation.
2. **Least-Cost Investment Plan for District Heating:** In order to overcome the degradation of the district heating systems in Bulgaria, the Ministry of Economy and Energy in cooperation with the State Energy and Water Regulatory Commission should develop and implement a least-cost investment plan for district heating.
3. **Transparent Public Procurement Guidelines:** In order to ensure transparency in public procurement transactions, specifically regarding procurement opportunities, contract evaluation and award procedure, the Ministry of Finance should introduce transparent Standard Bidding Documents.
4. **National Education, Training and Public Awareness Programme:** In order to ensure that energy efficiency and renewable energy will benefit from an exchange of information, experience and best practice at all levels it is highly recommended that a follow up and nationwide implementation of the UNDP pilot project “Energy Efficiency Demonstration Zone in Gabrovo” will be initiated.
5. **Capacity Building for Policy Makers**: In order to ensure successful monitoring of policy implementation, the Ministry of Economy and Energy in cooperation with the Center for Energy Efficiency, should provide adequate funding and training for the staff of ministries, regulators and other governmental or municipal agencies.
6. **Capacity Building for Local Financing Institutions**: In order to increase the number of participating banks and projects in energy efficiency and renewable energy, it is recommended that experts from the Bulgarian Energy Efficiency Fund jointly with the European Bank for Reconstruction and Development provide assistance and training in refining, standardizing and evaluating loan applications and appraisal procedures to local banks.

Recommendations to overcome legal, institutional and administrative barriers

Recommendation 1: Monitoring of Policy Implementation

Bulgaria has advanced substantially with the introduction of a coherent set of medium- to long-term strategies, specific legislation, and concrete action plans in accordance with the EU Acquis Communautaire. However, frequent amendments of existing regulations, strong regulatory proliferation as well as lack of monitoring of policy implementation hamper effective and successful policy implementation.

In order to ensure an institutionalization of regular energy policy monitoring aiming at developing and clarifying policies, the Ministry of Economy and Energy shall assign one or more new or existing authorities or agencies with the overall control and responsibilities for monitoring policy implementation. The establishment of the responsible agency could take up to six months. In particular this monitoring agency should:

- Monitor implementation effectiveness, cost-effectiveness/cost-benefit-analysis and impact analysis/socio-economic side effects;
- Focus on clarifying policies, monitoring for compliance, continuous improvement and appropriate use of funds;

- Summarize the results of the monitoring and recommendations in an evaluation report.

Recommendation 2: Least-Cost Investment Plan for District Heating

Between 1990 and 2005, the output of district heating systems declined by a factor of four. The reasons are twofold: firstly, district heating equipment is more than 20 years old and secondly, heat losses in the transmission network vary between 17 per cent and 20 per cent. The degradation of district heating systems in Bulgaria points out the need for further action and support to investments by the municipal entities.

In order to overcome the degradation of the district heating systems in Bulgaria the Ministry of Economy and Energy in cooperation with the State Energy and Water Regulatory Commission should develop regularly a least-cost investment plan for district heating. The time frame for elaboration of the least-cost investment plan should be scheduled with six to twelve months, depending on the availability of dat. The two above mentioned institutions should:

- Valuate costs and benefits of measures within the least-cost investment plan, such as optimization of heat supply systems (e.g. housing modernization programme), heat load redistribution, improvement of efficiency of heat supply companies, loss reduction, balancing centralized and de-centralized heating, cogeneration development, and metering;
- Ensure that the outcome of this investment plan should be a ranking of least-cost investment including a budget estimation, as well as an evaluation of suitable financing instruments (e.g. the leasing model applied in Ukraine [see page 307]).

Recommendation 3: Transparent Public Procurement Guidelines

Corruption and diffused criminality remain a widespread problem in Bulgaria, which should be addressed quickly in order to establish framework conditions which are in line with those of other Eastern European EU Member States such as Hungary or Slovenia. Regarding energy efficiency and renewable energy corruption might affect most specifically public procurement transactions.

In order to ensure transparency in public procurement transactions, specifically regarding procurement opportunities, contract evaluation and award procedures, which will increase the market share of energy efficiency and thereby increase the public awareness of these projects, the Ministry of Finance should:

- Introduce transparent Standard Bidding Documents, which ensure that procurement notices present exact details regarding the procurement method being sought, specifications of the required goods, works or services, recommended time frame for bid submissions, a clear indication of the closing date and time for receiving bids and opening date and time, any fees required to be paid to receive tender documents (this is meant for administrative and production costs of bidding documents);
- Ensure that for the public procurement of energy efficiency and renewable energy services or goods sustainable energy criteria are applied within the Standard Bidding Documents;
- Consider a time frame of six months for the elaboration and implementation, assuming a swift agreement on the terms between the governmental parties.

Recommendations to overcome lack of awareness and human capacities for the preparation of bankable projects

Recommendation 4: National Education, Training and Public Awareness Programme

The awareness on energy efficiency and renewable energy appears to be high in Bulgaria, compared to most other countries in the project region. However, the total supply of primary energy sources per capita is an indicator for general lack of awareness and/or lack of professional capacities at the municipal level. The current degradation state of district heating systems indicates lack of awareness and professional capacities in the public sector.

In order to ensure that energy efficiency and renewable energy will benefit from an exchange of information, experience and best practice at all levels, including, in particular, the public sector, it is highly recommended that a follow up and nationwide implementation of the UNDP pilot project Energy Efficiency Demonstration Zone in Gabrovo (see section 16.1) will be initiated. Several demonstrations in the fields of street lighting, district heating and buildings retrofit have translated capacity building to reality. The project should enhance energy efficiency planning and management as well as the integration of renewable energy systems at municipal level and raise public awareness for energy efficiency and renewable energy. The nationwide implementation of this programme would take several years, assuming approximately twelve months per set up of Demonstration Zone. The Center for Energy Efficiency, the Ministry of Economy and Energy in cooperation with international organizations such as the United Nations Development Programme should enhance the diffusion of results from Gabrovo to other municipalities, capacity building, including training of municipal officers and project developers, development of municipal programmes for sustainable energy, design of energy efficiency and renewable energy projects and the use of the relevant financial mechanism.

Recommendation 5: Capacity Building for Policy Makers

Awareness of governmental institutions appear to be widespread and mainly driven by the requirement of compliance to EU regulations and targets for energy efficiency and renewable energy sources; both the awareness and the availability of resources at the regulatory level are witnessed by the high level of regulatory activity in Bulgaria. Nevertheless, it is necessary for Bulgaria to ensure the successful monitoring of policy implementation.

In order to ensure successful monitoring of policy implementation it is necessary to provide adequate funding and training for the staff of ministries, regulators and other governmental or municipal agencies with responsibilities in the energy sector (see recommendations for Belarus in section 18.2). The Center for Energy Efficiency (EnEffect) in cooperation with the Ministry of Economy and Energy, would be the ideal institution with the necessary capacities to provide the trainings, which should last around six months comprising intensive training sessions of up to one week, as well as on the job training. International donors could financially support the capacity building and training.

Recommendation 6: Capacity Building for Local Financing Institutions

The Bulgarian Energy Efficiency and Renewable Energy Credit Line (BEERECL) was developed by the European Bank for Reconstruction and Development in 2004 in close co-operation with the Bulgarian Government and the European Union. The facility extends loans to participating banks for on-lending to private sector companies for industrial energy efficiency and small renewable projects. Since April 2004, the EUR 100 million BEERECL facility has developed 149 sustainable energy projects, disbursed loans of EUR 81.4 million, and provided incentive grants of EUR 13.7 million to project developers (see section 16.5). Despite the availability of the Bulgarian Energy Efficiency and Renewable Energy Credit Line, the limited number of participating banks (currently two) points out a lack of awareness on potential financial benefits as well as possibly also the lack of technical understanding for project evaluation in the local banking sector.

In order to increase the number of participating banks and BEERECL funded projects, assistance and training in refining, standardizing and evaluating loan applications, and appraisal procedures to local banks is recommended. The assistance and training could be organized jointly by the European Bank for Reconstruction and Development and experts from the Bulgarian Energy Efficiency Fund. The time frame for the implementation of compact training session could be six months. Periodical training should accompany the bank officers from pilot to full operation during two to three years.

18.5. *Conclusions and Recommendations for Croatia*

Box 29: Summary of proposed recommendations for future policy reforms in Croatia

Croatia has adopted solid and broad energy policies with a medium-term vision of a sustainable energy system. This has enabled the effective implementation of energy reforms including the adoption of a regulatory framework and the development of policies to enhance renewable energy and energy efficiency. Continuous efforts are needed to further formulate policy and design tools (e.g. forecasts, least-cost plans and indicators) for effective and efficient implementation and monitoring. Therefore the implementation of the following recommendations is recommended for Croatia:

1. **Monitoring of Policy Implementation:** In order to strengthen the implementation of adequate regulatory measures, the Government via a newly established National Agency for Renewable Energy and Energy Efficiency should evaluate the implementation effectiveness, cost-effectiveness, as well as the socio-economic effects of policy measures employed.
2. **Establishment of National Agency for Renewable Energy and Energy Efficiency:** In order to strengthen the growth of renewable energy and energy efficiency in Croatia, the Ministry of Economy, Labor and Entrepreneurship should establish a National Agency for Renewable Energy and Energy Efficiency.
3. **Public Procurement Guidelines:** In order to set a good example regarding investments, maintenance and other expenditure in energy efficiency and renewable energy use, the Ministry of Finance should introduce sustainable energy criteria in tendering procedures for public procurement.
4. **Transparent One-Stop Authorization:** In order to reduce the administrative burden for the developer related to the authorization of new projects, the Ministry of Economy, Labor and Entrepreneurship and the Ministry of Environmental Protection and Physical Planning and Construction in cooperation with the Croatian Energy Regulatory Agency should establish one single responsible authorization, which will set clear guidelines for authorization procedures.
5. **Master Plan Transmission Grid:** In order to facilitate an increased investment in the grid infrastructure, the Ministry of Economy, Labor and Entrepreneurship in close cooperation with the Croatian Energy Regulatory Agency, the Croatian Energy Market Operator and the transmission and distribution system operator, should elaborate a Master Plan Transmission Grid.
6. **Strengthen Available Financing Schemes:** In order to provide small independent project developers access to available credit lines the institutional credit lines provided for instance by the Croatian Bank for Reconstruction and Development or the Environmental Protection and Energy Efficiency Fund should aggregate and bundle similar projects into one financing package or cluster them.
7. **Adaptation of existing Feed-in Tariff for Electricity from Renewable Energy Sources and Cogeneration**: Due to the absence of an economic incentive for heat production, the Ministry of Economy, Labor and Entrepreneurship via the Croatian Electricity Market Operator should ensure that support for cogeneration is based on the useful demand for heating and cooling and primary energy savings and should implement feed-in tariffs that incentivize high efficiency cogeneration plants.
8. **National Education, Training and Public Awareness Program:** In order to create a positive image for investments in sustainable energy, the Croatian Government with participation of local and regional authorities should develop suitable information, awareness-raising, guidance, or training programs.
9. **Capacity Building for Policy Makers:** In order to ensure successful monitoring of policy implementation recommended to overcome legal, institutional and administrative barriers, the Government should provide adequate funding and training for the staff of ministries, regulators and other governmental or municipal agencies with responsibilities in the energy sector.

10. **Capacity Building for Local Financing Institutions:** In order to raise awareness about the availability of funding schemes and to improve the expertise on energy efficiency and renewable energy projects within commercial banks, the Croatian Bank for Reconstruction and Development (HBOR) in cooperation with participating banks, HEP ESCO and international institutions should conduct intensive marketing including information dissemination about schemes to project developers and client enterprises and provide support to local banks in terms of assistance and training.

Recommendations to overcome legal, institutional and administrative barriers

Recommendation 1: Monitoring of Policy Implementation

Croatia has well advanced in the proper implementation of laws, strategies, and action plans promoting energy efficiency and renewable energy. However, adequate regulatory measures, such as the building code or the regulation on biofuels, necessary to foster investment, lack behind: implementation of existing regulation, monitoring for compliance, continuous improvement and appropriate use of funds rather than development of new policies would be crucial.

In order to strengthen the implementation of adequate regulatory measures, the Government of Croatia should:

- Evaluate implementation effectiveness, cost-effectiveness as well as the socio-economic side effects of policy measures employed in order to further develop and improve existing policy measures (as recommended for Bulgaria);
- Assign the overall control and responsibility for monitoring and reporting to the National Agency for Renewable Energy and Energy Efficiency as recommended below.

Recommendation 2: Establishment of National Agency for Renewable Energy and Energy Efficiency

Croatia disposes of a significant potential regarding energy efficiency and renewable energy; however lack of a dedicated governmental agency or institution hampers the extensive growth of renewable energy and energy efficiency in Croatia.

In order to strengthen the growth of renewable energy and energy efficiency in Croatia, the Ministry of Economy, Labor and Entrepreneurship should:

- Establish a National Agency for Renewable Energy and Energy Efficiency, which shall be responsible for elaborating, implementing, and monitoring renewable energy and energy efficiency policy, and service to facilitate and promote cooperation between the ministries, local authorities, and utilities (the set-up until start of operation could take between six to twelve months);
- Allocate adequate as a prerequisite for the agencies to be active.

Recommendation 3: Public Procurement Guidelines

A reform of the public procurement system and full harmonization of the Croatian legal framework with the European Union acquis is a priority of the Government of the Republic of Croatia. The aim of regulating public procurement procedures is to ensure more competitiveness and prevent any discrimination against tenderers, and at the same time improve transparency in the business operations of the contracting authority in property rights relations. Croatia has already made an important step by adopting the new Public Procurement Act on January 1, 2008. Nevertheless, the introduction of sustainable energy criteria in tendering procedures for public procurement is recommended.

In order to set a good example regarding investments, maintenance and other expenditure in energy efficiency and renewable energy use, the Ministry of Finance should introduce, within the existing Public Procurement Act, sustainable energy criteria in tendering procedures for public procurement of e.g. electrical appliances, heating devices and energy services, or when renting, purchasing or refurbishing buildings.

Recommendation 4: Transparent One-Stop Authorization

Croatia disposes of a high renewable energy potential, especially regarding electricity from wind generation. More than 122 projects have been announced to the Ministry of Economy, Labor and Entrepreneurship so far. However, complex authorization procedures requiring e.g. about 20 different permits for the development of renewable energy projects for energy production are a major barrier towards the development of sustainable energy projects. Numerous ministries, national and local institutions are involved in the permission and authorization process in Croatia. Lack of coordination between authorities often leads to delays, investment uncertainty and a multiplication of necessary efforts.

In order to reduce the administrative burden for the developer related to the authorization of new projects, the Ministry of Economy, Labor and Entrepreneurship and the Ministry of Environmental Protection and Physical Planning and Construction in cooperation with the Croatian Energy Regulatory Agency should:

- Establish one single responsible authorization (one-stop authorization; the set-up of this authorization including the selection of adequate specialists from other governmental agencies could take between six to twelve months);
- Implement clear guidelines for authorization procedures;
- Incorporate obligatory response periods for the authorities;
- Establish approval rates as a tool for checking the streamlining of authorization procedures.

Recommendation 5: Master Plan Transmission Grid

There is a high potential for wind power development in Croatia. Currently, research is being carried out on the potential construction of wind farms of a total installed capacity of about 1,500 MW. Due to the high profitability of the wind power plants, mostly based on the feed-in-tariffs, at present more than 5,000 MW of new wind capacity are being considered for development. However, the transmission grid can accommodate at present a maximum capacity of around 360 MW.

In order to facilitate an increased investment in the grid infrastructure in the short and medium term, the Ministry of Economy, Labor and Entrepreneurship in close cooperation with the Croatian Energy Regulatory Agency, the Croatian Energy Market Operator and the transmission and distribution system operator, should:

- Elaborate a Master Plan Transmission Grid with indicative overall and intermediate targets, description and cost-benefit evaluation of planned measures, time schedule for implementation, monitoring, and reporting (the expected time frame for the elaboration is approximately six months);
- Identify and evaluate the needs for an upgrade and expansion of the transmission capacity;
- Look at strategies for overcoming planning hurdles, sharing costs, accessing equipment, and assessing priority actions;
- Identify market mechanism and funding models;
- Define a horizon plan for the successful integration of renewable energy projects in the grid.

Recommendations to overcome economic and financial barriers

Recommendation 6: Strengthen Available Financing Schemes

One main economic barrier for the development of energy efficiency and renewable energy projects are capital constraints, i.e. long payback periods and high upfront costs which are difficult to access for small independent project developers. At the same time, however, several credit lines for energy efficiency and renewable energy are available in Croatia and many financial resources remain unused, pointing out the necessity for a further economic stimulation of the demand for energy services and renewable energy sources.

In order to provide small independent project developers access to available credit lines and help them to overcome the economic barrier of high upfront costs and long payback periods, the institutional credit lines provided by the Croatian Bank for Reconstruction and Development (HBOR) or the Environmental Protection and Energy Efficiency Fund should aggregate and bundle similar projects into one financing package or replicate these projects in a large number of similar enterprises or situations. Another solution to overcome the mentioned barriers could be clustering. The cluster approach can bring specialized technical support and outreach to smaller enterprises along with follow-up loan provisions based on a standardized, replicable model that can result in substantial reductions in transaction costs per loan.

The ESCO portfolio guarantee offered by the Bulgarian Energy Efficiency Fund (BEEF) is a good example for a clustering solution. BEEF signs a framework agreement with the Energy Service Company (ESCO) to issue a portfolio guarantee for a pre-approved portfolio of projects. If the ESCO wins a tender for an energy efficiency project, BEEF approves the project and adds it to the portfolio of the approved projects. BEEF guarantees that it will cover up to five per cent (the percentage is negotiable) of the defaults of the delayed payments of this portfolio. With this guarantee, the ESCO gets better interest rates on its debt with commercial banks and security that there is a five per cent failsafe trigger that will prevent cash flow disruptions and will reduce the risk of the clients. In case of payment delays, BEEF will act as financial buffer to absorb the shocks.

Recommendation 7: Adaptation of existing Feed-in Tariff for Electricity from Renewable Energy Sources and Cogeneration

In August 2007, the Government of the Republic of Croatia instituted a feed-in tariff system, requiring the Croatian Electricity Market Operator (HROTE) to off-take the electricity produced from renewable energy sources or efficient cogeneration units. However, due to the absence of an economic incentive for heat production the advantages of the co-generated, useful heat are lost.

In order to promote cogeneration, the Ministry of Economy, Labor and Entrepreneurship via the Croatian Electricity Market Operator (HROTE) shall ensure that support for cogeneration – existing and future units – is based on the useful demand for heating and cooling and primary energy savings[lxxxi]. Feed-in tariffs for heating and cooling can be designed to incentivize high efficiency cogeneration plants, for example by ensuring they reach a minimum efficiency threshold to qualify for support. High efficiencies can further be encouraged by linking the bonus level to the efficiency. In order to ensure the success of these measures, the Government should:

- Set the tariff sufficiently high to allow for an attractive return on investment by linking the tariff to the price of fuel to avoid, as far as possible, fuel-price risk;
- Provide a sufficiently high duration of the feed-in contract, which is typically ten to 20 years, in order to strengthen investor confidence;
- Consider that the remuneration should as far as possible reflect the environmental, social, and network benefits that cogeneration provides.

Recommendations to overcome lack of awareness and human capacities for the preparation of bankable projects

Recommendation 8: National Education, Training and Public Awareness Program

Lack of awareness among final energy consumers has been identified to be one of the main bottlenecks for the development of a domestic market for energy efficiency and renewable energy projects in Croatia. Additionally the lack of information regarding ESCO business models for performance contracting has so far prevented private companies from developing energy efficiency projects on a bigger scale. The planned obligation to perform energy audits and energy certification of buildings will be gradually introduced from April 2010 onwards. However, in order to perform these energy audits, specifically trained energy auditors are required.

In order to create a positive image for investments in sustainable energy, the Croatian Government with participation of local and regional authorities should:

- Develop suitable information, awareness-raising, guidance, or training programmes in order to inform citizens of the benefits and practicalities of developing and using energy from renewable sources and energy efficiency measures;
- Tailor information dissemination to the end-user in order to ensure an effective information dissemination;
- Organize and implement advertising campaigns, information dissemination on energy labels and standards, advice on behavioral practices, information dissemination through energy auditors, and capacity building for project developers, architects, installers etc;
- Allocate additional resources for the training programmes and information dissemination.

[lxxxi] Energy savings obtained by combined production instead of separate production of heat and electricity.

Recommendation 9: Capacity Building for Policy Makers

Government institutions and policy makers seem not to be entirely immune from lack of awareness on the relevance of reaching the targets for energy efficiency and renewable energy sources. The abandonment of the establishment of an Agency for energy efficiency and renewable energy sources appears to be an indicator of this tendency. Furthermore, the implementation of existing regulation, monitoring for compliance, continuous improvement and appropriate use of funds rather than development of new policies are crucial on the part of the government institutions and policy makers.

In order to ensure successful monitoring of policy implementation recommended to overcome legal, institutional and administrative barriers, the Government should provide adequate funding and training for the staff of ministries, regulators, and other governmental or municipal agencies with responsibilities in the energy sector. The implementation of these trainings can take up to two years (see Case Study of Slovenia in section 16.6), while the financial costs are considered to be below USD 100,000.

Recommendation 10: Capacity Building for Local Financing Institutions

Commercial banks appear to have a rather low level of awareness and expertise on energy efficiency and renewable energy projects, as these are – despite the availability of credit lines from the government and from international financing institutions – still considered not to be business as usual. Additionally, the promotion of available funds specifically intended for such kind of projects among bank clients is virtually non-existent, leading to the case of available financing mechanisms remaining unused.

In order to raise awareness about the availability of funding schemes and to improve the expertise on energy efficiency and renewable energy projects within commercial banks, the Croatian Bank for Reconstruction and Development (HBOR) in cooperation with participating banks, HEP ESCO, and international institutions (e.g. European Bank for Reconstruction and Development, the United Nations Development Programme) should:

- Conduct intensive marketing including dissemination of information about schemes to project developers and client enterprises;
- Provide support to local banks in terms of assistance and training in refining, standardizing and evaluating loan applications and appraisal procedures (the timeframe for a compact training should be around six months, while periodical training accompanying the move from pilot to full operation should be over a time period of two to three years).

18.6. *Conclusions and Recommendations for Kazakhstan*

Box 30: Summary of proposed recommendations for future policy reforms in Kazakhstan

Kazakhstan has vast primary energy resources (e.g. gas, oil, coal), and is not only able to meet domestic energy demands, but also to export energy resources in significant amounts. Energy policy objectives are presented throughout a number of documents (strategies, concepts, etc.). The reconstruction and modernization of existing power plants with focus on cogeneration, the development of renewable electricity generation, and investments in modern heating technologies are main objectives of the government's energy policy as described in the Regional Analysis. Nevertheless, several barriers could be identified in Kazakhstan. Therefore, the following recommendations are suggested for Kazakhstan:

1. **Monitoring of Policy Implementation:** In order to ensure an institutionalization of regular energy policy monitoring aiming at developing and clarifying policies, the Ministry of Energy and Mineral Resources shall assign one or more new or existing authorities with the overall control and responsibilities for monitoring policy implementation.
2. **Provincial Energy Strategies:** Decentralization of regulation and administration from national to provincial level, calls for the development and implementation of provincial energy strategies based on the targets formulated in the relevant national strategies.
3. **Transparent Public Procurement Guidelines:** In order to ensure transparency in public procurement transactions, specifically regarding procurement opportunities, contract evaluation, and award procedures, the Ministry of Finance in cooperation with the Ministry of Energy and Mineral Resources should introduce transparent Standard Bidding Documents.
4. **Creation of Energy Agencies Network:** In order to reinforce the implementation and monitoring of energy efficiency and renewable energy policy, the Ministry of Energy and Mineral Resources should establish a network of Provincial Energy Agencies supervised by a National Energy Agency.
5. **Least-Cost Investment Plan for District Heating:** In order to overcome the degradation of the district heating systems in Kazakhstan, the Ministry of Energy and Mineral Resources in cooperation with the Agency of the Republic of Kazakhstan on Regulation of Natural Monopolies should develop regularly and implement a least-cost investment plan for district heating.
6. **Transparent Grid Connection Procedures:** In order to overcome the lack of accounting rules for the grid costs, the Committee of Governmental Energetic Surveillance in cooperation with the Agency of the Republic of Kazakhstan on Regulation of Natural Monopolies should ensure that final accounting rules are formulated and summarized in a guideline.
7. **Small Municipalities Energy Efficiency and Renewable Energy Finance Facility:** In order to stimulate energy efficiency and renewable energy investments at municipal level, a dedicated fund such as the EU/EBRD Small Municipalities Finance Facility could be established by the Kazakh Government in cooperation with international donors.
8. **Adaptation of existing Law supporting Renewable Energy Use:** In order to ensure guaranteed financial incentives in combination with obligation to purchase electricity from renewable energy and preferential grid access, the Agency of the Republic of Kazakhstan on Regulation of Natural Monopolies should introduce an advanced feed-in tariff scheme.
9. **National Education, Training and Public Awareness Programme:** In order to create a positive image for investments in sustainable energy, the Kazakh Government with participation of a network of Provincial Energy Agencies should develop suitable information, awareness-raising, guidance or training programmes. A training and certification programme for energy auditors should be one core area.
10. **Capacity Building for Policy Makers:** In order to ensure a successful implementation of renewable energy and energy efficiency policy and to overcome legal, institutional, and administrative barriers, it is necessary to provide in cooperation with international donors adequate funding and training for the staff of ministries, regulators, provincial, and municipal authorities with responsibilities in the energy sector.

11. **Capacity Building for Local Financing Institutions:** In order to raise awareness about the availability of funding schemes international institutions such as the EBRD jointly with participating banks and the Kazakh Government should conduct intensive marketing and support local banks in terms of assistance and training in refining, standardizing and evaluating loan applications and appraisal procedures.

Recommendations to overcome legal, institutional and administrative barriers

Recommendation 1: Monitoring of Policy Implementation

The Energy Sector Development Programme until 2030 sets the framework for the promotion of energy efficiency and renewable energy in Kazakhstan. However, there are few signs of progress in policy implementation, e.g. the Law on Energy Savings of 1997 was never effectively implemented.

In order to ensure an institutionalization of regular energy policy monitoring aiming at developing and clarifying policies, analogous to Belarus and Bulgaria, the Ministry of Energy and Mineral Resources of the Republic of Kazakhstan shall assign one or more new or existing authorities or agencies for the overall control and responsibility for monitoring of policy implementation. The establishment of the responsible agency could take up to six months. In particular this monitoring agency should:

- Monitor implementation effectiveness, cost-effectiveness/cost-benefit analysis and impact analysis/socio-economic side effects;
- Focus on clarifying policies, monitoring for compliance, continuous improvement, and appropriate use of funds;
- Summarize the results of the monitoring and recommendations in an evaluation report.

Recommendation 2: Provincial Energy Strategies

Kazakhstan suffers from a lack of provincial strategies on energy efficiency and renewables, which is particularly serious, since the vast size of the country and the diverse energetic conditions of the 14 provinces call for the development and implementation of provincial strategies.

Decentralization of regulation and administration from national to provincial level, calls for the development and implementation of provincial energy strategies based on the targets formulated in the relevant national strategies. It will be the tool for development, monitoring, evaluation and constant further development of a sustainable energy policy taking into consideration the specific conditions and potentials for energy efficiency and renewable energy in the respective region. The time table for implementation, monitoring and reporting should be determined by the Ministry of Energy and Mineral Resources of the Republic of Kazakhstan. Furthermore, the Ministry of Energy and Mineral Resources of the Republic of Kazakhstan in cooperation with the respective provincial authorities should:

- Indicative overall and intermediate targets;
- Provide a description as well as ex-post evaluation of the current measures promoting energy efficiency and renewable energy (e.g. laws, regulations, support and financing instruments available on municipal, regional, national, and international level, soft measures such as information campaigns, training, and capacity building initiatives etc.);
- Provide a description of new measures including authority in charge for implementation, and expected date of implementation;
- Conduct an ex-ante evaluation of the expected contribution of each measure in place and planned to reach the overall and intermediate target in terms of energy saved and socio-economic effects;
- Ensure that the results of the provincial energy strategies will be summarized and incorporated in relevant national strategies.

Recommendation 3: Transparent Public Procurement Guidelines

Despite the efforts made by the Kazakh Government to support a positive environment for foreign investments, international observers point out administrative restrictions for foreign investments as well as increasing diffused corruption. These restrictions prevent foreign companies in investing in energy efficiency and renewable energy projects in Kazakhstan.

In order to ensure transparency in public procurement transactions, specifically regarding procurement opportunities, contract evaluation, and award procedures, which will increase the market share of energy efficiency and thereby increase the public awareness of these projects, the Ministry of Finance in cooperation with the Ministry of Energy and Mineral Resources should:

- Introduce transparent Standard Bidding Documents, which ensure that procurement notices present exact details regarding the procurement method being sought, specifications of the required goods, works or services, recommended time frame for bid submissions, a clear indication of the closing date and time for receiving bids and opening date and time, any fees required to be paid to receive tender documents (this is meant for administrative and production costs of bidding documents);
- Ensure that for the public procurement of energy efficiency and renewable energy services or goods sustainable energy criteria are applied within the Standard Bidding Documents.

Recommendation 4: Creation of Energy Agencies Network

Kazakhstan currently lacks an institutional organization in charge of implementation and monitoring of energy efficiency and renewable energy policy. While there is currently no discussion on going regarding the establishment of an institutional organization in charge of renewable energy policy, the Committee of governmental energetic surveillance is in discussion to be the responsible governmental agency related to energy efficiency.

In order to reinforce the implementation and monitoring of energy efficiency and renewable energy policy, it is recommended that the Ministry of Energy and Mineral Resources of the Republic of Kazakhstan will establish a network of Provincial Energy Agencies supervised by a National Energy Agency. Allocation of adequate funding is a prerequisite for the agencies to be active, while the time frame of the establishment of the National and Provincial Energy Agencies could take up to twelve months. The National as well as Provincial Energy Agencies should:

- Have the primary responsibility for implementation and monitoring of energy efficiency and renewable energy policy;
- Provide capacity building and reinforcement of local communities, project developers, and private investors for development of cooperation with local and regional authorities;
- Facilitate private and public sector investments in sustainable energy.

Recommendation 5: Least-Cost Investment Plan for District Heating

Due to lack of funds for maintenance and renovation of district heating systems, which are often more than 20 years old, investment needs are significantly high. Very limited funds have been spent on maintenance and renovation of the district heating systems, which are often more than 20 years old, and the investment needs are significantly high. Furthermore the total heat losses in the distribution systems are about 40 per cent.

As recommended for Bulgaria, in order to overcome the degradation of the district heating systems in Kazakhstan, the Ministry of Energy and Mineral Resources in cooperation with the Agency of the Republic of Kazakhstan on Regulation of Natural Monopolies should develop regularly a least-cost investment plan for district heating. The two above mentioned institutions should:

- Evaluate costs and benefits of measures within the least-cost investment plan, such as optimization of heat supply systems (e.g. housing modernization programme), heat load redistribution, improvement of efficiency of heat supply companies, loss reduction, balancing centralized and de-centralized heating, cogeneration development, and metering;
- Ensure that the outcome of this investment plan should be a ranking of least-cost investment including a budget estimation, as well as an evaluation of suitable financing instruments (e.g. the leasing model applied in Ukraine [see page 307]).

Recommendation 6: Transparent Grid Connection Procedures

Procedures related to grid connection and accounting rules for the grid costs are not yet formulated in Kazakhstan.

In order to overcome the lack of accounting rules for the grid costs, the Committee of Governmental Energetic Surveillance in cooperation with the Agency of the Republic of Kazakhstan on Regulation of Natural Monopolies should:

- Develop a route-map of the application process;
- Collect background information about the electricity industry, in terms of its structure and the regulatory framework that underpins the connection process;
- List technical issues that commonly arise during connection negotiations, and their implications for distribution system operators (DSOs) and developers;
- Provide a description of the main factors affecting connection costs and timescales for achieving connection;
- Develop an identification of different contracts that relate to the connection;
- Ensure that the final accounting rules for grid costs are formulated and summarized in a guideline.

Recommendations to overcome economic and financial barriers

Recommendation 7: Small Municipalities Energy Efficiency and Renewable Energy Finance Facility

There are currently no provisions for the establishment of national of municipal funds dedicated to energy efficiency and renewable energy in Kazakhstan. This lack of municipal funds is a barrier towards sustainable development at local level.

To overcome this barrier and stimulate energy efficiency and renewable energy investments at municipal level, a dedicated fund such as the EU/EBRD Small Municipalities Finance Facility could be established by the Kazakh Government in cooperation with international donors. The European Bank for Reconstruction and Development provided long-term credit lines in the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovak Republic, Slovenia as well as Bulgaria and Romania. The time frame for the set-up of the fund depends heavily on the political decision making process; but a one year period should be feasible. The duration of the fund should be at least three years in order to provide security to investors. In particular the Fund should:

- Meet the need for long-term funding for municipal infrastructure and energy efficiency investments;
- Use local intermediaries to reach smaller municipal borrowers than EBRD can directly;
- Share risk with the banks to encourage them to extend the maturities of municipal loans;
- Build the institutional capacity of banks in municipal finance, in particular with respect to energy efficiency, in line with Case Study 6 “Sustainable Energy Financing Facilities - Dedicated Loan Facilities to Local Banks Undertaking Energy Efficiency Projects – Case Study of Bulgaria”;
- Improve the creditworthiness of small municipal borrowers through programmes to enhance creditworthiness;
- Enhance the capacity of municipalities to structure and apply for financing for energy efficiency investments as described in Case Study 1 “Energy Efficiency Demonstration Zone – Case Study of Bulgaria”.

Recommendation 8: Adaptation of existing Law supporting Renewable Energy Use

The Law on Support of the renewable energy sources use adopted by the Kazakh Parliament in June 2009 foresees preferential grid access, a purchase obligation as well as the provision of land plots for the construction of renewable power plants. However, the fact that tariffs have to be negotiated bilaterally between the project developer and the Ministry of Energy and Mineral Resources is a clear barrier towards investments in renewable energy projects. Investors in renewable energy generation require announced and guaranteed financial incentives in combination with obligation to purchase electricity from renewable energy sources and preferential grid access.

As recommended for Albania, (see section 18.1) the adoption of an advanced feed-in tariff scheme is highly recommended. In particular this advanced feed-in tariff scheme, which should be developed by the Agency of the Republic of Kazakhstan on Regulation of Natural Monopolies, should:

- Ensure the least cost approach while considering future technology development, changes in market competition and optimum resource utilization;
- Focus on technology-specific and size specific tariffs supporting different technologies while avoiding windfall profits for cheaper technologies;
- Contain stepped tariffs according to site conditions (e.g. average wind speed);
- Incorporate tariff degression over time for new installations in order to reflect economies of scale and learning;
- Front load the payment stream considering increased tariffs for the first years of a project while decreasing tariffs in the last years, without increasing the total sum of financial support, similarly to a scheme applied e.g. in Germany for wind energy;
- Contain a maximum time period of e.g. ten to 20 years depending on the renewable energy sources.

Recommendations to overcome lack of awareness and human capacities for the preparation of bankable projects

Recommendation 9: National Education, Training and Public Awareness Programme

Lack of awareness among different public administrations, the financing sector and final customers has been identified to be one of the main bottlenecks for the development of a domestic market for energy efficiency and renewable energy projects in Kazakhstan.

To overcome this barrier and to create a positive image for investments in sustainable energy, the Kazakh government with participation of a network of provincial energy agencies recommended above, should:

- Develop suitable information, awareness-raising, guidance or training programmes in order to inform about the benefits and practicalities of developing and using energy from renewable sources and energy efficiency measures;
- Include information dissemination and advertising campaigns, advice on behavioral practices and capacity building;
- Develop and implement in cooperation with international donors a training and certification programme for energy auditors in accordance with the Slovenian Energy Auditing Programme (EAP) (Case Study 7 “Enhancement of Awareness-Raising through the Development of a Network of Certified Energy Auditors – Case Study of Slovenia”).

Recommendation 10: Capacity Building for Policy Makers

The huge availability of natural, in particular fossil fuel, has so far prevented to the public administration to develop an awareness and also potential benefits from energy efficiency and renewable energy projects.

In order to ensure a successful implementation of renewable energy and energy efficiency policy and to overcome legal, institutional, and administrative barriers, it is necessary to provide adequate funding and training for the staff of ministries, regulators, provincial and municipal authorities with responsibilities in the energy sector. The time frame for a compact training should be around six months comprising intensive training session of up to one week as well as on the job training. The Kazakh Resarch Institute of Power Engineering named after Sh. Ch. Chokin would be a suitable institution to provide the trainings in cooperation with international experts.

Recommendation 11: Capacity Building for Local Financing Institutions

By the end of 2008, the EBRD established the Kazakhstan Sustainable Energy Financing Facility (KAZSEFF) providing USD 75 million in the form of dedicated credit lines to local financial institutions for on-lending to private sector companies to finance investments in energy efficiency in the industrial sector and small renewable energy projects. However, the general awareness regarding the availability of funding schemes is low in Kazakhstan.

In order to raise awareness about the availability of funding schemes international institutions such as the European Bank for Reconstruction and Development jointly with participating banks and the Kazakh Government should:

- Conduct intensive marketing including dissemination of information about schemes to local financing institutions;
- Support local banks in terms of assistance and training in refining, standardizing and evaluating loan applications and appraisal procedures in order to increase expertise with financing energy efficiency and renewable energy projects.

18.7. *Conclusions and Recommendations for the Republic of Moldova*

Box 31: Summary of proposed recommendations for future policy reforms in the Republic of Moldova

The Republic of Moldova is one of the poorest countries of Europe, facing problems regarding energy and the rational use of natural resources. According to the Country Analysis, the Republic of Moldova has no reserves of coal and gas, insignificant reserves of petroleum, and a low potential for hydro power. This has led to a high dependence on energy imports (mainly from the Russian Federation and Ukraine) with import levels reaching 98 per cent of the total energy consumption. Therefore, active use of renewable energy sources and increased energy efficiency would be essential for Moldova to decrease the dependency on imports. In particular the following recommendations are suggested for the Republic of Moldova:

1. **Monitoring of Policy Implementation:** In order to ensure an institutionalization of regular energy policy monitoring aiming at developing and clarifying policies, the Ministry of Economy shall assign one or more new or existing authorities with the overall control and responsibilities for monitoring policy implementation.
2. **Transparent Public Procurement and Tendering Guidelines:** In order to ensure transparency in public procurement transactions, specifically regarding procurement opportunities, contract evaluation, and award procedures, the Ministry of Finance in cooperation with the Ministry of Economy should introduce transparent Standard Bidding Documents applying also sustainable energy criteria.
3. **Adaptation Land Code and Spatial Planning:** In order to overcome the excessive fragmentation of land ownerships and the discrimination of Non-Moldovians regarding the purchase of agricultural or forestry land the Government of the Republic of Moldova should adjust the existing legal framework taking into consideration the specific needs of new renewable energy initiatives.
4. **Master Plan Transmission Grid:** In order to ensure security, transparency and reliability of operations of the transmission grid, the Ministry of Economy in close cooperation with the National Agency for Energy Regulation (ANRE) and the transmission system operator should elaborate a Master Plan Transmission Grid.
5. **Biomass for Energy Programme:** In order encourage the sustainable use of untapped biomass resources, the Ministry of Environment in cooperation with the Ministry of Economy should develop, implement, and monitor a Biomass for Energy Programme.
6. **Financial Incentives for Energy Efficiency and Renewables (excluding renewable electricity):** In order to overcome the lack of public funding for energy efficiency and renewable projects, the establishment of a fund by the Government of the Republic of Moldova in cooperation with international donors is recommended.
7. **Small Municipalities Energy Efficiency and Renewable Energy Finance:** In order to stimulate energy efficiency and renewable energy investments at municipal level, a dedicated fund, such as the EU/EBRD Small Municipalities Finance Facility should be established by the Moldovian Government.
8. **Adaptation of Support Scheme for Renewable Electricity:** In order to improve the current feed-in tariff methodology, which does not provide for announced and guaranteed financial incentives, the National Agency for Energy Regulation (ANRE) should adopt an advanced feed-in tariff scheme.
9. **National Education, Training and Public Awareness Programme:** In order to create a positive image for investments in sustainable energy, the Moldovian Government should develop suitable information, awareness-raising, guidance or training programmes.
10. **Capacity Building for Policy Makers:** In order to ensure successful monitoring of policy implementation, recommended as measure to overcome legal, institutional and administrative barriers, it is necessary to provide adequate funding and training for the staff of ministries, regulators and other governmental or municipal agencies.

11. **Capacity Building for Project Developers:** In order to improve the skills regarding business development and the preparation of bankable project proposals, the national government in cooperation with participating banks and international donors should provide capacity building including dissemination of information about available schemes in combination with training on how to develop bankable projects.

Recommendations to overcome legal, institutional and administrative barriers

Recommendation 1: Monitoring of Policy Implementation

With the Energy Strategy until 2020, the Republic of Moldova has introduced the legal framework to promote renewable energy and energy efficiency investments. However, lack of information of policy implementation e.g. the revision of the current Law on Energy Conservation or the new feed-in tariff promoting renewable energy generation, which is not operational yet, hampers effective and successful policy implementation.

In order to ensure an institutionalization of regular energy policy monitoring aiming at developing and clarifying policies, analogous to Belarus and Bulgaria, the Ministry of Economy of the Republic of Moldova shall assign one or more new or existing authorities or agencies for the overall control and responsibility for monitoring of policy implementation. The establishment of the responsible agency could take up to six months. In particular this monitoring agency should:

- Monitor implementation effectiveness, cost-effectiveness/cost-benefit analysis and impact analysis/socio-economic side effects;
- Focus on clarifying policies, monitoring for compliance, continuous improvement and appropriate use of funds;
- Communicate policy requirements to all concerned parties using appropriate strategies;
- Summarize the results of the monitoring and recommendations in an evaluation report.

Recommendation 2: Transparent Public Procurement and Tendering Guidelines

Lack of public tendering process discriminates private investments in energy efficiency and renewable energy projects in the Republic of Moldova.

In order to ensure transparency in public procurement transactions, specifically regarding procurement opportunities, contract evaluation and award procedures and promote sustainability within public procurement the Ministry of Finance in cooperation with the Ministry of Economy should:

- Introduce transparent Standard Bidding Documents, which ensure that procurement notices present exact details regarding the procurement method being sought, specifications of the required goods, works or services, recommended time frame for bid submissions, a clear indication of the closing date and time for receiving bids and opening date and time, any fees required to be paid to receive tender documents (this is meant for administrative and production costs of bidding documents);
- Ensure that for the public procurement of energy efficiency and renewable energy services or goods sustainable energy criteria are applied within the Standard Bidding Documents.

Recommendation 3: Adaptation Land Code and Spatial Planning

The excessive fragmentation of land ownerships is a barrier to the development of large scale biomass projects. This is due to the fact that future developments of renewable energies were not taken into account when national and regional authorities implemented the land codes and drew up their spatial plans. Furthermore Non-Moldovians are not allowed to buy agricultural or forestry land.

In order to overcome the excessive fragmentation of land ownerships and the discrimination of Non-Moldovians regarding the purchase of agricultural or forestry land, which both are a barrier to the development of large scale biomass projects, the Government of the Republic of Moldova should:

- Adjust the existing legal framework taking into consideration the specific needs of new renewable energy initiatives and adapt the land code (this measure requires long lead time of several years);
- Stimulate authorities to anticipate the development of future projects in their region by allocating suitable areas, these measures does not require the adaption of the land code and is therefore a suitable short term instruments to overcome the above mentioned barrier;
- Allow Non-Moldovians to purchase agricultural land for the purpose of developing large scale biomass projects.

Recommendation 4: Master Plan Transmission Grid

Lack of security, transparency and reliability of operations of the transmission grid are a barrier to the realization of renewable electricity projects. Currently, the balancing of the electricity system is undertaken by Ukraine.

In order to ensure security, transparency, and reliability of operations of the transmission grid, the Ministry of Economy in close cooperation with the National Agency for Energy Regulation (ANRE) and the transmission and distribution system operator, should:

- Elaborate a Master Plan Transmission Grid with indicative overall and intermediate targets, description and cost-benefit evaluation of planned measures, time schedule for implementation, monitoring, and reporting (the expected time frame for the elaboration is approximately six months);
- Identify and evaluate the needs for an upgrade and expansion of the transmission capacity;
- Look at strategies for overcoming planning hurdles, sharing costs, accessing equipment, and assessing priority actions;
- Identify market mechanism and funding models;
- Define a horizon plan for the successful integration of renewable energy projects in the grid.

Recommendation 5: Biomass for Energy Programme

The Republic of Moldova has a huge potential for energetic use of fuel wood, agricultural and forestry waste currently unused.

In order to encourage the sustainable use of untapped biomass resources, the Ministry of Environment in cooperation with the Ministry of Economy should develop, implement, and monitor a Biomass for Energy Programme. The Biomass for Energy Programme shall mobilize so far unused biomass resources from forestry, agriculture and related industries, increase and accelerate the availability of biomass as energy source in the Republic of Moldova. Within the Biomass for Energy Programme, the Ministry of Environment should:

- Promote the enhanced co-operation and information exchange between market players such as farmers, forest owners, utilities, wood, and food processing industry;
- Establish quality criteria and guidelines for the energetic use of biomass resources;
- Start up support for the development and implementation of regional pilot and demonstration projects;
- Provide capacity building on biomass logistics for farmers;
- Determine the potential of biomass resources per region;
- Indicative overall and intermediate targets;
- Provide a description and ex-ante evaluation of measures to accelerate the use of biomass for energy;
- Establish a timetable for the implementation, monitoring and reporting of the programme, whose preparation could take around six to twelve months, while the duration should be at least three years.

Recommendations to overcome economic and financial barriers

Recommendation 6: Financial Incentives for Energy Efficiency and Renewables (excluding renewable electricity)

There are currently no public funds for projects in energy efficiency or renewable energy available in the Republic of Moldova. This lack of public funding is an economic barrier for energy efficiency and renewable energy projects in the Republic of Moldova.

In order to overcome the lack of public funding, the establishment of a fund by the Moldovian Government in cooperation with international donors according to Case Study 6 "Sustainable Energy Financing Facilities - Dedicated Loan Facilities to Local Banks Undertaking Energy Efficiency Projects – Case Study of Bulgaria" is recommended. Proper fund establishment should comprise market transformation elements as well as training and risk mitigation. The time frame for the set-up of the fund depends heavily on the political decision making process: but a one year period should be feasible. The duration of the fund should be at least three years in order to provide security to investors. In particular the fund should:

- Support renewable heating systems, cogeneration as well as energy efficiency measures and shall be open to private business and households;
- Promote accompanying measures such as energy audits and the installation of metering devices is highly recommended;
- Consider the bundling of small scale renewable energy and energy efficiency projects as option to reduce transaction costs;
- Select the key areas of support and key sectors based on the available energy savings potential as well as the cost-benefit ratio to be evaluated.

Recommendation 7: Small Municipalities Energy Efficiency and Renewable Energy Finance

Lack of availability of public funds hampers the development of municipal energy efficiency and renewable energy projects. The current situation of degradation and disrepair of municipal district heating system is one example for symptomatic lack of financial means for municipalities.

To overcome this barrier and stimulate energy efficiency and renewable energy investments at municipal level, a dedicated fund such as the EU/EBRD Small Municipalities Finance Facility could be established by the Moldovian Government. The time frame for the set-up of the fund depends heavily on the political decision making process; but a one year period should be feasible. The duration of the fund should be at least three years in order to provide security to investors. In particular the Fund should:

- Meet the need for long-term funding for municipal infrastructure and energy efficiency investments;
- Use local intermediaries to reach smaller municipal borrowers than EBRD can directly;
- Share risk with the banks to encourage them to extend the maturities of municipal loans;
- Build the institutional capacity of banks in municipal finance, in particular with respect to energy efficiency, according to Case Study 6 "Sustainable Energy Financing Facilities - Dedicated Loan Facilities to Local Banks Undertaking Energy Efficiency Projects – Case Study of Bulgaria";
- Improve the creditworthiness of small municipal borrowers through programmes to enhance creditworthiness;
- Enhance the capacity of municipalities to structure and apply for financing for energy efficiency investments as described in Case Study 1 "Energy Efficiency Demonstration Zone – Case Study of Bulgaria".

Recommendation 8: Adaptation of Support Scheme for Renewable Electricity

The publication of the Methodology for the Determination, Approval and Application of Tariffs for Electricity Generation from Renewable Electric Energy and Fuel provides the basis for investments in renewable electricity. However, the fact that tariffs must be calculated by investors and the lack of benchmarks is a clear barrier for investors. Investors require announced and guaranteed financial incentives.

As recommended for Albania (see section 18.1) the adoption of an advanced feed-in tariff scheme is highly recommended. In particular this advanced feed-in tariff scheme, which should be developed by the National Agency for Energy Regulation (ANRE), should:

- Ensure the least cost approach while considering future technology development, changes in market competition, and optimum resource utilization;
- Focus on technology-specific and size specific tariffs supporting different technologies while avoiding windfall profits for cheaper technologies;
- Contain stepped tariffs according to site conditions (e.g. average wind speed);
- Incorporate tariff degression over time for new installations in order to reflect economies of scale and learning;
- Front load the payment stream considering increased tariffs for the first years of a project while decreasing tariffs in the last years, without increasing the total sum of financial support, similarly to a scheme applied e.g. in Germany for wind energy;
- Contain a maximum time period of e.g. ten to 20 years depending on the renewable energy sources;
- Combine an obligation to purchase electricity from renewable energy sources and preferential grid access.

Recommendations to overcome lack of awareness and human capacities for the preparation of bankable projects

Recommendation 9: National Education, Training and Public Awareness Programme

Lack of awareness is one major bottleneck to the development of a domestic market for energy efficiency and renewable energy projects in the Republic of Moldova.

To overcome this barrier and to create a positive image for investments in sustainable energy, the Moldovian Government should:

- Develop suitable information, awareness-raising, guidance, or training programmes in order to inform about the benefits and practicalities of developing and using energy from renewable sources and energy efficiency measures;
- Include information dissemination on energy labels and standards, advice on behavioral practices, information dissemination through energy auditors according to Case Study 8 “Enhancement of Awareness-Raising through the Development of a Network of Certified Energy Auditors – Case Study of Slovenia”, and capacity building for project developers, architects, installers;
- Implement a dedicated information campaign for farmers in the framework of the Biomass for Energy Programme.

Recommendation 10: Capacity Building for Policy Makers

While technological skills appear to be reasonably well developed in the Republic of Moldova, at the same time they appear to be concentrated in those public institutions that are in charge of the development of the projects (Ministries, University).

In order to ensure successful monitoring of policy implementation, recommended as measure to overcome legal, institutional, and administrative barriers, it is necessary to provide adequate funding and training for the staff of ministries, regulators and other governmental or municipal agencies with responsibilities in the energy sector. The time frame for a compact training should be around six months comprising intensive training session of up to one week as well as on the job training.

Recommendation 11: Capacity Building for Project Developers

The lack of private companies active in the sector of project development is an indicator not only of the lack of financial resources, but also of lack of awareness of the possibilities of investment return offered by the energy sector, and this despite the fact that Moldovan final customers currently pay by far the highest energy tariffs in the entire project region. Furthermore, as the current projects are financed through credit lines of international financial institutions (e.g. the World Bank), very likely there are not enough skills available regarding business development and the preparation of bankable project proposals.

In order to improve the skills regarding business development and the preparation of bankable project proposals, capacity building including dissemination of information about available schemes in combination with training on how to develop bankable projects (see also Case Study 4 "TSKB - Environmental Impact Assessment of Projects – Case Study of Turkey") is highly recommend to accelerate the implementation of private projects. This capacity building and awareness raising initiative should be a joint initiative of international donors in cooperation with participating banks and the national government.

18.8. *Conclusions and Recommendations for Romania*

Box 32: Summary of proposed recommendations for future policy reforms in Romania

Although Romania has the largest oil and gas reserves in Central Europe, it is a net importer of petroleum products. In recent years, the efficient use of energy along the entire energy chain has been a consistent feature of Romanian energy policy as well as the diversification of energy supplies, including the promotion of renewable energies. Nuclear energy generation is another important cornerstone in the energy strategy. Romania's long term policy with regard to energy efficiency and renewable energies should concentrate on:

1. **Energy Wood Programme:** To overcome the barriers related to a more efficient use of energy wood and increase the sensible use of energy wood in Romania, the Ministry of Economy and Finance should develop, implement and monitor a Romanian Energy Wood Programme.
2. **Gas Tariff Reform:** In order to overcome the current situation with gas prices far below opportunity costs and increase the financial viability of energy efficiency projects and thus investments in energy efficiency and revise the current gas prices the Romanian Energy Regulatory Authority (ANRE) should proceed with the liberalization of the gas market and establish a set schedule for gas price increases.
3. **Small Municipalities Energy Efficiency and Renewable Energy Finance**: To overcome the barriers related to the uncertainty about the availability of co-financing on a non-guaranteed basis at municipal level, the Ministry of Economy and Finance should set up a Financing Facility for sustainable energy projects in Romania with the aim to stimulate energy efficiency and renewable energy investments at municipal level.
4. **Capacity Building on Financing Renewable and Energy Efficiency Investments:** In order to overcome the lack of knowledge and awareness with respect to financing of sustainable energy projects and to raise awareness about the availability of funding schemes and increase expertise with financing such projects, the Ministry of Economy and Finance should intensify marketing including dissemination of information about schemes to project developers, municipalities and client enterprises and support local banks with training in loan applications and appraisal procedures.

Recommendations to overcome legal, institutional and administrative barriers

Recommendation 1: Energy Wood Programme

Romania has the highest biomass resource potential outside the EU-15 and ranks second after the United Kingdom regarding expected deployment between 2010 and 2020 in the EU-27. Yet, the current annual allowable cut (AAC) is relatively low compared to wood resources and increment. Barriers to a more efficient use of energy wood in Romania are the lack of modern wood harvesting and forwarding technology combined with lack of information, finance, and trained operators.

To overcome these barriers described above and increase the sensible use of energy wood in Romania, the Ministry of Economy and Finance with its responsibility for developing energy strategies and programmes should:

- Develop, implement, and monitor a Romanian Energy Wood Programme, comparable to the programme described for Albania in section 18.1, which and focus measures and activities on capacity building and information dissemination on biomass logistics for forest owners and large scale energy wood buyers;
- Promote enhanced co-operation and information exchange between market players, financial institutions, and technology providers in the framework of the Energy Wood Programme;
- Expect six to twelve months for the preparation of the programme, while the duration should be at least three years;

- Assign the programme management to the Ministry of Agriculture, Forests and Rural Development or a designed authority, such as the National Forest Administration ROMSILVA.

Recommendations to overcome economic and financial barriers

Recommendation 2: Gas Tariff Reform

Despite considerable increases, gas prices remain far below opportunity costs and the domestic gas price is far below the international import price, e.g. gas prices for industrial users are about 39 per cent below EU average. Therefore, gas tariffs currently in place discourage energy efficiency and operational efficiency behavior and as such represent a barrier towards the implementation of energy efficiency measures and projects in Romania.

In order to overcome the current situation and increase the financial viability of energy efficiency projects, the Romanian Energy Regulatory Authority (ANRE) – analogous to Case Study 2 "Water Efficiency – Tariff Reform Programme – Case Study of the Russian Federation" – should:

- Proceed with liberalization of the gas market;
- Establish a set schedule for gas price increases.

Recommendation 3: Small Municipalities Energy Efficiency and Renewable Energy Finance

The uncertainty about the availability of co-financing on a non-guaranteed basis constitutes a barrier for the implementation of sustainable energy projects at municipal level in Romania.

To overcome this barrier and stimulate energy efficiency and renewable energy investments at municipal level, a dedicated fund such as the EU/EBRD Small Municipalities Finance Facility could be established by the Ministry of Economy and Finance. The time frame for the set-up of the fund depends heavily on the political decision making process; but a one year period should be feasible. The duration of the fund should be at least three years in order to provide security to investors. In particular the Fund should:

- Meet the need for long-term funding for municipal infrastructure and energy efficiency investments;
- Use local intermediaries to reach smaller municipal borrowers than EBRD can directly;
- Share risk with the banks to encourage them to extend the maturities of municipal loans;
- Build the institutional capacity of banks in municipal finance, in particular with respect to energy efficiency according to Case Study 6 "Sustainable Energy Financing Facilities - Dedicated Loan Facilities to Local Banks Undertaking Energy Efficiency Projects – Case Study of Bulgaria";
- Improve the creditworthiness of small municipal borrowers through programmes to enhance creditworthiness;
- Enhance the capacity of municipalities to structure and apply for financing for energy efficiency investments as described in Case Study 1 "Energy Efficiency Demonstration Zone – Case Study of Bulgaria".

Recommendations to overcome lack of awareness and human capacities for the preparation of bankable projects

Recommendation 4: Capacity Building on Financing Renewable and Energy Efficiency Investments

The management of industrial units and local authorities lack knowledge about project financing mechanisms and local banks lack preoccupation, competence and experience in financing renewable energy and energy efficiency projects. This lack of capacity and awareness with regard to financing of energy efficiency and renewable energy projects is a main barrier towards the development of such projects in Romania.

In order to overcome the described lack of knowledge and awareness with respect to financing of sustainable energy projects and to raise awareness about the availability of funding schemes and increase expertise with financing such projects, the Ministry of Economy and Finance should:

- Intensify marketing including dissemination of information about schemes to project developers, municipalities and client enterprises;
- Support local banks in terms of assistance and training in refining, standardizing and evaluating loan applications and appraisal procedures as described Case Study 4 “TSKB - Environmental Impact Assessment of Projects – Case Study of Turkey”;
- Combine this support with capacity building measures for project developers;
- Organize the capacity building and awareness raising initiative as a joint initiative by the Romanian Energy Efficiency Fund, the Romanian Energy Efficiency and Renewable Energy Credit Line and participating banks.

18.9. *Conclusions and Recommendations for the Russian Federation*

Box 33: Summary of proposed recommendations for future policy reforms in the Russian Federation

The main objective of the Russian Energy Strategy 2030 is defined to be the determination of ways of reaching a better quality of fuel and energy mix and enhancing the competitive ability of Russian energy production and services in the world market. The Federal Law on Energy Saving and on Increasing Energy Efficiency and on Introduction of Changes in Selected Legislative Acts of the Russian Federation (approved on 23 November 2009) is likely to be key to the country's efforts in increasing energy efficiency. For this purpose, taking into consideration the latest developments, the long term policy should concentrate on energy safety, effectiveness and renewable energy sources:

1. **Provincial Strategies on Energy Efficiency and Renewable Energy:** In order to promote energy efficiency and renewable energy, taking into consideration specific local conditions, the Russian Government should develop and implement regional and local provincial strategies as forseen in the new Federal Law on Energy Saving and on Increasing Energy Efficiency.
2. **Statistical Data Gathering on Provincial Level:** Swift implementation of the State Information System on Energy Savings and Energy Efficiency Increases as foreseen in the new law on energy efficiency. This information system should also comprise an energy accounting system for large buildings.
3. **Transparent Grid Connection Procedures:** To overcome barriers related to the lack of accounting rules relevant for grid connection of renewable energy power plants, the Federal Agency for Tariffs in cooperation with the Ministry of Energy should formulate grid connection and account rules for grid costs for renewable power plants.
4. **Metering und Consumption Based Billing:** To overcome the barriers related to lack of energy consumption metering and the current billing practices for gas and district heating and increase revenue collection, the Ministry of Energy in cooperation with the newly established National Energy Agency should implement an effective metering and billing programme.
5. **Financial Incentives for Energy Efficiency and Renewables in the Private Sector**: To overcome the barriers related to the lack of public funding, the Russian government should establish a public fund supporting sustainable energy projects in analogy to the recommendations for Albania in addition to the tax incentives foressen by the new energy efficiency law.
6. **Budget Flexibility for State-funded Organizations:** In order to overcome the barriers related to the incompatibility of current budgeting methods for state-funded organizations and energy efficiency, the swift adoption of budgeting principles based on full life-cycle costing as foreseen in the newly adopted energy efficiency is recommended.
7. **National Education, Training and Public Awareness Program:** To overcome the general lack of awareness with regard to renewable energy and energy efficiency the Ministry of Energy should swiftly implement the dedicated provisions in the new energy efficieny law by developing a national guidance or training programme based on existing regional initiatives.
8. **Capacity Building for Policy Makers:** In order to ensure the implementation of renewable energy and energy efficiency policy and to overcome legal, institutional and administrative barriers, the Ministry of Energy should provide funding and training for the staff of ministries, regulators, provincial and municipal authorities.
9. **Capacity Building for Local Financing Institutions:** To overcome the barrier related to the lack of awareness and technical capabilities in local financial institutions, the national government should intensify marketing, dissemination of information, and provide capacity building to increase expertise with financing energy efficiency and renewable energy projects within local banks.

Recommendations to overcome legal, institutional and administrative barriers

Recommendation 1: Provincial Strategies on Energy Efficiency and Renewable Energy

Regional energy efficiency programmes have been developed in more than 40 regions of the Russian Federation. However, the remaining regions of the Russian Federation do not dispose of regional strategies on energy efficiency and renewable energy, which is particularly serious, since the federal subjects of the Russian Federation dispose of a substantial degree of autonomy in the field of energy efficiency and renewable energy sources. Decentralization of regulation and administration from national to provincial level calls for the development and implementation of provincial strategies promoting sustainable energy based on the targets formulated in the relevant national strategies.

The newly adopted Law on Energy Saving and on Increasing Energy Efficiency defines the power and areas of competences for regional and local agencies for energy efficiency. Therefore, it can be expected that the development and implementation of reqional energy policies will start also in those regions which had not undertaken any actions in this direction so far. Additionally, the establishment of local energy efficiency agencies will ensure implementation not only at the regional but also at the sub-regional and municipal level.

Regional and local programmes will be the tool for development, monitoring, evaluation, and constant further development of a sustainable energy policy taking into consideration the specific conditions and potentials for energy efficiency and renewable energy in the respective province (as already recommended for Kazakhstan). Specifically, the newly established Russian Energy Agency should:

- Develop indicative targets, a description and ex-post evaluation of the current measures, a description of new measures as well as an ex-ante evaluation of the expected contribution of existing and future measures in the regional and local programmes;
- Summarize and incorporate the results of the regional and local programmes in the relevant national strategies;
- Determine the time table for implementation, monitoring and reporting.

Recommendation 2: Statistical Data Gathering on Provincial Level

Lack of systemic and comprehensive data gathering is one barrier for creating and monitoring the energy policy. The newly adopted Law on Energy Saving and on Increasing Energy Efficiency foresees the implementation of an state information system on energy savings and energy efficiency increases. Availability and quality of energy data on provincial level is particularly poor.

In order to implement a sound statistical system, which is in line with national and international standards, and develop a reliable information base for the development of energy efficiency projects, the Ministry of Energy should:

- Establish a sound statistical system comprising data collection also on provincial level;
- Constitute an energy accounting system for large buildings (both public and private);
- Proceed with establishing energy efficiency indicators which will assist policy makers in setting priorities and monitoring progress with the implementation of energy efficiency policies and initiatives[225].
- Furthermore, cooperate with international organizations or associations such as the International Energy Association and the Government of the United Kingdom for the transfer of knowledge and the improvement of the collection of energy efficiency indicators.

Recommendation 3: Transparent Grid Connection Procedures

Procedures related to grid connection of renewable energy power plants and accounting rules for the grid costs are not publicly available in the Russian Federation and are thus unclear.

To overcome this barrier related to the lack of accounting rules relevant for grid connection of renewable energy power plants and therefore for the investment in such plants, the Federal Agency for Tariffs in cooperation with the Ministry of Energy should:

- Formulate grid connection and account rules for grid costs for renewable power plants;
- Summarize these rules in a guideline as already recommended for Kazakhstan;

- Include a route-map of the application process, technical issues, account rules for grid costs and an identification of different contracts related to the connection of renewable energy plants to the grid.

Recommendation 4: Metering und Consumption Based Billing

Lack of energy consumption metering and billing for gas and district heating based on floor space are barriers towards energy efficiency. Thus, the new energy efficiency law established a general rule that consumption meters for electricity, gas, heat and water must be installed and put into operation in all existing building by January 2012.

To support the implementation of this provision in the new energy efficiency law and to increase the viability of energy supply systems in the Russian Federation as well as increase revenue collection the Ministry of Energy in cooperation with the newly established National Energy Agency should:

- Elaborate an action plan for a nationwide rollout of individual metering systems according to the newly introduced Law on Energy Saving and on Increasing Energy Efficiency, evaluate different options which are technically possible, financially reasonable, and proportionate in relation to the potential energy savings.
- Implement effective metering of energy consumption and an effective billing system by introducing a nationwide metering incentive programme as already implemented in Rostov: In the framework of this programme, heat metering devices were installed in 357 houses resulting in a heat consumption decrease of 12 to 37 per cent compared to the consumption norms, and a hot water consumption decrease of ten to 33 per cent[229].

Recommendations to overcome economic and financial barriers

Recommendation 5: Financial Incentives for Energy Efficiency and Renewables in the Private Sector

The absence of operational dedicated credit lines (provided by public funds) is a barrier for the development of energy efficiency and renewable energy (excluding renewable electricity) projects. The sole financing mechanisms currently available are commercial loans which are only available for short- to mid-term time periods and to relatively high interest rates.

To overcome this barrier the Government of the Russian Federation should – in addition to the tax incentives foreseen by the new energy efficiency law - establish a public fund supporting sustainable energy projects in analogy to the recommendations for Albania and Belarus. The Russian Government should consider co-funding by international institutions such as the United Nations Economic Commission for Europe, the European Bank for Reconstruction and Development or the World Bank as an option. In particular, the public fund should:

- Provide the possibility for bundling of small scale projects;
- Support renewable heating systems and ensure that cogeneration as well as energy efficiency measures are open to private business and households and support accompanying measures such as energy audits and the installation of metering devices;
- Select the key areas of support and key sectors based on the available energy savings potential as well as the cost-benefit ratio to be evaluated.

Recommendation 6: Budget Flexibility for State-funded Organizations

The current method of budgeting for state-funded organizations does not consider actual energy needs. Expenditures are determined by the government and do not allow to retain or reallocate any savings for long term investments in energy efficiency or renewable energy projects. Furthermore, the usage of energy services is not widely spread. However, special aspects concerning the execution of state and municipal energy service contracts are envisaged by the Russian budgetary legislation as by the one on the placement of state and municipal orders (both being restated by the Law on Energy Saving and on Increasing Energy Efficiency).

In order to overcome the barriers, the swift adoption of budgeting principles based on full life-cycle costing as foreseen in the newly adopted energy efficiency is recommended. The Russian Government should:

- Develop and implement a regulation enabling state-funded companies to enter multi-year contracts;

- Base budgeting principles on full life-cycle costing in order to capture the benefits of long term investments.

Recommendations to overcome lack of awareness and human capacities for the preparation of bankable projects

Recommendation 7: National Education, Training and Public Awareness Program

Lack of awareness among different public administrations, the financing sector and final customers has been identified to be one of the main bottlenecks for the development of energy efficiency and renewable energy projects in the Russian Federation.

To overcome this barrier and to swiftly implement the dedicated provisions in the new energy efficiency law, the Ministry of Energy in cooperation with the National Energy Agency should:

- Develop suitable information, awareness-raising, guidance or training programmes;
- Include information dissemination and advertising campaigns in the programme and advice on behavioral practices and capacity building;
- Base such a national programme on the ongoing regional initiatives.

Recommendation 8: Capacity Building for Policy Makers

The Russian Federation suffers on the institutional level lack of resources dedicated to energy efficiency and renewable energy in terms of manpower and funding.

In order to ensure a successful implementation of renewable energy and energy efficiency policy and to overcome legal, institutional and administrative barriers, the Ministry of Energy should provide adequate funding and training for the staff of ministries, regulators, provincial and municipal authorities with responsibilities in the energy sector.

Recommendation 9: Capacity Building for Local Financing Institutions

The European Bank for Reconstruction and Development, the International Finance Corporation of the World Bank Group or the Nordic Environment Finance Corporation (NEFCO) launched dedicated credit lines financing sustainable energy projects. However, currently the number of projects financed as well as the number of participating banks is limited.

To overcome this barrier and to raise awareness about the availability of funding schemes, the Ministry of Energy in cooperation with international donors should:

- Intensify marketing including dissemination of information about schemes to local financing institutions;
- Increase expertise with financing energy efficiency and renewable energy projects and support local banks in terms of assistance and training in refining, standardizing and evaluating loan applications and appraisal procedures.

18.10. *Conclusions and Recommendations for Serbia*

Box 34: Summary of proposed recommendations for future policy reforms in Serbia

Since 2003, Serbia has developed its energy strategy and established a market-based regulatory framework, enforced by an independent regulator. These efforts were undertaken with the goal of creating a viable and efficient energy market. Key elements include the creation of transparent, attractive and stable conditions for investments in energy efficiency in both supply and demand and to stimulate the use of renewable energy sources. The long term policy with regard to energy efficiency and renewable energies should concentrate on:

1. **Continuation of national framework implementation:** To overcome the barriers related to the slow progress in policy implementation and the insufficient co-ordination among government bodies the Serbian Energy Efficiency Agency (SEEA) should improve the implementation of the national framework on energy efficiency and renewable energy projects.
2. **Least-Cost Investment Plan for District Heating:** To overcome the barriers related to Serbia's district heating system's efficiency the Serbian Energy Agency should develop a regular least-cost investment plan for the district heating system.
3. **Metering und Consumption based Billing for District Heating*:*** To overcome the barriers with regard to the district heating system in Serbia, the Serbian Energy Efficiency Agency (SEEA) should implement effective metering and billing system of heat consumption to increase revenue collection and provide obligatory individual meters in new or refurbished buildings and elaborate an energy efficiency action plan.
4. **Statistical Data Gathering:** To overcome the barriers related to comprehensive data gathering and as such improve the basis for energy policy decisions, the Serbian Energy Agency in cooperation with the statistical office should develop a sound statistical system and constitute a consumption database.
5. **Transparent Authorization for Renewable Energy Projects:** To overcome the barriers related to the lack of transparent authorization procedures for renewable energy projects the Serbian Energy Agency should develop transparent authorization procedures and simplification of procedures for small scale projects.
6. **Adaptation Land Code and Spatial Planning:** To stimulate anticipated future projects and take into consideration the specific needs of new renewable energy initiatives the Ministry of Mining and Energy should allocate suitable areas for anticipated future projects within the area of renewable energy projects and adopt the land code accordingly.
7. **Tariff Reform:** In order to encourage improvements in operating and maintaining efficiency as well as capital investments related to energy efficiency and renewable energy projects, the Serbian Energy Agency should remove district heating subsidies from public budgets, introduce different tariff structures and charges and market-based instruments.
8. **Financial Incentives for Energy Efficiency and Renewables in the Residential Sector:** In order to overcome the lack of public funding for energy efficiency and renewable energy projects in the Serbian residential sector, the Ministry of Finance and the Ministry of Mining and Energy should introduce financial incentives, which support Serbian families in their effort to increase the energy efficiency of their households.
9. **Adaptation and implementation of Feed-In Tariff Electricity from Renewable Energy Sources and Cogeneration:** In order to overcome the barriers towards profitable production of renewable electricity and provide also for an economic incentive for cogeneration, the SEEA should implement an "advanced" feed-in tariff scheme.
10. **National Education, Training and Public Awareness Program:** To overcome the lack of awareness with regard to sustainable energy and the Serbian Energy Agency should develop suitable information and awareness-raising, disseminate this information, and implement a training programmefor energy auditors.

11. **Capacity Building for Policy Makers:** In order to ensure a successful continuation of the national framework implementation recommended to overcome legal, institutional and administrative barriers, the Serbian Energy Agency should provide funding and training for the staff of ministries, regulators and other governmental or municipal agencies.
12. **Capacity Building for Local Financing Institutions:** To increase the number of participating banks for the "Western Balkans Sustainable Energy Credit Line Facility", the Ministry of Finance should organize capacity building as a joint initiative of EBRD and Banca Intesa Beograd including communication about the availability of the facility and training in preparing loan applications.

Recommendations to overcome legal, institutional and administrative barriers

Recommendation 1: Continuation of national framework implementation

Energy efficiency and renewable energy are priorities in the National Energy Strategy of Serbia. The Serbian Energy Efficiency Agency (SEEA) is responsible for implementing energy efficiency programmes, including awareness campaigns and training. However, there are few signs of progress in policy implementation (e.g. the energy efficiency law is currently under development) and there is insufficient co-ordination among government bodies.

To overcome these barriers related to the slow progress in policy implementation and the insufficient co-ordination among government bodies the SEEA in cooperation with the Serbian Energy Agency should:

- Improve the implementation of the national framework on energy efficiency and renewable energy;
- Assign an agency that is accountable for carrying out the role of implementation of the national framework.

Recommendation 2: Least-Cost Investment Plan for District Heating

Serbia's district heating system suffers from relatively low efficiency, even by technical standards of the time at which most of it was built, i.e. 1980 and from lack of development and refurbishment of the heating sector in general.

In order to improve the efficiency of Serbia's district heating system, the Serbian Energy Agency with assistance of SEEA, the Ministry of Finance and supported by international donors should:

- Develop regularly a least-cost investment plan for district heating similar to what was recommended for Bulgaria;
- Make this least-cost investment plan the basis for development and refurbishment of the heating sector in Serbia;
- Include in the least-cost investment plan the evaluation of costs and benefits of different energy efficiency measures such as optimization of heat supply systems, heat load redistribution, loss reduction, balancing centralized and de-centralized heating, and cogeneration and metering;
- Setup the least-cost investment plan in a way that a ranking of least-cost investments including a budget estimation, a time schedule for implementation as well as an evaluation of suitable financing instruments (e.g. the leasing model applied in Ukraine [see page 307]) is part of the outcome.

Recommendation 3: Metering und Consumption based Billing for District Heating

Serbia suffers from a low viability of its district heating system, old and outdated individual meters are often installed in buildings instead of on individual apartment level and hamper an effective billing system with regard to revenue collection.

To overcome these barriers with regard to the district heating system as described above and to increase the viability of the district heating system in Serbia, the SEEA should:

- Implement effective metering of heat consumption and an effective billing system to increase revenue collection;

- Provide obligatory individual meters in new buildings or buildings undergoing major renovations as a first step;
- Elaborate, in a second step, an action plan for a nationwide rollout of individual metering systems, evaluating different options and their technical possibility and financial reasonability, and making sure that the options are proportionate in relation to the potential energy savings and that there are indicative overall and intermediate targets.

Recommendation 4: Statistical Data Gathering

Lack of systemic and comprehensive data gathering is one barrier for creating and monitoring energy policy. Serbia began establishing a framework for energy statistics in 2005. Availability and quality of energy data especially on final energy consumption are still poor.

To overcome these barriers related to comprehensive data gathering and as such improve the basis for energy policy decisions, the Serbian Energy Agency with assistance of the SEEA and the statistical office should:

- Develop a sound statistical system in accordance with international standards such as from the Organization for Economic Co-operation and Development (OECD), EUROSTAT, and the United Nations Economic Commission for Europe (UNECE);
- Constitute a consumption database including the results obtained from planned energy audits which serves as a reliable information base for project developers and supports the monitoring of progress in energy efficiency;
- Setup a further database for renewable energy projects as well as the use of fuel wood and as such allow the monitoring of progress in renewable energy;
- Assign the legal capacity to collect, progress, and publish appropriate energy statistics to the Statistical Office.

Recommendation 5: Transparent Authorization for Renewable Energy Projects

In Serbia, authorization procedures for renewable energy projects are complex in general, and lack of simplification for small scale projects disadvantage independent project developers due to high transaction costs. The authorization procedures are hardly transparent and as such project development is hampered.

To overcome the barriers related to the lack of transparent authorization procedures for renewable energy projects the Serbian Energy Agency should:

- Develop transparent authorization procedures as described in section 18.1;
- Develop simplification of procedures for small scale projects.

Recommendation 6: Adaptation Land Code and Spatial Planning

Land ownership issues are complicated in Serbia and can hinder the planning of renewable energy projects, especially for biomass and wind energy projects, due to long appeal periods. Furthermore, Serbia is facing a lack of updated topographical maps. This is mainly due to the fact that future developments of renewable energies were not taken into account when national and regional authorities implemented the land codes and drew up their spatial plans.

To stimulate anticipated future projects without undergoing the time consuming adjusting of the existing legal framework, which might hamper the realization of the initiative, and at the same time taking into consideration the specific needs of new renewable energy initiatives, the Ministry of Mining and Energy should:

- Allocate suitable areas for anticipated future projects within the area of renewable energy projects in each region;
- Adopt the land code to take into account the need of new renewable energy projects in a further step.

Recommendations to overcome economic and financial barriers

Recommendation 7: Tariff Reform

Current district heating subsidies from the public budget hamper energy efficiency in the district heating sector both on the supply and demand side. Furthermore, Serbia does not take into consideration *environmental costs* (e.g. CO_2, SO_x, or NO_x emissions released) associated with mainly coal-based energy production and consumption. By not accounting the environmental costs, Serbia artificially lowers the energy costs. These are among the main barriers towards the development of profitable energy efficiency and renewable energy projects within district heating.

In order to overcome the current situation and encourage energy efficiency improvements in operation and maintenance as well as capital investments related to energy efficiency and renewable energy projects, the Serbian Energy Agency should in line with Case Study 2 "Water Efficiency – Tariff Reform Programme – Case Study of the Russian Federation":

- Remove district heating subsidies from public budgets;
- Introduce different tariff structures and charges;
- Introduce market-based instruments (e.g. taxes, charges, emission trading) to give incentives to limit external effects, this could be e.g. tax rates in proportion to the carbon content of the fuel used for electricity and district heating generation.

Recommendation 8: Financial Incentives for Energy Efficiency and Renewables in the Residential Sector

Currently, the residential sector - Serbia's second largest energy consumer – lacks public funding for energy efficiency and renewable energy projects. This is one of the main barriers with respect to the setup of energy efficiency and renewable energy projects in the Serbian residential sector.

In order to overcome this lack of public funding for energy efficiency and renewable energy projects in the Serbian residential sector, SEEA in cooperation with the Ministry of Finance and international donors should introduce financial incentives, which could support Serbian families in their effort to increase the energy efficiency of their households. Such efforts include investments in the modernization of wall insulation, replacement of windows, biomass efficient heating systems, solar water heaters and efficient gas boilers and others.

Comparable funding schemes were implemented successfully by the European Bank for Reconstruction and Development in Bulgaria and Slovakia:

- EUR 50 million EBRD Credit Line Framework with Bulgarian banks for on-lending to individuals for energy efficiency investments in residential sector granting so far 23,700 sub-loans with a total amount of EUR 35.4 million;
- EUR 60 million EBRD Credit Line Framework with Slovak banks. Eligible projects include residential energy efficiency (incl. housing associations), energy investments in industry and renewable energy projects. A portfolio of 208 residential energy efficiency projects (~11,000 standard flats refurbished and 33,000 people benefiting from lower energy bills and better thermal comfort) and 17 industrial energy efficiency/renewable energy projects were financed with EUR 34 million. A pipeline of EUR 20 million is under preparation.

Recommendation 9: Adaptation and implementation of Feed-In Tariff Electricity from Renewable Energy Sources and Cogeneration

Although the Energy Law provides for subsidies for electricity generation from renewable energy sources, waste and cogeneration and a corresponding law is currently under development, currently there are no economic incentives for heat production from cogeneration. This appears to be one of the main barriers towards profitable production of heat from cogeneration.

In order to overcome the barriers towards profitable production of renewable electricity and provide also an economic incentive for combined heat and power production, SEEA should implement an advanced feed-in tariff scheme as suggested for Albania in section 18.1, which should:

- Be set sufficiently high to allow for an attractive return on investment and also involve linking the tariff to the price of fuel to avoid, as far as possible, fuel-price risk;
- Be of sufficient length to provide investor confidence, ie. the typical term of these arrangements is ten to 20 years;

- Ensure that the remuneration should as far as possible reflect the environmental, social and network benefits that cogeneration provides.

Recommendations to overcome lack of awareness and human capacities for the preparation of bankable projects

Recommendation 10: National Education, Training and Public Awareness Program

Lack of awareness among different project stakeholders (e.g. private companies) has been identified to be one of the main bottlenecks for the development of a domestic market for energy efficiency and renewable energy projects in Serbia.

To overcome this barrier and to create a positive image for investments in sustainable energy and in order to inform project stakeholders of the benefits and practicalities of developing and using energy from renewable sources and energy efficiency measures, the Serbian Energy Agency with participation of local and regional authorities should:

- Develop suitable information, awareness-raising, guidance or training programmes;
- Disseminate information tailored to the end-user in order to be effective;
- Include activities such as advertising campaigns, information dissemination on energy labels and standards, advice on behavioral practices and financing opportunities, information dissemination through energy auditors, and capacity building for project developers, architects, installers etc.;
- Implement a training programme for energy auditors as described in the Slovenian Energy Auditing Programme (EAP) (see section 16.6) to reduce the lack of information and awareness in private companies.

Recommendation 11: Capacity Building for Policy Makers

One of the main barriers to the successful implementation of the national framework recommended to overcome legal, institutional and administrative barriers is the lack of funding and training for the staff of ministries, regulators, and other governmental institutions, who are supposed to implement the framework.

In order to ensure a successful continuation of the national framework implementation recommended to overcome legal, institutional, and administrative barriers, the Serbian Energy Agency should, as recommended for Albania in section 18.1, provide adequate funding and training for the staff of ministries, regulators, and other governmental or municipal agencies with responsibilities in the energy sector.

Recommendation 12*: Capacity Building for Local Financing Institutions*

In March 2005, the European Bank for Reconstruction and Development and Banca Intesa Beograd signed the agreement on using the first credit line of EBRD in Serbia within the programme named Western Balkans Sustainable Energy Credit Line Facility. Yet, there is still a limited number of participating banks and lack of awareness and capacity within local banks with regard to this credit line is one of the barriers to the financing and realization of energy efficiency and renewable energy projects in Serbia.

In order to overcome the current situation and increase the number of participating banks, the Ministry of Finance and the Serbian Energy Agency should:

- Raise awareness about the availability of the facility in combination with assistance and training in refining, standardizing and evaluating loan applications and appraisal procedures as described in Case Study 4 “TSKB - Environmental Impact Assessment of Projects – Case Study of Turkey”;
- Organize the capacity building and awareness raising initiative as a joint initiative of EBRD and Banca Intesa Beograd.

18.11. *Conclusions and Recommendations for the former Yugoslav Republic of Macedonia*

Box 35: Summary of proposed recommendations for future policy reforms in the former Yugoslav Republic of Macedonia

As stated in the Country Analysis, a key objective of the former Yugoslav Republic of Macedonia's energy policy is to make the best use of the country's limited capabilities to cover its energy needs, given the limited availability of domestic energy sources. There is an implicit expectation that increased use of renewable energy sources and improved energy efficiency could improve the former Yugoslav Republic of Macedonia's security of energy supply and reduce its energy import dependence. Therefore the implementation of the following recommendations is proposed for the former Yugoslav Republic of Macedonia:

1. **Renewable Energy Action Plan:** In order to successfully develop and implement policy instruments promoting renewable energy growth in the former Yugoslav Republic of Macedonia, the Research Center for Energy, Informatics and Materials (ICEIM-MANU) of the Macedonian Academy of Sciences and Arts should elaborate a Renewable Energy Action Plan to become an integral part of the National Energy Strategy and assign responsibilities for controlling and managing the implementation.
2. **Adoption and Implementation of Draft Energy Efficiency and Renewable Energy Laws:** In order to promote investments in energy efficiency and renewable energy, the Energy Regulatory Commission (ERC) should advance the adoption and implementation of dedicated laws and regulations currently under development such as an advanced feed-in tariff scheme or an Energy Efficiency and Renewable Energy Fund.
3. **Establishment of Municipal Energy Agencies:** In order to implement local energy efficiency programs and action plans and foster capacity and fund raising-ability within the municipalities, the Energy Agency of the Republic of Macedonia should establish a Municipal Energy Agency.
4. **Transparent Public Tendering Procedures:** In order to overcome the lack of transparency and straightforwardness of public tender procedures, the ERC should develop a standard public tender procedure and prepare standard bidding documents.
5. **Energy Wood Programme:** In order to encourage the sustainable use of wood resources, the Ministry of Agriculture, Forestry and Water Economy should develop an Energy Wood Programmeand assign an agency with the management and monitoring of the programme.
6. **Tariff reform:** In order to overcome the partly inadequate structure of energy prices and tariffs the ERC is advised execute an energy tariff reform, considering cost covering price levels and environmental externalities.
7. **Fiscal Incentive for Energy Efficiency and Renewable Energy Applications**: To encourage investments in sustainable energy, the Ministry of Finance in cooperation with the Energy Department of the Ministry of Economy should implement fiscal incentives reducing the tax bufrden of sustainable projects, and in the long-term setup a so called “ecological tax reform”.
8. **Implementation of Feed-In Tariff for Electricity from Renewable Energy Sources**: To overcome the lack of legislation for the implementation of rules and methods dedicated to feed-in tariffs for renewable electricity, the Energy Department of the Ministry of Economy should support the implementation of above mentioned rules and methods by the creation and adoption of relevant legislation.
9. **National Education, Training and Public Awareness Programme:** In order to create a positive image for sustainable energy, the Energy Agency of the Republic of Macedonia should develop awareness-raising campaigns and implement training programmes.
10. **Capacity Building for Policy Makers**: In order to increase the capacity of the personnel of ministries, regulators and governmental and municipal agencies, the Energy Agency of the Republic of Macedonia should provide capacity building with the support from international donors.

11. **Capacity Building on Financing Renewable and Energy Efficiency Investments:** To overcome the lack of knowledge on project financing mechanisms and the availability of funding schemes, the National Energy Agency should organize capacity building in cooperation with international donors and carry out intensive marketing and information dissemination for local banks and project developers.

Recommendations to overcome legal, institutional and administrative barriers

Recommendation 1: Renewable Energy Action Plan

The former Yugoslav Republic of Macedonia has considerable potential of renewable energy sources, namely small hydro power, geothermal, solar, biomass and also wind power. The draft energy strategy currently under revision does not foresee any targets for renewable energy sources other than large hydropower.

In order to successfully develop and implement policy instruments promoting renewable energy growth in the former Yugoslav Republic of Macedonia, the Research Center for Energy, Informatics and Materials (ICEIM-MANU) of the Macedonian Academy of Sciences and Arts should elaborate a Renewable Energy Action Plan combined with periodic monitoring as a foundation for the implementation of such policy instruments. The preparation of the Renewable Energy Action Plan should not take longer than 12 months.

The Renewable Energy Action Plan should cover renewable heating/cooling, electricity and biofuels and become an integral part of the National Energy Strategy. The template for national renewable energy action plans[327] elaborated by the European Commission could be used as a guideline for the Macedonian Renewable Energy Action Plan. Topics to be covered should comprise a summary of national renewable energy policy, a national overall target and sector targets, the planned measures including time schedule of implementation and evaluation of the expected contribution to reach the national target and specific measures for the promotion of the use of energy from biomass (more detailed information is presented in the Energy Wood Programme further below).

Recommendation 2: Adoption and Implementation of Draft Energy Efficiency and Renewable Energy Laws

Dedicated laws and regulations promoting energy efficiency and renewable energy are currently under development but not yet adopted. Even the feed-in tariff for electricity from small hydro power is not yet operational for lack of adoption of governmental acts. As regards energy efficiency, so far the focus has been on measures and tools that support physical improvements within the energy production and end use sector, while the implementation of other powerful instruments have not been emphasized.

In order to promote energy efficiency and renewable energy projects, the adoption and implementation of existing draft governmental acts is highly recommended. Therefore, the Ministry of Economy in cooperation with the Energy Regulatory Commission (ERC) should:

- Adopt an advanced feed-in tariff scheme regarding renewable electricity, as being described and recommended in section 18.1 for Albania;
- Support heat generation from renewable sources financially e.g. by the implementation of an Energy Efficiency and Renewable Energy Fund as recommended below;
- Consider the implementation of instruments such as a reform of energy tariffs, enforcement of technical standards and energy labels or taxation (e.g. environmental tax) in the energy efficiency law currently under development.

Recommendation 3: Establishment of Municipal Energy Agencies

The Energy Law 2006 obliges municipalities to elaborate and implement five-year local energy efficiency programmes and action plans for implementation. However, there is a significant lack of capacities within the municipal authorities. A further barrier towards the implementation of local energy efficiency programmes is the lack of financial possibilities.

In order to overcome the current situation, the Energy Agency of the Republic of Macedonia should:

- Establish Municipal Energy Agencies to increase capacities in the municipal authorities;
- Assign primary responsibilities to those Municipal Energy Agencies for elaboration, implementation and monitoring of local programmes and actions plans for energy efficiency and renewable energy;
- Assign the obligation to facilitate and promote cooperation between the Ministries, local authorities, the National Energy Agency and other municipal energy agencies to one chosen Municipal Energy Agency;
- Allocate adequate funding to the municipal energy agencies as a prerequisite for the agencies to be active.

Recommendation 4: Transparent Public Tendering Procedures

In the former Yugoslav Republic of Macedonia the currently implemented public tender procedures appear to be complex, non-transparent and even non-binding from the client side.

In order to overcome the lack of transparency and straightforwardness of the current public tender procedures, the national government should:

- Develop a standard public tender procedure and standard bidding documents providing transparency about contract evaluation criteria, awarding procedures, time schedule, fees, and contract condition; Timeframe for elaboration and implementation is scheduled with six months, assuming a swift agreement on the terms between the governmental parties;
- Develop a simplified process for smaller sites, to minimize the transaction costs of project developers (see also section 18.4).

Recommendation 5: Energy Wood Programme

Fuel wood plays an important role in meeting the energy and heating needs of the former Yugoslav Republic of Macedonia. However, excessive harvesting of fuel wood in public and privately owned forests, acidification of land and air and regular harvesting of low quality forests for fuel wood for residential heating lead to deforestation[41].

In order to prevent the negative impacts on the climate and environment caused by the excessive use of wood resources and promote the sustainable use of wood resources in the former Yugoslav Republic of Macedonia, the Ministry of Agriculture, Forestry and Water Economy should:

- Develop and implement an Energy Wood Programme to be monitored periodically, which should evaluate current energy wood use and future potential as well as indicate targets for energy wood use, describe measures to accelerate sustainable use of energy wood (e.g. promotion of enhanced co-operation and information exchange between market players, data collection on wood energy demand and supply, observation of price development and capacity building) and indicate a time schedule for implementation, monitoring and programme reporting;
- Assign a new or already existing agency or authority with the management and monitoring of the Energy Wood Programme, which should be prepared within six months and last at least three years.

Recommendations to overcome economic and financial barriers

Recommendation 6: Tariff reform

Due to only partial liberalization of the energy market, energy tariffs in the Former Yugoslav Republic of Macedonia are too low to ensure an adequate return on investments for energy efficiency and renewable energy projects. In addition, the non-consideration of environmental costs associated with mainly fossil fuel based energy production and consumption (40 per cent coal and 34 per cent oil) artificially lowers energy prices representing a further economic barrier for both energy efficiency and renewable energy projects.

In order to overcome the partly inadequate price and tariff structure currently in place in the former Yugoslav Republic of Macedonia, the Energy Regulatory Commission (ERC) should:

- Implement an energy tariff reform comprising the introduction of different tariff structures and charges with an overall tariff design reflecting actual costs of energy generation and supply; and the internalization of environmental externalities;

- Link the proposed tariff reforms with target subsidies allowing prices to reach a cost-recovery level, while ensuring that those people least able to pay the increased prices are compensated accordingly.

Recommendation 7: Fiscal Incentive for Energy Efficiency and Renewable Energy Applications

The investment climate for energy efficiency and renewable energy in the former Yugoslav Republic of Macedonia is among the best in the project region. However, Energy Service Companies (ESCOs) or other investors are currently showing little interest in this market. Absence of fiscal incentives (e.g. investment or production tax exemptions) might be the reason for little tangible progress. Fiscal incentives play an important role in the promotion of sustainable energy, although unlike for biofuels - where tax exemptions have recently stimulated substantial development in some countries – fiscal incentives are secondary instruments to support other instruments rather than being the main support instrument in the majority of the EU 27 countries.

To overcome the barriers described above and improve the investment climate for energy efficiency and renewable energy in the former Yugoslav Republic of Macedonia for ESCOs and other investors the Ministry of Finance in cooperation with the Energy Department of the Ministry of Economy should:

- Announce fiscal incentive schemes guaranteed for a number of years in advance to increase the planning security for project developers;
- Setup a so called “ecological tax reform” e.g. a surcharge on energy consumption (e.g. (increased) taxes on motor fuels, heating fuels and electricity based on fossil fuels). The additional tax income could be used for setting up a Renewable Energy and Energy Efficiency Fund.

Recommendation 8: Implementation of Feed-In Tariff for Electricity from Renewable Energy Sources

In 2007, several Rulebooks on the method and procedure for establishing and approving the use of feed-in tariffs for purchase of electricity produced from biomass, small hydro power plants, wind power plants, and photovoltaic systems were drafted by the Energy Regulatory Commission (ERC) of the former Yugoslav Republic of Macedonia. According to those draft Rulebooks, technology-specific and size specific tariffs should be granted for a time period of 20 years. Until now, the relevant legislation required is not available in the former Yugoslav Republic of Macedonia.

To enable the further development of the electricity generation from renewable energy sources, the Energy Department of the Ministry of Economy should adopt the relevant legislation and implement a feed-in law within the timeframe not longer than 12 months.

Recommendations to overcome lack of awareness and human capacities for the preparation of bankable projects

Recommendation 9: National Education, Training and Public Awareness Programme

Lack of awareness among different project stakeholders (e.g. private companies), has been identified to be one of the main bottlenecks for the development of a domestic market for energy efficiency and renewable energy projects in the former Yugoslav Republic of Macedonia.

To overcome this barrier and to create a positive image for investments in sustainable energy at the Energy Agency of the Republic of Macedonia with participation of local and regional authorities should:

- Develop suitable information, awareness-raising campaigns and programmes, and guidance or training programmes providing information tailored to the end-user in order to be effective and include activities such as advertising campaigns, information dissemination on energy labels and standards, advice on behavioral practices and financing opportunities, information dissemination through energy auditors, and capacity building for project developers, architects, installers etc.;
- Consider a time frame of up to 12 months for the preparation of the national awareness raising campaign, while the duration should be scheduled for a period of minimum three years;
- Include periodic evaluation in order to enhance and improve the programme;

- Implement a training programme for energy auditors in accordance with the Macedonian Rulebook for energy efficiency in new and refurbished buildings comparable to the Slovenian Energy Auditing Programme (EAP) (see section 16.6).

Recommendation 10: Capacity Building for Policy Makers

In general, legal, institutional and administrative barriers have been identified for the former Yugoslav Republic of Macedonia. Such barriers are e.g. lack of training and capacity building for the personnel of Macedonian ministries, regulators, and other governmental and municipal agencies with responsibilities in the energy sector.

To overcome these barriers and to ensure a successful continuation of national framework implementation, the Energy Agency of the Republic of Macedonia in cooperation with international donors should provide adequate and regular training for the staff of ministries, regulators and governmental or municipal agencies.

Recommendation 11: Capacity Building on Financing Renewable and Energy Efficiency Investments

Project developers and local authorities lack knowledge on project financing mechanisms. Local banks to date lack experience in providing credits and investments in energy efficiency and renewable energy projects, despite the availability of different credit lines from the European Bank for Reconstruction and Development, the World Bank, or the United States Agency for International Development.

In order to raise awareness about the availability of funding schemes and to increase expertise with financing energy efficiency and renewable energy projects the Energy Agency of the Republic of Macedonia with support of international donors should:

- Carry out intensive marketing including dissemination of information about schemes to project developers and local financing institutions;
- Support the local banks in terms of assistance and training in refining, standardizing, and evaluating loan applications and appraisal procedures (as described in the Case Study of Bulgaria in section 16.5);
- Develop tailormade training sessions for project developers to increase their capacity on how to develop bankable project proposals;
- Organize the capacity building and awareness raising initiatives as joint initiatives of international donors in cooperation with participating banks and the national government;
- Consider around six months for the implementation of compact training sessions, while periodical training accompanying the move from pilot to full operation should cover two to three years.

18.12. *Conclusions and Recommendations for Ukraine*

Box 36: Summary of proposed recommendations for future policy reforms in Ukraine

Summarizing the results of the Country Analysis, the Ukrainian energy policy is mainly driven by the strong desire to improve energy security and reduce natural gas imports. As the Ukrainian energy policy is mainly focused on energy production from traditional resources (natural gas, oil, nuclear and coal), thus there is much opportunity for increasing energy efficiency. Thus the following recommendations for Ukraine are suggested:

1. **Monitoring of Policy Implementation:** To monitor and enhance energy efficiency and renewable energy policy implementation, ministries, and institutions in charge of energy intensive sectors should establish structural subdivisions or departments responsible for rational energy use. These subdivisions should identify, evaluate, and improve relevant policy measures and incentives schemes to promote the implementation of sustainable energy projects.
2. **National Energy Efficiency and Renewable Energy Action Plan:** In order to overcome the lack of implementation plans for energy efficiency and renewable energy targets, the Ministry of Fuel and Energy in cooperation with the National Agency of Ukraine for the Effective Use of Energy Sources (NAER) and the below mentioned National Renewable Energy Agency should implement a National Energy Efficiency and Renewable Energy Action Plan.
3. **Least-Cost Investment Plan for District Heating:** In order to overcome the lack of maintenance and capital repairs, increase efficiency and restrict distribution losses in the district heating system of Ukraine, the NAER should develop a least-cost investment plan for district heating, which becomes the basis for development and refurbishment of the heating sector.
4. **Tariff reform:** In order to overcome the barriers related to insufficient market structures with regard to electricity, gas, and heat and incomplete market opening in combination with regulated prices on the wholesale market and below-market tariffs for end customers the relevant regulatory bodies should establish tariff reforms in analogy to the recommendations for the Russian Federation, Belarus or the former Yugoslav Republic of Macedonia.
5. **Financial Incentives for Renewable Heat:** In order support the investments in small and large scale renewable heating systems (solar, biomass, geothermal) the Ministry of Fuel and Energy in cooperation with the Ministry of Finance and international donors should establish a public fund supporting heat generation from renewable energy sources.
6. **National Education, Training and Public Awareness Programme**: To overcome the general lack of awareness and to create a positive image for investments in sustainable energy, the Ministry of Fuel and Energy with participation of the National Agency for Efficient Use of Energy Sources and the recommended National Renewable Energy Agency should develop suitable information, awareness-raising, training programs and comprise activities like advertising campaigns as well as implement a training programmefor energy auditors.
7. **Capacity Building on Financing Renewable and Energy Efficiency Investments**: To overcome the barriers related to the lack of project financing capabilities the NAER and the suggested Renewable Energy Agency in cooperation with international donors should raise awareness about the availability of funding schemes, support local banks with assistance and training in standardizing and evaluating loan applications, and organize capacity building on how to develop bankable project proposals for project developers.

Recommendations to overcome legal, institutional and administrative barriers

Recommendation 1: Monitoring of Policy Implementation

The legal framework for promoting energy efficiency and renewable energy in Ukraine is complex and partly fragmented and outdated.

To monitor and enhance energy efficiency and renewable energy policy implementation, ministries and institutions in charge of energy intensive sectors should establish structural subdivisions or departments responsible for rational energy use. These subdivisions should:

- Identify and evaluate relevant policy measures and incentives schemes promoting the implementation of sustainable energy projects;
- Draw justifiable conclusions on how to improve the regulatory framework in Ukraine.

Recommendation 2: National Energy Efficiency and Renewable Energy Action Plan

The Ukrainian Energy Strategy until 2030 has rather ambitious energy efficiency and renewable energy targets (50 per cent reduction of energy intensity and share of 19 per cent of renewable energy sources among primary energy supply). However, in absence of an implementation plan, it is not clear how these targets are going to be reached.

To overcome this barrier the elaboration and implementation of national programmes or action plans with clear timelines and responsibilities, backed up by national and local energy agencies with adequate human and financial resources are a prerequisite for the successful implementation of the Energy Strategy of Ukraine for the period until 2030. The elaboration of such a Action Plans or Programmes takes between 6 to 12 months. Therefore, the Ministry of Fuel and Energy in cooperation with the National Agency of Ukraine for the Effective Use of Energy Sources (NAER) should:

- Elaborate and implement a National Energy Efficiency and Renewable Energy Action Plan, which should include indicative overall and intermediate targets, a description and ex-post evaluation of existing measures, a description of planned measures, an ex-ante evaluation of the expected contribution of each measures as well as a timetable for implementation, monitoring and report of the programme;
- Assign to one or more new existing authorities or agencies the overall control and responsibility for monitoring and reporting.

Recommendation 3: Least-Cost Investment Plan for District Heating

There is no dedicated agency or institution for the development of renewable energy sources. The National Agency of Ukraine for the Effective Use of Energy Sources (NAER) has its institutional priorities on the promotion of energy efficiency. Thus the lack of a dedicated agency or institution dedicated to the promotion of renewable energy hampers its extensive growth.

To increase the efficiency of district heating system of Ukraine, the National Agency of Ukraine for the Effective Use of Energy Sources (NAER) should:

- Develop and implement a least-cost investment plan for district heating as basis for development and refurbishment of the heating sector in Ukraine within a timeframe of max. 12 months and specifically evaluate costs and benefits of different energy efficiency measures such as optimization of heat supply systems, heat load redistribution, loss reduction, balancing centralized and de-centralized heating, cogeneration and metering and finally ensure that the outcome of this investment plan will be a ranking of least-cost investment, including budget estimation, time schedule for implementation as well as evaluation of suitable financing instruments (special focus should be on the evaluation of the leasing model already applied in Ukraine [see page 307]);
- Actively cooperate with the Interbranch Association of Development Heat Supply Systems for an exchange of knowledge, capacity building and contact to the district heating companies.

Recommendations to overcome economic and financial barriers

Recommendation 4: Tariff reform

Insufficient market structures with regard to electricity, gas and heat and incomplete market opening in combination with regulated prices on the wholesale market and below-market tariffs for end customers hinder the realization of energy efficiency and renewable energy projects.

To overcome these barriers described above, the National Electricity Regulation Commission of Ukraine (NERC) should establish a tariff reform in analogy to several other countries such as the Russian Federation, Belarus or the former Yugoslav Republic of Macedonia. The Case Study 2 "Water Efficiency – Tariff Reform Programme – Case Study of the Russian Federation" provides a good example for the successful implementation of a tariff reform. In particular the introduction of different tariff structures and charges, which specifically encourage investments in energy efficiency and renewable energy projects is highly recommended. To ensure that low-income consumers, which are not able to absorb the price increases, are compensated, tariff reforms should be coupled with targeted subsidies.

Recommendation 5: Financial Incentives for Renewable Heat

Lack of a dedicated funding scheme for renewable heat is an economic barrier to the creation of a domestic market for renewables.

To overcome the barriers and to support investments in small and large scale renewable heating systems (solar, biomass, geothermal) the Ministry of Fuel and Energy of Ukraine in cooperation with the Ministry of Finance and international donors should establish a public fund supporting heat generation from renewable energy. The fund should be managed by a newly created or existing authority/agency. In particular, the fund managers should:

- Select key areas and sectors of support, based on the available energy savings and greenhouse gases reduction potential as well as the cost-benefit ratio to be evaluated;
- Ensure that the fund will be open to private business, municipalities, and households;
- Allow bundling of small scale projects and the support of accompanying measures, such as energy audits and the installation of metering devices;
- Consider risk mitigation via a partial risk guarantee as an option for private business projects;
- Establish coordination and cooperation with relevant special interest groups and associations such as the Interbranch Association of Development Heat Supply Systems in order to promote the fund and attract project developers;
- Consider co-funding funding by international institutions such as the United Nations Economic Commission for Europe, the European Bank for Reconstruction and Development or the World Bank.

Recommendations to overcome lack of awareness and human capacities for the preparation of bankable projects

Recommendation 6: National Education, Training and Public Awareness Programme

Lack of awareness has been identified to be one of the main bottlenecks for the enhanced development of energy efficiency and renewable energy projects in Ukraine. The current deterioration of the district heating systems points out not only the lack of financial resources of the Ukrainian municipal administrations but also the lack of awareness and of human capacities for identification of bankable projects: while technical capabilities and professional skills might be available, no expertise is so far available in the sector of project financing and profitability evaluation of projects.

To overcome this barrier and to create a positive image for investments in sustainable energy the National Agency of Ukraine for the Effective Use of Energy Sources (NAER) with participation of the recommended National Renewable Energy Agency (see recommendation 3) should:

- Develop suitable information, awareness-raising campaigns and programmes, and guidance or training programmes providing information tailored to the end-user in order to be effective and include activities such as advertising campaigns, information dissemination on energy labels and standards, advice on behavioral practices and financing opportunities, information dissemination through energy auditors, and capacity building for project developers, architects, installers etc.;

- Consider a time frame of up to 12 months for the preparation of the national awareness raising campaign, while the duration should be scheduled for a period of minimum three years;
- Include periodic evaluation in order to enhance and improve the programme;
- Implement a training programme for energy auditors comparable to the Slovenian Energy Auditing Programme (EAP) (see section 16.6).

Recommendation 7: Capacity Building on Financing Renewable and Energy Efficiency Investments

Project developers and local authorities lack knowledge on project financing mechanisms and local banks to date are reluctant to invest in energy efficiency and renewable energy projects, despite the availability of different credit lines from the European Bank for Reconstruction and Development, the World Bank, or the United States Agency for International Development.

To increase expertise on financing energy efficiency and renewable energy projects, the Ministry of Fuel and Energy in cooperation international donors should:

- Raise awareness about the availability of funding schemes via intensive marketing and information dissemination activities directed to project developers and local financing institutions;
- Support local banks in terms of assistance and training in refining, standardizing and evaluating loan applications and appraisal procedures as described in Case Study 4 "TSKB - Environmental Impact Assessment of Projects – Case Study of Turkey";
- Organize capacity building on how to develop bankable project proposals for project developers as a joint initiative of international donors in cooperation with banks participating in available credit lines dedicated to sustainable energy projects;
- Consider six months for the implementation of compact training sessions, while periodical training accompanying the move from pilot to full operation should cover two to three years.

Chapter 19: Conclusions and Recommendations at the Regional and Sub-Regional Levels

The identification of country-specific policy recommendations to overcome barriers to investments in energy efficiency and renewable energy, which has been conducted in the previous chapter, are based on the consideration of the country-specific political and economic framework.

The present section provides a summarized overview of policy recommendation which are applicable at regional or sub-regional levels. It is recommended that the governments should focus on the following categories of measures, each of which is necessary to achieve the full energy efficiency and renewable potential of the project region:

“Quick Wins” will demonstrate some rapid results and increase political support. These measures can be introduced in less than a year and are likely to produce significant impact at moderate costs.

Examples comprise:

- National Education, Training and Public Awareness Programmes;
- Capacity building for local financial institutions and project developers;
- Flexible budgeting for state-funded organizations;
- Transparent procedures for authorization, public procurement and tendering.

“Essentials” are the backbone of a comprehensive energy efficiency and renewable energy policy, affecting the areas of greatest potential by raising standards and stimulating investments that are already financially viable. Measures comprise:

- Financial incentives for energy efficiency and renewables such as funds and energy finance facilities, feed-in tariffs or fiscal incentives;
- Least-cost investment plan for district heating;
- Master Plan Transmission Grid.

“High Cost, High Return” measures will remove fundamental barriers and will make more energy efficiency and renewable energy investments financially viable. These interventions carry a much higher initial cost to the economy but most of them have a high return in terms of energy savings or renewable energy generation as well and are critical to ensure long lasting impact and sustainability.

Some of these interventions have already been initiated; others are still to be developed:

- Tariff reform;
- Policy framework in terms of strategies, programmes and action plans including monitoring;
- Establishment of institutional structures.

19.1. *Recommendations to Overcome Legal, Institutional and Administrative Barriers*

Policy frameworks

Strategies, plans, and programmes include the policy framework that identifies the measures that can cost-effectively yield energy savings or increase renewable energy generation in the short term, assigns the responsible institutions in charge of developing, implementing and monitoring the policy framework, and indicates the resources assigned for supporting the implementation of the policy framework.

Renewable energy and energy efficiency policy objectives are usually very clear and easy to define. However, programmes and action plans bear to meet the ambitious targets with limited resources and within short timeframes.

Albania and Ukraine are still missing a National Energy Efficiency Programme. Albania, the former Yugoslav Republic of Macedonia, and Ukraine lack a National Renewable Energy Action Plan. For Bosnia and Herzegovina the elaboration of a National Energy Strategy aligning the strategies of both Bosnian entities is recommended, while for Kazakhstan and the Russian Federation, due to their size, climate and geographical differences, the elaboration of Provincial Strategies is considered to be essential. Energy Wood Programmes are recommended for Albania, Bulgaria, Romania and the former Yugoslav Republic of Macedonia facing deforestation due to lack of sustainable forest management. A Biomass Energy Programme is highly recommended for the Republic of Moldova to use their huge biomass potential. The elaboration of a Least Cost Investment Plan for District Heating should become the basis for development and refurbishment of district heating in Bulgaria, Kazakhstan, Serbia, and Ukraine.

Those strategies, programmes, and action plans should have the following content:

- Indicative overall and intermediate targets;
- A description as well as ex-post evaluation of policy measures in place (e.g. laws, regulations, support and financing instruments available on municipal, regional, national and international level, soft measures such as information campaigns, training, and capacity building initiatives etc.);
- A description of new measures including authority in charge for implementation, and expected date of implementation;
- An ex-ante evaluation of the expected contribution of each measure in place and planned to reach the overall and intermediate target in terms of energy saved and socio-economic effects;
- A timetable for implementation, monitoring and reporting of the programme.

Legal and regulatory gaps

Monitoring of policy implementation

Belarus, Bulgaria, Croatia, Kazakhstan, the Republic of Moldova, the Russian Federation, Serbia, the Former Yugoslav Republic of Macedonia, and Ukraine introduced the legal framework to promote renewable energy and energy efficiency investments. However, lack of secondary legislation, enforcement mechanisms and responsibilities for policy implementation or of appropriate monitoring hamper a successful implementation of the policy framework.

The establishment of regular and institutionalized policy monitoring is highly recommended for the group of countries mentioned above. This should involve communicating policy requirements to all concerned parties using appropriate strategies, ensuring that targets of positive support for policy changes are identified, encouraging supporters of policy change to agree to clear statements of need for, and nature of changes and improvement, ensuring that potential resistance to policy change is identified.

The need for further incentives to support policy implementation and available resources for incentives and potential funding bodies have to be identified, most appropriate types of incentives evaluated and incentive requirements accurately prioritized.

A new or existing authority or agency shall be assigned with the overall control and responsibility for monitoring policy implementation. A suitable monitoring system, which is capable of generating valid and reliable data, has to be implemented and performed regularly. A monitoring report summarizing the results and drawing justifiable conclusions should be presented in a suitable format to the decision makers.

The current method of budgeting for state-funded organizations in Belarus and the Russian Federation does not consider actual energy needs. Expenditures are determined by the government and do not allow to retain or reallocate any saving for long term investments in energy efficiency or renewable energy.

Thus, *budgeting principles for state-funded organizations* should be based on full life-cycle costing in order to capture the benefits of long term investments and encourage the usage of energy services.

Transparent procedures (tendering, authorization, grid connection)

Non-transparent regulations and inefficient bureaucracy is a further barrier to investments in renewable energy and energy efficiency projects. Numerous authorities (national, regional and municipal) are involved in the permission process. Lack of coordination between authorities often leads to delays, investment uncertainty and a multiplication of necessary efforts.

Lack of transparency in public procurement and tendering hamper private investments in Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Kazakhstan, the Republic of Moldova and the former Yugoslav Republic of Macedonia. *Standard Bidding* Documents provide a guide to transparency in procurement opportunities and that of contract evaluation and award procedures.

Albania, Croatia and Serbia require clear *guidelines for authorization procedures* to overcome the above mentioned barrier. Obligatory response periods for the authorities involved can be incorporated in such procedures. Setting approval rates can be a tool for checking the streamlining of authorization procedures.

Grid access of renewable energy plants is a challenge to be faced in Croatia, Kazakhstan, the Republic of Moldova, and the Russian Federation. Croatia and the Republic of Moldova require the elaboration of a *Master Plan Transmission Grid*. The Master Plan Transmission Grid shall identify and evaluate the needs for an upgrade and expansion of the transmission capacity, look at strategies for overcoming planning hurdles, sharing costs, accessing equipment and assessing priority actions, and identify market mechanism and funding models for the integration of renewable electricity projects.

Procedures related to *Grid Connection and Accounting Rules* for the grid costs are not yet formulated in Kazakhstan and still unclear in the Russian Federation. To overcome this barrier grid connection and accounting rules for grid costs should be formulated and summarized in a guideline containing the following information:

- Route-map of the application process;
- Background information about the electricity industry, in terms of its structure and the regulatory framework that underpins the connection process;
- Technical issues that commonly arise during connection negotiations, and their implications for distribution system operators (DSOs) and developers;
- Description of the main factors affecting connection costs and timescales for achieving connection;
- An identification of different contracts that relate to the connection.

Adaptation of Land Codes and Spatial Planning

The excessive fragmentation of land ownerships is a barrier to the development of wind and/or large scale biomass projects in the Republic of Moldova and Serbia.

This is due to the fact that future developments of renewable energies were not taken into account when national and regional authorities implemented the land codes and drew up their spatial plans. As adjustments of existing legal framework, taking into consideration the specific needs of new renewable energy initiatives, can take a very long time, and can hamper the realization of the initiative, authorities could be stimulated to anticipate the development of future projects in their region by allocating suitable areas. In a next step, the *adaptation of the land code* is highly recommended.

Metering und consumption based billing

Incomplete metering of energy consumption and billing based on size of the customer's apartment are barriers towards energy efficiency in the Russian Federation and Serbia.

In a first step, the obligatory provision of individual meters in new buildings or buildings undergoing major renovations is recommended. In a second step, an action plan for a nationwide rollout of individual metering systems should be elaborated, evaluating different options which are technically possible, financially reasonable, and proportionate in relation to the potential energy savings and indicating indicative overall and intermediate targets.

Institutional Structures

Once the national policy framework is in place, it needs to be implemented in national, regional and/or municipal level. Implementation requires preparation and training of experts who are skilled and qualified to assess the potential for energy efficiency and renewable energy and to evaluate policy instruments. It is recommended to set up or strengthen the dedicated institutions and empower them to realize the energy efficiency and renewable energy potential, such as a National Agency for Renewable Energy and Energy Efficiency in Croatia, a network of Provincial Energy Agencies under the umbrella of a National Energy Agency in Kazakhstan, Municipal Energy Agencies in the Former Yugoslav Republic of Macedonia and a National Renewable Energy Strategy in Ukraine. For Bosnia and Herzegovina the establishment of a Communication Council facilitating and promoting the cooperation between the Federation of Bosnia and Herzegovina and the Republika Srpska is highly recommended.

Those institutions should ensure the availability of reliable statistical information essential for understanding the current situation and monitoring the effectiveness of policy. Currently, statistical data on a number of sectors, such as buildings or heating is virtually nonexistent in Belarus, Bosnia and Herzegovina, Serbia as well as on provincial level in the Russian Federation. Thus, the development of a *sound statistical system* in accordance with international standards such as from the Organization for Economic Co-operation and Development (OECD), EUROSTAT and the United Nations Economic Commission for Europe (UNECE) is highly recommended.

19.2. *Recommendations to Overcome Economic and Financial Barriers*

Tariff reform

Low-price policy in the energy sector has been identified to be one of the main economic and financial barriers in Belarus (electricity, heat), Bosnia and Herzegovina (electricity, heat), Romania (gas), the Russian Federation, Serbia, the former Yugoslav Republic of Macedonia, and Ukraine (all electricity, heat, gas). Prices and tariffs are considered too low to ensure an adequate return on investment for renewable energy and energy efficiency projects.

Furthermore, Bosnia and Herzegovina, the Russian Federation, Serbia, the former Yugoslav Republic of Macedonia, and Ukraine do not take into consideration *environmental costs* (e.g. CO_2, SO_x, or NO_x emissions released) associated with mainly coal-based energy production and consumption. By not accounting the environmental costs, energy costs are artificially lowered.

A tariff reform will mean not just higher tariffs but also the introduction of different tariff structures and charges which specifically encourage energy efficiency and renewable energy:

- The tariff level, customer classification, and tariff design must reflect as closely as possible the costs as the utility incurs them;
- The tariff must internalize environmental externalities on energy prices;
- Reform determination of service cost in order to encourage improvements in operating and maintenance efficiency as well as capital investments.

Financial incentives

The most comprehensive legislation cannot guarantee that energy efficiency and renewable energy measures are implemented without provisions in place that encourage and support investments.

Financial incentives (e.g. capital grants, third-party finance, investment tax credits, property tax exemptions, production tax credits, sales tax rebates and excise tax exemptions) are focused on cost reductions and improving the relative competitiveness of sustainable energy technologies in given markets.

There are provisions for financing energy efficiency and renewable energy that are included in the policy framework of some countries surveyed that could be beneficial for market development in other countries surveyed. The establishment of a *Public Fund for Energy Efficiency and Renewables* dedicated to investments in the private sector is recommended for Albania, Belarus, Bosnia and Herzegovina, the Republic of Moldova, the Russian Federation, Serbia (focus on residential sector), and Ukraine. In the Republic of Moldova, Kazakhstan, and Romania there is need for long-term funding for municipal infrastructure and energy efficiency investments, therefore the foundation of a *Small Municipalities Energy Efficiency and Renewable Energy Finance Facility* is highly recommended.

The key areas of support and key sectors should be selected based on the available potential for energy efficiency and renewable energy as well as the cost-benefit ratio to be evaluated when developing a National Programme, Strategy or Action Plan. The possibility of aggregation and bundling of similar projects into one financing package combined with specialized technical support along with follow-up loan provisions based on a standardized, replicable model should attract small enterprises.

The investment climate for energy efficiency and renewable energy in the former Yugoslav Republic of Macedonia is among the best in the project region. However, Energy Service Companies (ESCOs) and other investors are currently showing little interest, due to the absence of *fiscal incentives*. Therefore a fiscal incentive scheme should be announced and guaranteed for a couple of years in advance.

Advanced feed-in tariffs

The implementation or adaptation of feed-in tariffs for electricity produced from renewable energy sources or high efficiency combined heat and power plants[lxxxii] are recommended for Albania (other renewables than hydropower), Belarus, Bosnia and Herzegovina, Croatia, Kazakhstan, the Republic of Moldova, Serbia (inclusion of cogeneration), and the former Yugoslav Republic of Macedonia.

Advanced feed-in tariff schemes ensure the least cost approach while considering future technology development, changes in market competition and optimum resource utilization in terms of:

- *Technology-specific and size specific tariffs* supporting different technologies while avoiding windfall profits for cheaper technologies;
- *Stepped tariffs* according to site conditions (e.g. average wind speed);
- *Tariff degression* over time for new installations in order to reflect economies of scale and learning;
- *Front loading the payment stream* considering increased tariffs for the first years of a project while decreasing tariffs in the last years, without increasing the total sum of financial support. This scheme is applied e.g. in Germany for wind energy;
- *A maximum time period* of e.g. ten to 20 years.

Successful fixed tariff schemes were combined with an obligation to purchase electricity from renewable energy sources and preferential grid access.

lxxxii The European Commission published reference efficiency values for the separate generation of electricity and heat in February 2007. The efficiency requirements for a cogeneration plant using biomass are far less stringent to be qualified as “high efficiency” than for a fossil fuel fired plant.

19.3. Recommendations to Overcome Lack of Awareness and Human Capacities for the Preparation of Bankable Projects

Public awareness and information dissemination

Lack of awareness has been identified to be one of the main bottlenecks for the development of a domestic market for energy efficiency and renewable energy projects throughout the whole the project region. Households, companies, and public organizations need know-how on the different possibilities for sustainable energy use, economic and environmental advantages, costs and financial support available, and information on best practice examples.

The national governments with participation of local and regional authorities shall develop suitable *information, awareness-raising, guidance, or training programmes* in order to inform citizens of the benefits and practicalities of developing and using energy from renewable sources and energy efficiency measures.

Information dissemination needs to be tailored to the end-user in order to be effective. Activities comprise:

- *Advertising campaigns* e.g. dissemination of leaflets, development of internet platforms, round tables, announcement in newspapers;
- *Energy labels and standards for lighting, household and industry appliances*. E.g. in the European Union refrigerator standards coupled with a labeling programme increased sales of Class A refrigerators from five per cent in 1995 to 61 per cent in 2005;
- *Energy performance certificate for buildings* ensuring that when buildings are constructed, sold or rented out, an energy performance certificate is made available to the owner or by the owner to the prospective buyer or tenant. In a first step, the focus should be on newly constructed and refurbished buildings, in a second step on sold and rented buildings. Buildings occupied by public authorities and by institutions providing public services to a large number of persons an energy performance certificate shall be placed in a prominent place clearly visible to the public;
- *Advice on behavioral practices, education at schools and information dissemination through energy consultants undertaking energy audits.*

Capacity Building

Capacity building and awareness raising can accelerate the achievement of energy efficiency and renewable energy objectives by introducing decision makers such as policy makers, investors, banks or project developer to state-of-the-art technologies, successful institutional models, innovative financing mechanisms, and practical identification and preparation of bankable projects.

Best practice examples suitable for replication are the Energy Efficiency Demonstration Zone in Bulgaria (see section 16.1) or the Slovenian Energy Auditing Programme (see section 16.6) providing technical skills to project developers, auditors or municipal authorities.

Energy administrations of Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Kazakhstan, the Republic of Moldova, the Russia Federation, Serbia, and the former Yugoslav Republic of Macedonia need to be reinforced to ensure that they have the capacity and means to develop strategies and implement policies promoting energy efficiency and renewable energy projects. Understaffing of energy administrations (including regulators) is a serious problem across the region: employment conditions need to be adequate to attract and retain staff with the required skills and knowledge.

In the Republic of Moldova, Romania, the former Yugoslav Republic of Macedonia, and Ukraine project developers lack knowledge about project financing mechanisms. Therefore, capacity building including dissemination of information about available schemes in combination with training on how to develop bankable projects is highly recommend accelerating the implementation of private projects.

Commercial financing institutions are reluctant to financing energy efficiency and renewable projects; due to lack of experience in evaluation such type of projects. Support to local banks in terms of assistance and training in refining, standardizing and evaluating loan applications and appraisal procedures (see section 16.1) is highly recommended for Albania, Bosnia and

Herzegovina, Bulgaria, Croatia, Kazakhstan, Romania, the Russian Federation, Serbia, the former Yugoslav Republic of Macedonia, and Ukraine.

ANNEXES

Annex 1 - Economic Indicators

VAT rates in the project region

Table A.1.1: VAT rates in the project region

Country	Standard VAT rate
Albania	20%
Belarus	18%
Bosnia and Herzegovina	17%
Bulgaria	20%
Croatia	23%
Kazakhstan	12%
Republic of Moldova	20%
Romania	19%
Russian Federation	18%
Serbia	18%
The former Yugoslav Republic of Macedonia	18%
Ukraine	20%

Source: Deloitte Touche Tohmatsu, Global Indirect Tax Rates (2008)

Currency exchange rates in the project region

Table A.1.2: Currency exchange rate averages in the project region

Country	National currency	Exchange rate EUR (1 EUR = … national currency)				Exchange rate USD (1 USD = … national currency)			
		2006	2007	2008	2009	2006	2007	2008	2009
Albania	Albanian Lek (ALL)	129.17	127.52	125.25	133.59	102.91	93.23	85.59	96.96
Belarus	Belarussian Ruble (BYR)	2,706	2,949	3,165	3,852	2,151	2,151	2,151	2,792
Bosnia and Herzegovina	Convertible Marka (BAM)	1.96	1.96	1.96	1.96	1.56	1.43	1.34	1.42
Bulgaria	Bulgarian Lev (BGN)	1.97	1.96	1.96	1.96	1.57	1.43	1.34	1.42
Croatia	Croatian Kuna (HRK)	7.33	7.35	7.24	7.36	5.84	5.37	4.94	5.35
Kazakhstan	Kazakhstan Tenge (KZT)	164.02	172.45	180.06	206.3	130.59	125.9	122.38	149.37
Republic of Moldova	Moldovan Leu (MDL)	17.1	16.99	15.55	15.55	13.59	12.42	10.58	11.26
Romania	Romanian New Lei (RON)	3.54	3.35	3.7	4.25	2.82	2.45	2.53	3.09
Russian Federation	Russian Rouble (RUB)	34.13	35.03	36.44	44.36	27.19	25.58	24.87	32.23
Serbia	Serbian Dinar (RSD)	87.0	81.7	82.04	94.29	69.36	59.71	56.14	68.5
The former Yugoslav Republic of Macedonia	Macedonian Denar (MKD)	63.15	62.66	62.01	62.08	50.31	45.79	42.36	45.09
Ukraine	Ukrainian Hryvnia (UAH)	6.56	7.09	7.83	11.25	5.22	5.18	5.37	8.15

Source: Oanda

Main economic indicators

Table A.1.3: Main economic indicators in Albania

	2003	2004	2005	2006	2007
GDP at market prices (ALL billion)	683	766	837	909[B]	1,018[B]
GDP (USD billion)	5.6	7.5	8.4	9.3[B]	11.3[B]
Real GDP growth (%)	5.7	5.9	5.5	5.0[B]	6.0[B]
Consumer price inflation (av; %)	2.4	2.3	2.4	2.4	2.9
Population (million)	3.1	3.1	3.2	3.2	3.2[B]
Trade balance (USD million)	-1,336.6	-1,591.6	-1,821.3	-2,122.8	-2,922.6
Exports of goods fob (USD million)	447.1	603.4	656.2	792.9	1,076.0
Imports of goods fob (USD million)	-1,783.4	-2,195.0	-2,477.5	-2,915.7	-3,998.6
Current-account balance (USD million)	-406.8	-358.0	-571.5	-670.8	-1,201.5
Foreign-exchange reserves excl gold (USD million)	1,009.4	1,357.6	1,404.1	1,768.8	2,104.2
Foreign Direct Investment (net inflows USD billion)	1.78	3.41	2.62	3.25	-

Source: Albanian National Agency of Natural Resources[33] (2009)

Table A.1.4: Main economic indicators in Belarus

	2003[A]	2004[A]	2005[A]	2006[A]	2007[A]
GDP at market prices (BYR billion)	36,565	49,992	65,067	79,231	96,087
GDP at market exchange rate (US$ billion)	17.8	23.1	30.2	36.9	44.8
Real GDP growth (%)	7.0	11.5	9.4	9.9	8.2
Consumer price inflation (av; %)	28.4	18.1	10.3	7.0	12.1
Population (mid-year; million)	9.8	9.8	9.8	9.7	9.7[B]
Trade balance (USD million)	-1,248	-2,184	-501	-2,399	-4,418
Exports of goods fob (USD million)	10,076	13,942	16,109	19,838	24,275
Imports of goods fob (USD million)	-11,324	-16,126	-16,610	-22,237	-28,693
Current-account balance (USD million)	-434	-1,194	434	-1,512	-2,875
Reserves excl gold (USD million)	595	749	1,137	1,163	4,445
Exchange rate (official; av; USD 1=BYR)	2,051.3	2,160.3	2,153.8	2,144.6	2,146.07

[A] Actual. [B] Economist Intelligence Unit forecasts. [C] Economist Intelligence Unit estimates

	2003	2004	2005	2006	2007
State Budget Expenditure	n.a	n.a	n.a	n.a.	n.a
FDI (Foreign Direct Investment, net inflows USD billion)	1.72	1.64	3.05	3.54	n.a

Source: Research and Production Communal Unitary Enterprise BelVIEC[61] (2009)

Table A.1.5: Main economic indicators in Bosnia and Herzegovina

	2003[A]	2004[A]	2005[A]	2006[A]	2007[A]	2008[B]
Nominal GDP (USD million)	7,755	9,316	10,040	11,511	14,331	18,254
Nominal GDP (BAM million)	13,443	14,678	15,791	17,950	20,479	23,107
Real GDP growth (%)	3	6.0	5.5	6.2	5.5	5.0
Population (million)	3.8	3.8	3.8	3.8	3.8	3.9
GDP per capita (USD at PPP)	5,198	5,568	5,941	7,132[B]	7,709	8,308
Trade balance (BAM million)	-5,937	-6,410	-7,397	-6,225	-7,962	-6,845
Goods: exports fob (BAM million)	2,428	3,013	3,783	5,164	5,937	5,092
Goods: imports fob (BAM million)	-8,365	-9,423	-11,180	-11,389	-13,899	-11,937
Exchange rate USD 1=BAM (end-period)	1.73	1.57	1.57	1.55	1.34[A]	1.26
Exchange rate EUR 1=BAM (end-period)	1.95	1.95	1.95	1.95	1.95	1.95
Consumer prices inflation (end-period; %)	0.6	0.4	3.7	7.5	1.6	7.5

[A] Actual. [B] Economist Intelligence Unit forecasts. [C] Economist Intelligence Unit estimates

	2003	2004	2005	2006	2007	2008
State Budget Expenditure (BAM million)	536,314	480,568	581,346	954,599	1,013,709	n.a.
FDI (Foreign Direct Investment, net inflows USD billion)	n.a.	1.044	0.823	0.429 (Sept)	n.a.	n.a.

Source: Ministry of Foreign Trade and Economic Relations of Bosnia and Herzegovina[91] (2009)

Table A.1.6: Main economic indicators in Bulgaria

	2003[A]	2004[A]	2005[A]	2006[A]	2007[A]	2008[B]
Nominal GDP (USD million)	20,021	24,679	27,260	31,690	39,551	52,441
Nominal GDP (BGN million)	34,628	38,823	42,797	49,361	56,520	66,386
Real GDP growth (%)	5.0	6.6	6.2	6.3	6.2	6.1
Population (million)	7.8	7.7	7.7	7.6[C]	7.6[C]	7.5
GDP per capita (USD at PPP)	7,718	8,518	9,401[C]	10,395[C]	11,390[C]	12,470
Trade balance (USD million)	-2,576	-3,688	-5,491	-7,028	-10,228	-12,121
Goods: exports fob (USD million)	7,081	9,931	11,776	15,101	18,441	24,656
Goods: imports fob (USD million)	-9,657	-13,619	-17,267	-22,130	-28,669	-36,777
Exchange rate USD 1=BGN (end-period)	1.55	1.44	1.66	1.49	1.51	1.25
Exchange rate EUR 1=BGN (end-period)	1.95	1.94	1.96	1.96	2.20	1.96
Consumer prices inflation (end-period; %)	5.6	4.0	6.5	6.5	15.3	9.7

[A] Actual. [B] Economist Intelligence Unit forecasts. [C] Economist Intelligence Unit estimates

	2003	2004	2005	2006	2007	2008
State Budget Expenditure	n.a	n.a	n.a	n.a.	n.a	n.a
FDI (Foreign Direct Investment, net inflows USD billion)	2.097	2.662	4.252	5.171	n.a	n.a

Source: Center for Energy Efficiency EnEffect[104] (2009)

Table A.1.7: Main economic indicators in Croatia

	2003[A]	2004[A]	2005[A]	2006[A]	2007[B]	2008[C]
Nominal GDP (USD million)	29,672	35,960	38,887	42,925	51,794a	64,305
Nominal GDP (HRK million)	198,951	216,995	231,348	250,590	276,841a	304,175
Real GDP growth (%)	5.3	4.3	4.3	4.8	5.7[A]	4.6
GDP per capita (USD at PPP)	11,321	12,145	13,079	14,138	15,348	16,663
Current account balance (EUR million)	-1,889	-1,434	-1,976	-2,696	-3,223	
Trade balance (USD million)	-7,905	-8,346	-9,342	-10,487	-14,401	-19,023
Goods: exports fob (USD million)	6,311	8,215	8,960	10,644	11,981	15,949
Goods: imports fob (USD million)	-14,216	-16,560	-18,301	-21,131	-26,382	-34,973
Exchange rate HRK:USD (end-period)	6.12	5.67	6.25	5.57	5.04[A]	4.75
Consumer prices (end-period; %)	1.7	2.7	3.6	2.2	8.4[A]	3.5

[A] Actual. [B] Economist Intelligence Unit forecasts. [C] Economist Intelligence Unit estimates

	2003	2004	2005	2006	2007	2008[D]
State Budget Expenditure ('000 HRK)	75.44	81.26	87.32	95.37	108.45	117.33
FDI (Foreign Direct Investment, net inflows EUR billion)	1.762	0.949	1.468	2.745	3.597	n.a.

[D] Plan

Source: Energy Institute Hrvoje Požar[123] (2009)

Table A.1.8: Main economic indicators in Kazakhstan

	2003[A]	2004[A]	2005[A]	2006[A]	2007[A]	2008[B]
Nominal GDP (USD billion)	30.8	43.2	57.1	80.4	103.8	141.6
Nominal GDP (KZT billion)	4,612	5,870	7,591	10,140	12,726	17,091
Real GDP growth (%)	9.3	9.6	9.7	10.6	8.5	5.9
Population (million)	15.0	15.1	15.2	15.4	15.6	15.7
GDP per capita (USD at PPP)	6,904	7,721	8,660[C]	9,766[C]	10,760[C]	11,554
Trade balance (USD million)	3,679	6,785	10,322	14,642	15,141	26,122
Goods: exports fob (USD million)	13,233	20,603	28,301	38,762	48,349	69,420
Goods: imports fob (USD million)	-9,554	-13,818	-17,979	-24,120	-33,208	-43,299
Exchange rate USD 1=KZT (end-period)	144.22	130.00	133.77	127.00	120.30	120.44
Exchange rate EUR 1=KZT (end-period)	181.92	175.99	157.80	167.60	175.67	186.69
Consumer prices inflation (end-period; %)	6.8	6.7	7.5	8.4	18.8	15.5

a Actual. b Economist Intelligence Unit forecasts. c Economist Intelligence Unit estimates

	2003	2004	2005	2006	2007	2008
State Budget Expenditure	n.a	n.a	n.a	n.a.	n.a	n.a
FDI (Foreign Direct Investment, net inflows USD billion)	2.092	4.157	1.975	6.143	n.a	n.a

Source: Kazakh Power Engineering Union[147] (2009)

Table A.1.9: Main economic indicators in the Republic of Moldova

	2003[A]	2004[A]	2005[A]	2006[A]	2007[A]	2008[B]
Nominal GDP (USD million)	1,980.6	2,598.0	2,988.3	3,408.3	4,394.9	5,912.8
Nominal GDP (MDL million)	27,619	32,032	37,652	44,754	53,354	65,041
Real GDP growth (%)	6.6	7.4	7.5	4.8	3.0	6.5
Population (million)	3.6	3.6	3.4	3.4	3.4[C]	3.4
GDP per capita (USD at PPP)	1,918	2,124	2,511	2,710	2,873[C]	3,047
Trade balance (USD million)	-623	-754	-1,192	-1,591	-2,316	-2,820
Goods: exports fob (USD million)	805	994	1,105	1,053	1,361	1,840
Goods: imports fob (USD million)	-1,428	-1,748	-2,296	-2,644	-3,677	-4,660
Exchange rate USD 1=MDL (end-period)	13.94	12.33	12.60	13.13	12.14	11.00
Exchange rate EUR 1=MDL (end-period)	15.77	15.33	15.70	16.49	16.62	17.00
Consumer prices inflation (end-period; %)	15.7	12.5	10.0	14.1	13.1	12.0

a Actual. b Economist Intelligence Unit forecasts. c Economist Intelligence Unit estimates

	2003	2004	2005	2006	2007	2008
State Budget Expenditure	n.a	n.a	n.a	n.a	n.a	n.a
FDI (Foreign Direct Investment, net inflows USD billion)	0.73	0.87	1.97	2.41	n.a	n.a

Source: Climate Change Office of the Ministry of Environment and Natural Resources[176] (2009)

Table A.1.10: Repartition of the Gross Domestic Product of the Republic of Moldova (1993-2008)

	1993	1994	1995	1996	1997	1998	1999	2000
Total GDP	100	100	100	100.0	100.0	100.0	100.0	100.0
Gross Value Added	99.0	93.4	88.6	87.5	86.0	84.6	89.3	87.5
Production, Total	70.2	58.6	54.3	50.6	46.2	42.5	41.9	41.7
Agriculture	31.2	27.3	29.3	27.5	26.0	25.8	24.9	25.4
Industry	39.0	31.4	25.0	23.1	20.2	16.7	17.0	16.3
Services, Total	32.9	38.6	36.6	41.7	43.5	46.9	53.0	48.2
Wholesale and Retail Trade	7.9	7.8	8.0	8.3	8.2	10.3	15.3	12.5
Transports and Communications	4.4	6.3	5.1	5.6	6.5	7.4	8.2	9.5
Construction Sector	3.3	4.5	3.5	3.8	4.7	3.2	3.3	2.7
Financial Sector	4.8	5.2	3.7	6.6	6.0	7.4	8.2	5.3
Other	12.5	15.0	16.3	17.4	18.2	18.7	18.0	18.2
Agent (Intermediary) Services	-4.1	-3.9	-2.2	-4.7	-3.8	-4.8	-5.6	-2.4
Product and Import Taxes, Net	1.0	6.6	11.4	12.5	14.0	15.4	10.7	12.5
	2001	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**
Total GDP	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Gross Value Added	88.0	87.3	85.2	85.9	84.0	83.4	83.0	81.4
Production, Total	41.1	38.3	35.9	34.7	32.2	29.2	24.7	24.5
Agriculture	22.4	21.0	18.3	17.6	16.4	14.5	9.9	9.9
Industry	18.7	17.3	17.6	17.1	15.8	14.7	14.8	14.6
Services, Total	49.2	51.0	51.6	53.5	53.8	56.7	61.1	59.6
Wholesale and Retail Trade	12.0	11.0	10.7	10.6	10.4	11.5	12.0	11.6
Transports and Communications	10.4	10.0	10.8	11.8	12.2	11.8	12.1	12.0
Construction Sector	3.1	2.9	2.9	3.4	3.3	4.0	4.8	5.4
Financial Sector	4.5	4.3	4.5	4.7	4.6	5.0	6.7	6.4
Other	19.2	22.7	22.6	23.0	23.2	24.5	25.5	24.2
Agent (Intermediary) Services	-2.3	-2.1	-2.3	-2.3	-2.0	-2.5	-2.8	-2.7
Product and Import Taxes, Net	12.0	12.7	14.8	14.1	16.0	16.6	17.0	18.6

Source: Ministry of Economy and Trade of the Republic of Moldova, Department of Macroeconomic Analysis and Forecasts (2009)

Table A.1.11: Main economic indicators in Romania

	2003[A]	2004[A]	2005[A]	2006[A]	2007[A]	2008[B]
Nominal GDP (USD million)	59.5	75.5	98.9	121.9	168.5	205.2
Nominal GDP (RON million)	198	246	288	342	411	492
Real GDP growth (%)	5.2	8.5	4.2	7.9	6.0	6.8
Population (million)	21.7	21.7	21.6	21.5	21.5	21.5
GDP per capita (USD at PPP)	7,782	8,704	9,393	10,474	11,419	12,514
Trade balance (USD million)	-2,691	-4,152	-9,618	-14,836	-24,223	-36,295
Goods: exports fob (USD million)	17,618	23,485	27,730	32,336	40,318	56,666
Goods: imports fob (USD million)	-20,309	-27,637	-37,348	-47,172	-64,541	-92,961
Exchange rate USD 1=RON (end-period)	3.32	3.26	2.91	2.81	2.44	2.40
Exchange rate EUR 1=RON (end-period)	3.75	4.06	3.63	3.53	3.34	3.71
Consumer prices inflation (end-period; %)	15.3	11.9	9.0	6.6	4.8	8.1

a Actual. b Economist Intelligence Unit forecasts.

	2003	2004	2005	2006	2007	2008
State Budget Expenditure	n.a	n.a	n.a	n.a	n.a	n.a
FDI (Foreign Direct Investment, net inflows USD million)	1,844	6,443	6,482	11,394	n.a	n.a

Source: Agency for Energy Conservation of Romania (2009)

Table A.1.12: Main economic indicators in the Russian Federation

	2003[A]	2004[A]	2005[A]	2006[A]	2007[A]	2008[B]
Nominal GDP (USD billion)	431.5	591.7	764.5	988.7	1,289.6	1,714.4
Nominal GDP (RUB billion)	13,243	17,048	21,625	26,883	32,989	41,145
Real GDP growth (%)	7.3	7.2	6.4	7.4	8.1	7.5
Population (million)	144.6	143.8	143.1	142.6	142.3	141.8
GDP per capita (USD at PPP)	9,694	10,746	11,861	13,190	14,661	16,205
Trade balance (USD million)	59,861	85,825	118,266	139,234	132,044	162,919
Goods: exports fob (USD million)	135,930	183,207	243,569	303,926	355,465	469,262
Goods: imports fob (USD million)	-76,069	-97,382	-125,303	-164,692	-223,421	-306,344
Exchange rate USD 1=RUB (av)	30.69	28.81	28.28	27.19	25.58	24.00
Exchange rate EUR 1=RUB (end-period)	34.71	35.82	35.24	34.14	35.01	37.08
Consumer prices inflation (av; %)	13.7	10.9	12.7	9.7	9.0	13.9

a Actual. b Economist Intelligence Unit forecasts. c Economist Intelligence Unit estimates

	2003	2004	2005	2006	2007	2008
State Budget Expenditure	n.a	n.a	n.a	n.a	n.a	n.a
FDI(Foreign Direct Investment, net inflows (USD million)	7,958	15,444	12,885	30,827	n.a	n.a

Source: International Sustainable Energy Development Centre[254] (2009)

Table A.1.13: Main economic indicators in Serbia

	2003[A]	2004[A]	2005[A]	2006[A]	2007[B]	2008[C]
Nominal GDP (EUR million)	18,010.20	19,723.50	21,077.20	24,254.81	29,920.00	34,152
Nominal GDP (RSD billion)	1,171.60	1,431.30	1,747.50	2,042.01	2,393.02	2,797.84
Real GDP growth (%)	2.5	8.4	6.2	5.7	7.5	6.0
Popula tion	7,480,591	7,463,157	7,440,769	7,411,569	7,381,579	7,365,507
GDP per capita (EUR at PPP)	2,401.40	2,642.80	2,832.70	3,272.61	3,971.00	4,532
Trade balance (EUR million)	-4,144.30	-5,791.70	-4,831.00	-5,360.10	-7,074.50	-11,657
Goods: exports fob (EUR million)	2,441.00	2,831.60	3,608.30	5,102.50	6,432.20	10,567
Goods: imports fob (EUR million)	-6,585.50	-8,623.30	-8,439.20	- 10,462.60	- 13,506.80	-17,795
Exchange rate USD 1 = RSD (end-period)	54,64	57,94	72,22	59,98	53,73	49,4
Exchange rate EUR 1 = RSD (end-period)	68,31	78,89	85,50	79,00	79,24	78.98
Consumer price inflation (end-period; %)	7.8	13.7	17.7	6.6	10.1a	9.5

a Actual. b Economist Intelligence Unit forecasts. c Economist Intelligence Unit estimates

	2003	2004	2005	2006	2007	2008
State Budget Expenditure (billion RSD)	391.6	355.9	438.8	529.7	617.4	441.1
FDI (Foreign Direct Investment, net inflows EUR million)	1,205	776	1,244	3,398	1,601	n.a.

Source: Ministry of Mining and Energy of the Republic of Serbia[254] (2009)

Table A.1.14: Main economic indicators in the former Yugoslav Republic of Macedonia

	2003[A]	2004[A]	2005[A]	2006[B]	2007[B]	2008[C]
Nominal GDP (USD million)	4,629.7	5,368.5	5,767.6	6,089.7	7,004.7	8,264.8
Nominal GDP (MKD million)	251,486	265,257	284,226	297,176	313,322	328,988
Real GDP growth (%)	2.8	4.1	4.0	4.3[A]	5.1[A]	5.0
Population (million)	2.0[B]	2.0[B]	2.0[B]	2.0	2.1	2.1
GDP per capita (USD at PPP)	6,432[B]	6,866[B]	7,346[B]	7,881	8,477	9,119
Trade balance (USD million)	-848	-1,112	-1,058	-1,285[A]	-1,627[A]	-2,181
Goods: exports fob (USD million)	1,363	1,672	2,040	2,396[A]	3,349[A]	4,344
Goods: imports fob (USD million)	-2,211	-2,785	-3,097	-3,682[A]	-4,976[A]	-6,525
Exchange rate USD 1=MKD (end-period)	49.05	45.07	51.86	46.45[A]	41.66[A]	39.68
Exchange rate EUR 1=MKD (end-period)	61.87	61.01	61.17	61.30[A]	60.83[A]	61.50
Consumer prices (end-period; %)	2.5	-1.9	1.2	2.9[A]	6.1[A]	7.6

a Actual. b Economist Intelligence Unit forecasts. c Economist Intelligence Unit estimates

	2003	2004	2005	2006	2007	2008
State Budget Expenditure	n.a	n.a	n.a	n.a	n.a	n.a
FDI (Foreign Direct Investment, net inflows USD billion)	0.96	1.57	1.00	350	n.a	n.a

Source: Energy Agency of the Republic of Macedonia[271] (2009)

Table A.1.15: Main economic indicators in Ukraine

	2003[A]	2004[A]	2005[A]	2006[A]	2007[A]	2008[B]
Nominal GDP (USD billion)	50.1	64.9	82.9	107.8	141.2	198.6
Nominal GDP (UAH billion)	267	345	425	544	713	983
Real GDP growth (%)	9.5	12.1	2.6	7.9	7.7	6.2
Population (million)	47.4	47.1	46.7	46.5	46.2	46.0
GDP per capita (USD at PPP)	4,520	5,251	5,625	6,299[C]	7,008[C]	7,659
Trade balance (USD million)	518	3,741	-1,135	-5,194	-10,572	-16,040
Goods: exports fob (USD million)	23,739	33,432	35,024	38,949	49,840	65,679
Goods: imports fob (USD million)	-23,221	-29,691	-36,159	-44,143	-60,412	-81,719
Exchange rate USD 1=UAH (end-period)	5.33	5.31	5.05	5.05	5.05	4.85*
Exchange rate EUR 1=UAH (end-period)	6.73	7.18	5.96	6.66	7.37	7.52*
Consumer prices inflation (end-period; %)	8.3	12.3	10.3	11.6	16.6	18.5

a Actual. b Economist Intelligence Unit forecasts. c Economist Intelligence Unit estimates; * UAH currency has been reevaluated since.

	2003	2004	2005	2006	2007	2008
State Budget Expenditure	44.39	63.73	89.91	n.a.	n.a	n.a
FDI (Foreign Direct Investment, net inflows USD billion)	1.424	1.715	7.808	5.604	n.a	n.a

Source: Agency for Rational Energy Use and Ecology (ARENA-ECO)[294] (2009)

Annex 2 - Energy balance

Total primary energy supply

Table A.2.1: Total primary energy supply in Albania in 2007

Total Primary Energy Supply (ktoe)	Coal & coal pro-ducts	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natural gas	Nu-clear	Hydro	Geo-thermal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Production	22	0	564	0	14	0	240	0	2	215	0	0	0	1,057
Imports	3	0	0	1,059	0	0	0	0	0	0	0	243	0	1,305
Exports	0	0	0	-45	0	0	0	0	0	0	0	0	0	-45
International Marine Bunkers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stock Changes	0	0	0	-41	0	0	0	0	0	0	0	0	0	-41
Total	**25**	**0**	**564**	**973**	**14**	**0**	**240**	**0**	**2**	**215**	**0**	**243**	**0**	**2,276**

Source: IEA[5](2009)

Table A.2.2: Total primary energy supply in Belarus in 2007

Total Primary Energy Supply (ktoe)	Coal & coal pro-ducts	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natural gas	Nu-clear	Hydro	Geo-thermal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Production	0	609	1,769	0	167	0	3	0	0	1,461	0	0	0	4,009
Imports	96	0	20,136	1,297	17,118	0	0	0	0	0	0	809	0	39,456
Exports	-80	0	-855	-14,325	0	0	0	0	0	0	0	-435	0	-15,696
International Marine Bunkers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stock Changes	-3	-71	422	-131	62	0	0	0	0	0	0	0	0	279
Total	**13**	**538**	**21,472**	**-13,159**	**17,347**	**0**	**3**	**0**	**0**	**1,461**	**0**	**374**	**0**	**28,048**

Source: IEA[5] (2009)

Table A 2.3: Total primary energy supply in Bosnia and Herzegovina in 2007

Total Primary Energy Supply (ktoe)	Coal & coal pro-ducts	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natural gas	Nu-clear	Hydro	Geo-thermal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Production	3,411	0	0	0	0	0	344	0	0	183	0	0	0	3,939
Imports	495	0	118	1,161	345	0	0	0	0	0	0	322	0	2,442
Exports	-415	0	0	-5	0	0	0	0	0	0	0	-374	0	-793
International Marine Bunkers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stock Changes	17	0	0	0	0	0	0	0	0	0	0	0	0	17
Total	**3,508**	**0**	**118**	**1,156**	**345**	**0**	**344**	**0**	**0**	**183**	**0**	**-52**	**0**	**5,605**

Source: IEA[5] (2009)

Table A.2.4: Total primary energy supply in Bulgaria in 2007

Total Primary Energy Supply (ktoe)	Coal & coal pro-ducts	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natural gas	Nu-clear	Hydro	Geo-thermal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Production	4,811	0	25	0	236	3,836	247	33	4	780	0	0	0	9,972
Imports	3,064	0	7,259	1,626	2,753	0	0	0	0	0	0	263	0	14,965
Exports	-1	0	0	-3,718	0	0	0	0	0	-25	0	-648	0	-4,392
International Marine Bunkers	0	0	0	-53	0	0	0	0	0	0	0	0	0	-53
Stock Changes	-23	0	-40	-30	21	0	0	0	0	-8	0	0	0	-79
Total	**7,851**	**0**	**7,244**	**-2,175**	**3,010**	**3,836**	**247**	**33**	**4**	**747**	**0**	**-385**	**0**	**20,413**

Source: IEA[5] (2009)

Table A.2.5: Total primary energy supply in Croatia in 2007

Total Primary Energy Supply (ktoe)	Coal & coal pro-ducts	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natura l gas	Nu-clear	Hydro	Geo-thermal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Production	0	0	952	0	2,362	0	364	3	4	366	0	0	0	4,051
Imports	704	0	4,569	1,383	862	0	0	0	0	1	0	672	0	8,191
Exports	-1	0	0	-2,071	-614	0	0	0	0	-45	0	-125	0	-2,855
International Marine Bunkers	0	0	0	-23	0	0	0	0	0	0	0	0	0	-23
Stock Changes	-13	0	11	-92	91	0	0	0	0	0	0	0	0	-2
Total	**690**	**0**	**5,532**	**-803**	**2,701**	**0**	**364**	**3**	**4**	**322**	**0**	**547**	**0**	**9,362**

Source: IEA[5] (2009)

Table A.2.6: Total primary energy supply in Kazakhstan in 2007

Total Primary Energy Supply (ktoe)	Coal & coal pro-ducts	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natura l gas	Nu-clear	Hydro	Geo-thermal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Production	43,014	0	67,413	0	24,792	0	703	0	0	73	0	0	0	135,995
Imports	718	0	7,085	2,549	5,352	0	0	0	0	0	0	281	0	15,986
Exports	-13,214	0	-61,718	-3,963	-6,519	0	0	0	0	0	0	-311	0	-85,725
International Marine Bunkers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stock Changes	380	0	0	140	0	0	0	0	0	0	0	0	0	520
Total	**30,898**	**0**	**12,780**	**-1,274**	**23,625**	**0**	**703**	**0**	**0**	**73**	**0**	**-30**	**0**	**66,776**

Source: IEA[5] (2009)

Table A.2.7: Total primary energy supply in the Republic of Moldova in 2007

Total Primary Energy Supply (ktoe)	Coal & coal pro-ducts	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natura l gas	Nu-clear	Hydro	Geo-thermal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Production	0	0	8	0	0	0	3	0	0	77	0	0	0	88
Imports	80	0	0	679	2,313	0	0	0	0	0	0	252	0	3,324
Exports	0	0	0	-34	0	0	0	0	0	0	0	0	0	-34
International Marine Bunkers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stock Changes	-22	0	0	-3	-2	0	0	0	0	0	0	0	0	-27
Total	**58**	**0**	**8**	**642**	**2,311**	**0**	**3**	**0**	**0**	**77**	**0**	**252**	**0**	**3,351**

Source: IEA[5] (2009)

Table A.2.8: Energy balance of the Republic of Moldova (excluding Transnistria) within 2000-2008 time series, ktoe

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Interne sources	72	85	92	87	84	87	92	88	110
Liquid fuels	–	–	–	2	8	10	7	16	26
Solid fuels	59	68	65	79	71	70	78	69	77
Hydroelectricity	13	17	27	6	5	7	7	3	7
Import	1,776	1,676	1,785	1,956	2,096	2,185	2,157	2,115	2,104
Liquid fuels	416	451	485	577	609	622	603	643	668
Natural Gases	888	981	977	1,062	1,083	1,205	1,201	1,110	1,057
Solid fuels	66	88	98	166	115	103	105	110	124
Electricity	406	156	225	151	289	255	248	252	255
Export	4	2	1	12	42	3	4	7	5
Stocks variation	-9	24	-16	53	-6	-9	-26	36	18
Intern Consumption from which, for:	1,853	1,735	1,892	1,978	2,144	2,278	2,271	2,160	2,191
Production of electricity and heat	935	810	802	681	783	842	817	767	764
Technological needs, inclusive in:	918	925	1,090	1,297	1,361	1,436	1,454	1,393	1,427
Industry and Construction	104	111	117	124	130	161	163	156	142
Agriculture	69	68	80	80	71	61	59	52	51
Transport	171	169	248	279	254	267	285	325	336
Commerce and Public Service	55	66	86	137	126	120	123	119	120
Residential (sold to population)	420	429	477	575	656	704	691	598	632
Other	99	82	82	102	124	123	133	143	146

Source: National Bureau of Statistics of the Republic of Moldova (2009), Energy Balance of the Republic of Moldova, 2008: Statistical Book. Chisinau: Statistica, 2009 (Statistica Moldovei), page 9.

Table A.2.9: The structure of main energy resource in the Republic of Moldova (excluding Transnistria) within 2000-2008 time series (in %)

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total resources, inclusive:	100	100	100	100	100	100	100	100	100
Coal	5.5	6.3	6.4	9.3	7.7	6.8	6.7	6.6	8.3
Diesel oil	10.9	13	14	15	15.3	15.1	15.1	16.6	17.3
Residual fuel oil	3.2	3.3	2.4	1.7	1.4	1.1	1.1	0.9	1.1
Gasoline	7.3	8.4	9.8	11	10.8	10.6	9.7	10.2	10.5
Natural gases	42.9	49.4	45.8	46.2	43.4	47.1	47.7	45.3	41.7
Liquefied gases	2.4	3.3	3.1	3.1	2.9	2.8	2.6	2.7	2.9
Fuel wood	2.7	2.9	3	3	2.5	2.5	2.9	2.7	2.9
Electricity	21.1	9.1	12	7.2	12.3	10.6	10.5	10.8	10.9
Other	4	4.3	3.5	3.5	3.7	3.4	3.7	4.2	4.4

Source: National Bureau of Statistics of the Republic of Moldova (2009), Energy Balance of the Republic of Moldova, 2008: Statistical Book. Chisinau: Statistica, 2009 (Statistica Moldovei), page 11.

Table A.2.10: Total Primary Energy Supply in Romania in 2007

Total Primary Energy Supply (ktoe)	Coal & coal pro-ducts	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natura l gas	Nu-clear	Hydro	Geo-thermal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Production	6'712	0	4'777	0	9'230	2'009	1'373	20	0	3'431	0	0	0	27'552
Imports	3'249	6	8'285	1'315	3'864	0	0	0	0	69	0	109	0	16'895
Exports	-41	0	0	-4'471	0	0	0	0	0	0	0	-289	0	-4'801
International Marine Bunkers	0	0	0	-35	0	0	0	0	0	0	0	0	0	-35
Stock Changes	-207	0	-60	-173	-116	0	0	0	0	-38	0	0	0	-595
Total	**9'713**	**6**	**13'002**	**-3'364**	**12'978**	**2'009**	**1'373**	**20**	**0**	**3'462**	**0**	**-180**	**0**	**39'016**

Source: IEA[5] (2009)

Table A.2.11: Total Primary Energy Supply in the Russian Federation in 2007

Total Primary Energy Supply (ktoe)	Coal & coal pro-ducts	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natural gas	Nu-clear	Hydro	Geo-ther mal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Production	145,852	306	490,038	0	521,848	42,059	15,226	417	1	6,581	0	0	8,302	1,230,631
Imports	13,002	0	2,706	37	5,987	0	0	0	0	0	0	488	0	22,220
Exports	-55,893	0	-259,870	-94,309	-154,963	0	0	0	0	0	0	-1,588	0	-566,624
International Marine Bunkers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stock Changes	-1,038	-26	-697	-19	-6,912	0	0	0	0	97	0	0	0	-8,595
Total	**101,923**	**280**	**232,177**	**-94,291**	**365,960**	**42,059**	**15,226**	**417**	**1**	**6,678**	**0**	**-1,100**	**8,302**	**677,632**

Source: IEA[5] (2009)

Table A.2.12: Total Primary Energy Supply in Serbia in 2007

Total Primary Energy Supply (ktoe)	Coal & coal pro-ducts	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natura l gas	Nu-clear	Hydro	Geo-thermal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Production	7,074	0	662	0	198	0	863	0	41	913	0	0	0	9,751
Imports	872	0	2,653	1,193	1,756	0	0	0	0	0	0	783	0	7,258
Exports	-92	0	0	-229	0	0	0	0	0	-100	0	-791	0	-1,212
International Marine Bunkers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stock Changes	16	0	44	-8	5	0	0	0	0	0	0	0	0	57
Total	**7,870**	**0**	**3,359**	**956**	**1,959**	**0**	**863**	**0**	**41**	**813**	**0**	**-8**	**0**	**15,854**

Source: IEA[5] (2009)

Table A.2.13: *Total Primary Energy Supply in the former Yugoslav Republic of Macedonia in 2007*

Total Primary Energy Supply (ktoe)	Coal & coal pro-ducts	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natural gas	Nu-clear	Hydro	Geo-thermal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Production	1,254	0	0	0	0	0	87	10	0	150	0	0	0	1,501
Imports	159	1	1,082	185	86	0	0	0	0	0	0	214	0	1,727
Exports	-1	0	0	-258	0	0	0	0	0	-1	0	0	0	-260
International Marine Bunkers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stock Changes	33	0	-10	46	0	0	0	0	0	-6	0	0	0	63
Total	**1,445**	**1**	**1,072**	**-27**	**86**	**0**	**87**	**10**	**0**	**143**	**0**	**214**	**0**	**3,031**

Source: IEA[5] (2009)

Table A.2.14: *Total primary Energy Supply in Ukraine in 2007*

Total Primary Energy Supply (ktoe)	Coal & coal pro-ducts	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natural gas	Nu-clear	Hydro	Geo-thermal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Production	33,550	92	4,477	0	17,697	24,117	872	0	4	792	0	0	0	81,600
Imports	9,278	2	10,299	5,371	42,000	0	0	0	0	0	0	291	0	67,241
Exports	-2,278	-1	-4	-4,263	-3	0	0	0	0	0	0	-1,080	0	-7,629
International Marine Bunkers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Stock Changes	-30	-5	118	-106	-3,549	0	0	0	0	59	0	0	0	-3,513
Total	**40,520**	**88**	**14,890**	**1,002**	**56,145**	**24,117**	**872**	**0**	**4**	**851**	**0**	**-789**	**0**	**137,699**

Source: IEA[5] (2009)

Energy use in the project countries

<u>Table A.2.15:</u> Energy use in Albania in 2007

Total Primary Energy Supply (ktoe)	Coal & coal pro-ducts	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natu-ral gas	Nu-clear	Hydro	Geo-therma l	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Energy related use	**-6**	**0**	**-564**	**442**	**-13**	**0**	**-240**	**0**	**-2**	**0**	**0**	**67**	**2**	**-313**
Transfers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Statistical differences	0	0	0	4	0	0	0	0	0	0	0	0	0	4
Main activity producer electricity plants	0	0	0	0	0	0	-240	0	0	0	0	240	0	0
Autoproducer electricity plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Main activity producer CHP plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Autoproducer CHP plants	0	0	0	-31	0	0	0	0	0	0	0	6	2	-22
Main activity producer heat plants	-3	0	0	0	0	0	0	0	-2	0	0	0	3	-2
Autoproducer heat plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heat pumps	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric boilers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemical heat for electricity production	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas works	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petroleum refineries	0	0	-564	516	0	0	0	0	0	0	0	0	0	-48
Coal transformation	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Liquefaction plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (transformation)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Own use	-3	0	0	-47	-13	0	0	0	0	0	0	-9	-3	-75
Distribution losses	0	0	0	0	0	0	0	0	0	0	0	-170	0	-170
Total Final Consump-tion	**18**	**0**	**0**	**1'313**	**2**	**0**	**0**	**0**	**0**	**215**	**0**	**310**	**2**	**1'861**
Industry sector	12	0	0	159	0	0	0	0	0	9	0	56	0	236
Transport sector	0	0	0	692	0	0	0	0	0	0	0	0	0	692
Residential	6	0	0	79	2	0	0	0	0	190	0	178	2	458
Commercial and public services	0	0	0	30	0	0	0	0	0	12	0	38	0	80
Agriculture/forestry	0	0	0	127	0	0	0	0	0	4	0	0	0	131
Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (other)	0	0	0	49	0	0	0	0	0	0	0	38	0	87
Non-energy use	0	0	0	177	0	0	0	0	0	0	0	0	0	177

Source: IEA[5] (2009)

Table A.2.16: *Energy use in Belarus in 2007*

Uses of energy (ktoe)	Coal & coal products	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natural gas	Nu-clear	Hydro	Geo-ther-mal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Energy related use	**348**	**-530**	**-19,812**	**17,915**	**-12,785**	**0**	**-3**	**0**	**0**	**-529**	**0**	**2,094**	**5,493**	**-7,809**
Transfers	0	0	0	-41	0	0	0	0	0	0	0	0	0	-41
Statistical differences	0	6	-16	0	0	0	0	0	0	0	0	0	0	-10
Main activity producer electricity plants	0	0	0	-15	-3,753	0	-2	0	0	0	0	1,462	0	-2,309
Autoproducer electricity plants	0	0	0	0	0	0	-1	0	0	0	0	1	0	0
Main activity producer CHP plants	0	-6	0	-52	-5,247	0	0	0	0	-30	0	1,181	2,813	-1,341
Autoproducer CHP plants	0	-12	0	-5	-662	0	0	0	0	-21	0	93	485	-122
Main activity producer heat plants	-22	0	0	-96	-1,535	0	0	0	0	-219	0	0	1,543	-329
Autoproducer heat plants	-53	-32	0	-205	-1,434	0	0	0	0	-233	0	0	1,627	-330
Heat pumps	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric boilers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemical heat for electricity production	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas works	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petroleum refineries	0	0	-19,411	18,856	0	0	0	0	0	0	0	0	0	-555
Coal transformation	423	-429	0	0	0	0	0	0	0	-4	0	0	0	-10
Liquefaction plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (transformation)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Own use	0	-13	0	-513	0	0	0	0	0	-22	0	-323	-358	-1,228
Distribution losses	0	-44	-385	-14	-154	0	0	0	0	0	0	-320	-617	-1,534
Total Final Consump-tion	**360**	**6**	**1,659**	**4,755**	**4,561**	**0**	**0**	**0**	**0**	**929**	**0**	**2,468**	**5,494**	**20,237**
Industry sector	57	0	0	564	1,692	0	0	0	0	157	0	1,214	1,980	5,664
Transport sector	7	0	0	1,698	432	0	0	0	0	0	0	157	0	2,295
Residential	229	2	0	1,214	1,199	0	0	0	0	580	0	517	2,230	5,972
Commercial and public services	2	0	0	4	3	0	0	0	0	155	0	297	1,127	1,589
Agriculture/forestry	2	1	0	760	40	0	0	0	0	37	0	123	157	1,120
Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (other)	54	3	0	62	16	0	0	0	0	0	0	160	0	296
Non-energy use	9	0	1,659	453	1,179	0	0	0	0	0	0	0	0	3,301

Source: IEA[5] (2009)

Table A.2.17: Energy use in Bosnia and Herzegovina in 2007

Uses of energy (ktoe)	Coal & coal products	Peat	Crude, NGL & feedstocks	Petroleum products	Natural gas	Nuclear	Hydro	Geothermal	Solar/ wind/ other	Renewables & waste	Heat production from non-specified comb.fuels	Electricity imports	Heat	Total
Energy related use	**-3,073**	**0**	**-118**	**41**	**-65**	**0**	**-344**	**0**	**0**	**0**	**0**	**720**	**99**	**-2,737**
Transfers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Statistical differences	-5	0	0	5	0	0	0	0	0	0	0	9	0	10
Main activity producer electricity plants	-2,912	0	0	0	0	0	-344	0	0	0	0	1,000	0	-2,256
Autoproducer electricity plants	0	0	0	-52	0	0	0	0	0	0	0	13	0	-38
Main activity producer CHP plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Autoproducer CHP plants	-55	0	0	0	0	0	0	0	0	0	0	3	41	-10
Main activity producer heat plants	0	0	0	0	-60	0	0	0	0	0	0	0	58	-1
Autoproducer heat plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heat pumps	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric boilers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemical heat for electricity production	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas works	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petroleum refineries	0	0	-118	114	0	0	0	0	0	0	0	0	0	-4
Coal transformation	-69	0	0	0	0	0	0	0	0	0	0	0	0	-69
Liquefaction plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (transformation)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Own use	-31	0	0	-26	0	0	0	0	0	0	0	-114	0	-172
Distribution losses	-1	0	0	0	-5	0	0	0	0	0	0	-191	0	-197
Total Final Consumption	**436**	**0**	**0**	**1,197**	**280**	**0**	**0**	**0**	**0**	**183**	**0**	**669**	**99**	**2,867**
Industry sector	166	0	0	0	221	0	0	0	0	0	0	207	0	594
Transport sector	0	0	0	883	0	0	0	0	0	0	0	0	0	883
Residential	0	0	0	0	51	0	0	0	0	183	0	354	0	589
Commercial and public services	0	0	0	0	8	0	0	0	0	0	0	108	0	117
Agriculture/forestry	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (other)	270	0	0	215	0	0	0	0	0	0	0	0	99	585
Non-energy use	0	0	0	99	0	0	0	0	0	0	0	0	0	99

Source: IEA[5] (2009)

<u>Table A.2.18:</u> Energy use in Bulgaria in 2007

Uses of energy (ktoe)	Coal & coal pro-ducts	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natural gas	Nu-clear	Hydro	Geo-ther-mal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Energy related use	**-7,045**	**0**	**-7,244**	**6,469**	**-1,204**	**-3,836**	**-247**	**0**	**-4**	**-2**	**0**	**2,724**	**814**	**-9,572**
Transfers	0	0	-74	82	0	0	0	0	0	0	0	0	0	8
Statistical differences	0	0	-2	-19	-86	0	0	0	0	0	0	-26	4	-128
Main activity producer electricity plants	-5,106	0	0	-21	-4	-3,816	-247	0	-4	0	0	3,142	0	-6,056
Autoproducer electricity plants	0	0	0	-6	-5	0	0	0	0	0	0	4	0	-7
Main activity producer CHP plants	-1,265	0	0	-17	-612	-20	0	0	0	0	0	392	1,024	-499
Autoproducer CHP plants	-166	0	0	-103	-153	0	0	0	0	-2	0	154	5	-264
Main activity producer heat plants	0	0	0	-25	-201	0	0	0	0	0	0	0	215	-11
Autoproducer heat plants	0	0	0	-1	-2	0	0	0	0	0	0	0	2	-1
Heat pumps	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric boilers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemical heat for electricity production	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas works	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petroleum refineries	0	0	-7,419	7,034	0	0	0	0	0	0	0	0	0	-385
Coal transformation	-357	0	0	0	0	0	0	0	0	0	0	0	0	-357
Liquefaction plants	0	0	28	0	0	0	0	0	0	0	0	0	0	28
Non-specified (transformation)	0	0	223	-219	-25	0	0	0	0	0	0	0	0	-21
Own use	-148	0	0	-236	-71	0	0	0	0	0	0	-538	-297	-1,290
Distribution losses	-3	0	0	0	-45	0	0	0	0	0	0	-404	-139	-589
Total Final Consump-tion	**807**	**0**	**1**	**4,112**	**1,806**	**0**	**0**	**33**	**0**	**745**	**0**	**2,339**	**815**	**10,659**
Industry sector	583	0	1	819	911	0	0	0	0	117	0	875	313	3,619
Transport sector	0	0	0	2,437	299	0	0	0	0	4	0	34	0	2,773
Residential	213	0	0	25	33	0	0	0	0	607	0	806	377	2,062
Commercial and public services	3	0	0	48	67	0	0	33	0	15	0	606	124	896
Agriculture/forestry	8	0	0	206	32	0	0	0	0	2	0	18	1	268
Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (other)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-energy use	0	0	0	577	464	0	0	0	0	0	0	0	0	1,041

Source: IEA[5] (2009)

Table A.2.19: *Energy use in Croatia in 2007*

Uses of energy (ktoe)	Coal & coal pro-ducts	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natural gas	Nu-clear	Hydro	Geo-ther-mal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Energy related use	**-538**	**0**	**-5,533**	**4,386**	**-1,083**	**0**	**-365**	**0**	**-3**	**-6**	**0**	**773**	**217**	**-2,150**
Transfers	0	0	-139	142	0	0	0	0	0	0	0	0	0	3
Statistical differences	0	0	0	0	0	0	0	0	0	-3	0	0	0	-3
Main activity producer electricity plants	-533	0	0	-407	-246	0	-364	0	-3	-2	0	812	0	-742
Autoproducer electricity plants	0	0	0	0	0	0	-1	0	0	0	0	1	0	0
Main activity producer CHP plants	0	0	0	-97	-468	0	0	0	0	0	0	182	207	-176
Autoproducer CHP plants	-5	0	0	-34	-80	0	0	0	0	-1	0	44	0	-75
Main activity producer heat plants	0	0	0	-32	-55	0	0	0	0	0	0	0	71	-16
Autoproducer heat plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heat pumps	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric boilers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemical heat for electricity production	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas works	0	0	0	-10	10	0	0	0	0	0	0	0	0	0
Petroleum refineries	0	0	-5,394	5,389	0	0	0	0	0	0	0	0	0	-5
Coal transformation	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Liquefaction plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (transformation)	0	0	0	0	-27	0	0	0	0	0	0	0	0	-27
Own use	0	0	0	-565	-175	0	0	0	0	0	0	-92	-19	-851
Distribution losses	0	0	0	0	-42	0	0	0	0	0	0	-174	-42	-258
Total Final Consump-tion	**154**	**0**	**0**	**3,539**	**1,619**	**0**	**0**	**3**	**1**	**318**	**0**	**1,321**	**218**	**7,171**
Industry sector	149	0	0	506	556	0	0	0	0	62	0	339	44	1,655
Transport sector	0	0	0	2,101	0	0	0	0	0	0	0	28	0	2,129
Residential	4	0	0	258	513	0	0	0	1	254	0	550	138	1,717
Commercial and public services	1	0	0	107	120	0	0	3	0	2	0	398	36	667
Agriculture/forestry	0	0	0	223	15	0	0	0	0	0	0	6	0	244
Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (other)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-energy use	0	0	0	344	415	0	0	0	0	0	0	0	0	759

Source: IEA[5] (2009)

Table A.2.20: *Energy use in Kazakhstan in 2007*

Uses of energy (ktoe)	Coal & coal products	Peat	Crude, NGL & feed-stocks	Petroleum products	Natural gas	Nuclear	Hydro	Geothermal	Solar/ wind/ other	Renewables & waste	Heat production from non-specified comb.fuels	Electricity imports	Heat	Total
Energy related use	**-23,625**	**0**	**-12,774**	**10,370**	**-7,867**	**0**	**-703**	**0**	**0**	**0**	**0**	**4,454**	**8,319**	**-21,827**
Transfers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Statistical differences	25	0	76	-492	-1,067	0	0	0	0	0	0	2	0	-1,456
Main activity producer electricity plants	0	0	-48	0	0	0	-703	0	0	0	0	703	0	-48
Autoproducer electricity plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Main activity producer CHP plants	-20,972	0	0	-745	-2,048	0	0	0	0	0	0	5,885	9,339	-8,542
Autoproducer CHP plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Main activity producer heat plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Autoproducer heat plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Heat pumps	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric boilers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemical heat for electricity production	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas works	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petroleum refineries	0	0	-12,306	12,009	0	0	0	0	0	0	0	0	0	-297
Coal transformation	-1,759	0	0	0	0	0	0	0	0	0	0	0	0	-1,759
Liquefaction plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (transformation)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Own use	0	0	0	-374	-4,043	0	0	0	0	0	0	-1,502	0	-5,919
Distribution losses	-919	0	-496	-28	-709	0	0	0	0	0	0	-634	-1,020	-3,806
Total Final Consumption	**7,271**	**0**	**6**	**8,784**	**15,759**	**0**	**0**	**0**	**0**	**73**	**0**	**4,423**	**8,319**	**44,634**
Industry sector	6,628	0	0	2,637	792	0	0	0	0	0	0	2,663	4,068	16,788
Transport sector	0	0	0	4,113	0	0	0	0	0	0	0	190	100	4,402
Residential	0	0	0	89	0	0	0	0	0	0	0	598	2,021	2,708
Commercial and public services	0	0	0	187	0	0	0	0	0	0	0	0	0	187
Agriculture/forestry	0	0	0	929	0	0	0	0	0	0	0	557	0	1,486
Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (other)	0	0	0	237	14,967	0	0	0	0	73	0	415	2,130	17,822
Non-energy use	643	0	6	592	0	0	0	0	0	0	0	0	0	1,241

Source: IEA[5] (2009)

Table A.2.21: Energy use in the Republic of Moldova in 2007

Uses of energy (ktoe)	Coal & coal products	Peat	Crude, NGL & feed-stocks	Petro-leum products	Natural gas	Nu-clear	Hydro	Geo-thermal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Energy related use	**-2**	**0**	**-8**	**19**	**-1,659**	**0**	**-3**	**0**	**0**	**-6**	**0**	**104**	**255**	**-1,298**
Transfers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Statistical differences	0	0	0	26	0	0	0	0	0	0	0	0	0	26
Main activity producer electricity plants	0	0	-8	0	-715	0	-3	0	0	0	0	237	0	-488
Autoproducer electricity plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Main activity producer CHP plants	0	0	0	0	-330	0	0	0	0	0	0	88	168	-74
Autoproducer CHP plants	0	0	0	0	-39	0	0	0	0	0	0	5	29	-4
Main activity producer heat plants	0	0	0	-7	-64	0	0	0	0	0	0	0	61	-10
Autoproducer heat plants	-2	0	0	0	-68	0	0	0	0	-6	0	0	66	-10
Heat pumps	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric boilers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemical heat for electricity production	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas works	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petroleum refineries	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Coal transformation	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Liquefaction plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (transformation)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Own use	0	0	0	0	-401	0	0	0	0	0	0	-59	0	-460
Distribution losses	0	0	0	0	-42	0	0	0	0	0	0	-167	-69	-278
Total Final Consump-tion	**56**	**0**	**0**	**646**	**651**	**0**	**0**	**0**	**0**	**71**	**0**	**357**	**256**	**2,037**
Industry sector	1	0	0	10	240	0	0	0	0	0	0	74	73	397
Transport sector	0	0	0	305	64	0	0	0	0	0	0	6	0	374
Residential	24	0	0	258	250	0	0	0	0	0	0	111	128	771
Commercial and public services	28	0	0	2	82	0	0	0	0	0	0	64	46	223
Agriculture/forestry	0	0	0	50	14	0	0	0	0	0	0	4	1	69
Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (other)	3	0	0	12	1	0	0	0	0	71	0	98	8	194
Non-energy use	0	0	0	9	0	0	0	0	0	0	0	0	0	9

Source: IEA[5] (2009)

Table A.2.22: Primary energy consumption by sectors in the Republic of Moldova (excluding Transnistria) within 2000-2008 time series, ktoe

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Primary energy consumption for technological needs, inclusive:	918	925	1,090	1,297	1,361	1,436	1,454	1,393	1427
Industry	100	107	113	121	126	157	157	150	136
Construction	4	4	4	3	4	4	6	6	6
Agriculture	69	68	80	80	71	61	59	52	51
Transport	171	169	248	279	254	267	285	325	336
Commerce and Public Service	55	66	86	137	126	120	123	119	120
Residential (sold to population)	420	429	477	575	656	704	691	598	632
Other	99	82	82	102	124	123	133	143	146

Source: National Bureau of Statistics of the Republic of Moldova (2009), Energy Balance of the Republic of Moldova, 2008: Statistical Book. Chisinau: Statistica, 2009 (Statistica Moldovei), page 10.

Table A.2.23: Electricity consumption by sectors in the Republic of Moldova (excluding Transnistria) within 2000-2007 time series, GWh

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total recourses	3,379	3,390	3,781	4,629	4,383	4,196	4,074	4,031	4,058
Total electricity consumption, inclusive:	2,244	2,206	2,449	2,527	2,634	2,921	3,215	3,364	3,428
Industry	627	648	733	865	871	974	1,026	1,049	948
Construction	11	10	9	8	10	10	14	15	14
Transport	61	60	61	51	47	50	58	65	62
Agriculture	71	59	63	52	48	51	55	50	54
Commerce and Public Service	393	347	566	581	539	671	753	745	841
Residential (sold to population)	790	813	774	836	964	1,041	1,154	1,295	1,371
Other	291	269	243	134	155	124	155	145	138

Source: National Bureau of Statistics of the Republic of Moldova (2009), Energy Balance of the Republic of Moldova, 2008: Statistical Book. Chisinau: Statistica, 2009 (Statistica Moldovei), page 13.

Table A.2.24: Heat consumption by sectors in the Republic of Moldova (excluding Transnistria) within 2000-2007 time series, thousand Gcal

	2000	2001	2002	2003	2004	2005	2006	2007	2008
Total recourses	3,057	3,298	3,217	3,347	3,147	3,591	3,552	3,094	3,074
Total electricity consumption, inclusive:	2,673	2,809	2,699	2,799	2,686	3,084	2,903	2,554	2,553
Industry	909	984	987	935	1,011	1,007	932	724	730
Construction	4	3	3	4	4	5	6	6	5
Transport	3	4	4	4	2	2	4	2	2
Agriculture	38	18	13	11	14	20	10	8	11
Commerce and Public Service	428	582	422	471	436	568	506	460	472
Residential (sold to population)	1,194	1,128	1,180	1,288	1,129	1,395	1,330	1,274	1,262
Other	97	90	90	86	90	87	115	80	71

Source: National Bureau of Statistics of the Republic of Moldova (2008), Energy Balance of the Republic of Moldova, 2007: Statistical Book. Chisinau: Statistica, 2008 (Statistica Moldovei), page 16.

Table A.2.25: Energy use in Romania in 2007

Uses of energy (ktoe)	Coal & coal products	Peat	Crude, NGL & feed-stocks	Petroleum products	Natural gas	Nuclear	Hydro	Geothermal	Solar/ wind/ other	Renewables & waste	Heat production from non-specified comb.fuels	Electricity imports	Heat	Total
Energy related use	**-8,696**	**-1**	**-12,959**	**12,074**	**-5,590**	**-2,009**	**-1,373**	**-4**	**0**	**-158**	**0**	**3,703**	**1,798**	**-13,216**
Transfers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Statistical differences	-400	-1	1	117	-248	0	0	0	0	-122	0	0	0	-652
Main activity producer electricity plants	-3,961	0	0	-10	-1,107	-2,009	-1,363	0	0	0	0	3,748	0	-4,702
Autoproducer electricity plants	-71	0	0	-48	-26	0	-10	0	0	0	0	75	0	-81
Main activity producer CHP plants	-2,258	0	0	-277	-2,353	0	0	0	0	-1	0	1,299	2,047	-1,542
Autoproducer CHP plants	-524	0	0	-53	-63	0	0	0	0	-4	0	182	101	-362
Main activity producer heat plants	-9	0	0	-23	-382	0	0	-4	0	-13	0	0	302	-130
Autoproducer heat plants	-7	0	0	-26	-171	0	0	0	0	-11	0	0	186	-29
Heat pumps	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric boilers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemical heat for electricity production	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas works	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petroleum refineries	0	0	-13,490	14,092	0	0	0	0	0	0	0	0	0	603
Coal transformation	-1,140	0	0	0	0	0	0	0	0	0	0	0	0	-1,140
Liquefaction plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (transformation)	0	0	536	-301	0	0	0	0	0	0	0	0	0	235
Own use	-248	0	-1	-1,355	-772	0	0	0	0	-6	0	-1,020	-335	-3,738
Distribution losses	-78	0	-5	-42	-468	0	0	0	0	-1	0	-581	-503	-1,678
Total Final Consumption	**1,015**	**5**	**43**	**8,600**	**7,387**	**0**	**0**	**15**	**0**	**3,303**	**0**	**3,523**	**1,798**	**25,692**
Industry sector	995	0	43	1,086	3,330	0	0	1	0	389	0	1,964	308	8,116
Transport sector	0	0	0	4,369	38	0	0	0	0	52	0	126	0	4,584
Residential	9	0	0	591	2,067	0	0	7	0	2,681	0	893	1,255	7,504
Commercial and public services	0	0	0	217	1,080	0	0	7	0	0	0	492	217	2,014
Agriculture/forestry	0	5	0	126	25	0	0	0	0	37	0	48	18	260
Fishing	0	0	0	3	0	0	0	0	0	0	0	0	0	3
Non-specified (other)	1	0	0	304	0	0	0	0	0	144	0	0	0	450
Non-energy use	10	0	0	1,904	847	0	0	0	0	0	0	0	0	2,761

Source: IEA[5] (2009)

Table A.2.26: *Energy use in the Russian Federation in 2007*

Uses of energy (ktoe)	Coal & coal pro-ducts	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natural gas	Nu-clear	Hydro	Geo-ther-mal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Energy related use	**-84,414**	**-277**	**-232,137**	**199,272**	**-234,825**	**-42,059**	**-15,226**	**-417**	**-1**	**-3,891**	**0**	**61,382**	**110,287**	**-242,307**
Transfers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Statistical differences	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Main activity producer electricity plants	0	0	0	0	0	-41,707	-15,125	-417	-1	0	0	28,931	0	-28,319
Autoproducer electricity plants	0	0	0	-458	-2,182	0	-101	0	0	0	0	707	0	-2,035
Main activity producer CHP plants	-51,295	-217	0	-3,669	-134,384	-352	0	0	0	0	0	53,613	50,732	-85,573
Autoproducer CHP plants	-8,904	0	-11	-2,017	-16,786	0	0	0	0	-1,275	0	3,902	13,458	-11,633
Main activity producer heat plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Autoproducer heat plants	-15,305	-46	-701	-7,118	-60,650	0	0	0	0	-2,516	0	0	74,257	-12,079
Heat pumps	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric boilers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemical heat for electricity production	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas works	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petroleum refineries	0	0	-228,310	227,224	0	0	0	0	0	0	0	0	0	-1,086
Coal transformation	-7,660	-12	0	0	0	0	0	0	0	0	0	0	0	-7,672
Liquefaction plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (transformation)	0	0	0	-608	-1,418	0	0	0	0	0	0	0	0	-2,026
Own use	-1,250	-2	-589	-14,082	-13,990	0	0	0	0	-100	0	-16,753	-17,887	-64,653
Distribution losses	0	0	-2,526	0	-5,415	0	0	0	0	0	0	-9,018	-10,273	-27,231
Total Final Consump-tion	**17,512**	**3**	**40**	**99,489**	**131,135**	**0**	**0**	**0**	**0**	**2,785**	**0**	**60,281**	**118,589**	**429,833**
Industry sector	12,893	1	12	12,520	26,841	0	0	0	0	371	0	30,339	44,586	127,563
Transport sector	0	0	8	50,103	34,943	0	0	0	0	0	0	7,452	0	92,505
Residential	2,416	2	0	6,814	38,811	0	0	0	0	1,292	0	9,970	52,977	112,282
Commercial and public services	1,855	0	0	2,051	5,501	0	0	0	0	616	0	11,106	18,024	39,153
Agriculture/forestry	82	0	20	4,258	946	0	0	0	0	380	0	1,391	2,960	10,037
Fishing	7	0	0	757	0	0	0	0	0	1	0	23	42	830
Non-specified (other)	0	0	0	0	0	0	0	0	0	125	0	0	0	125
Non-energy use	259	0	0	22,986	24,093	0	0	0	0	0	0	0	0	47,338

Source: IEA[5] (2009)

Table A.2.27: *Energy use in Serbia in 2007*

Uses of energy (ktoe)	Coal & coal pro-ducts	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natural gas	Nu-clear	Hydro	Geo-ther-mal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Energy related use	**-6,622**	**0**	**-3,359**	**2,578**	**-715**	**0**	**-863**	**0**	**-41**	**-13**	**0**	**2,288**	**985**	**-5,763**
Transfers	0	0	54	-51	0	0	0	0	0	0	0	0	0	3
Statistical differences	245	0	47	-28	0	0	0	0	0	0	0	0	0	264
Main activity producer electricity plants	-6,458	0	0	-48	0	0	-863	0	0	0	0	3,080	0	-4,289
Autoproducer electricity plants	-6	0	0	-186	0	0	0	0	0	0	0	3	0	-189
Main activity producer CHP plants	0	0	0	-62	0	0	0	0	0	0	0	46	41	25
Autoproducer CHP plants	-34	0	0	0	-110	0	0	0	0	0	0	12	137	6
Main activity producer heat plants	-47	0	0	-147	-367	0	0	0	-41	0	0	0	513	-89
Autoproducer heat plants	-89	0	0	-232	-223	0	0	0	0	-13	0	0	378	-179
Heat pumps	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric boilers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemical heat for electricity production	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas works	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petroleum refineries	0	0	-3,584	3,460	0	0	0	0	0	0	0	0	0	-124
Coal transformation	-207	0	0	0	0	0	0	0	0	0	0	0	0	-207
Liquefaction plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (transformation)	0	0	124	-128	0	0	0	0	0	0	0	0	0	-4
Own use	0	0	0	0	-4	0	0	0	0	0	0	-357	-21	-383
Distribution losses	-26	0	0	0	-11	0	0	0	0	0	0	-496	-63	-597
Total Final Consump-tion	**1,248**	**0**	**0**	**3,486**	**1,245**	**0**	**0**	**0**	**0**	**800**	**0**	**2,281**	**985**	**10,043**
Industry sector	628	0	0	861	920	0	0	0	0	0	0	581	533	3,522
Transport sector	0	0	0	1,826	0	0	0	0	0	0	0	22	0	1,849
Residential	510	0	0	282	82	0	0	0	0	800	0	1,198	362	3,233
Commercial and public services	0	0	0	0	0	0	0	0	0	0	0	462	87	549
Agriculture/forestry	1	0	0	71	176	0	0	0	0	0	0	18	3	269
Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (other)	83	0	0	199	27	0	0	0	0	0	0	0	0	309
Non-energy use	26	0	0	247	40	0	0	0	0	0	0	0	0	312

Source: IEA[5] (2009)

Table A.2.28: Energy use in the former Yugoslav Republic of Macedonia in 2007

Uses of energy (ktoe)	Coal & coal products	Peat	Crude, NGL & feed-stocks	Petroleum products	Natural gas	Nuclear	Hydro	Geothermal	Solar/ wind/ other	Renewables & waste	Heat production from non-specified comb.fuels	Electricity imports	Heat	Total
Energy related use	**-1,291**	**0**	**-1,072**	**800**	**-51**	**0**	**-87**	**-1**	**0**	**-8**	**0**	**365**	**104**	**-1,237**
Transfers	0	0	48	-45	0	0	0	0	0	0	0	0	0	3
Statistical differences	-13	0	0	0	0	0	0	0	0	-6	0	0	0	-18
Main activity producer electricity plants	-1,267	0	0	-114	0	0	-87	0	0	0	0	578	0	-889
Autoproducer electricity plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Main activity producer CHP plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Autoproducer CHP plants	-6	0	0	-13	-1	0	0	0	0	0	0	0	13	-6
Main activity producer heat plants	0	0	0	-40	-36	0	0	0	0	0	0	0	70	-6
Autoproducer heat plants	-5	0	0	-38	-14	0	0	0	0	-2	0	0	44	-14
Heat pumps	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric boilers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemical heat for electricity production	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas works	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petroleum refineries	0	0	-1,120	1,052	0	0	0	0	0	0	0	0	0	-68
Coal transformation	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Liquefaction plants	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (transformation)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Own use	0	0	0	-2	0	0	0	0	0	0	0	-83	-16	-101
Distribution losses	0	0	0	0	0	0	0	-1	0	0	0	-130	-7	-138
Total Final Consumption	**155**	**1**	**0**	**765**	**34**	**0**	**0**	**9**	**0**	**136**	**0**	**580**	**104**	**1,786**
Industry sector	151	0	0	194	33	0	0	0	0	2	0	211	49	640
Transport sector	0	0	0	391	0	0	0	0	0	0	0	3	0	394
Residential	1	0	0	42	0	0	0	0	0	124	0	261	39	468
Commercial and public services	2	1	0	97	1	0	0	2	0	9	0	104	16	231
Agriculture/forestry	1	0	0	12	0	0	0	7	0	1	0	1	0	24
Fishing	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-specified (other)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-energy use	0	0	0	29	0	0	0	0	0	0	0	0	0	29

Source: IEA[5] (2009)

Table A.2.29: *Energy use in Ukraine in 2007*

Uses of energy (ktoe)	Coal & coal products	Peat	Crude, NGL & feed-stocks	Petro-leum pro-ducts	Natural gas	Nu-clear	Hydro	Geo-ther-mal	Solar/ wind/ other	Renew-ables & waste	Heat production from non-specified comb.fuels	Elec-tricity im-ports	Heat	Total
Energy related use	**-27,591**	**-70**	**-14,870**	**13,601**	**-23,166**	**-24,117**	**-873**	**0**	**-4**	**-330**	**0**	**12,401**	**10,111**	**-54,908**
Transfers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Statistical differences	2,191	1	0	-152	36	0	0	0	0	0	0	0	0	2,076
Main activity producer electricity plants	-16,642	0	0	-189	-1,863	-24,117	-870	0	-4	0	0	14,850	0	-28,834
Autoproducer electricity plants	-1,250	0	0	0	0	0	-3	0	0	0	0	294	0	-959
Main activity producer CHP plants	-394	0	0	-13	-4,354	0	0	0	0	0	0	1,350	2,554	-857
Autoproducer CHP plants	0	0	0	0	-1,527	0	0	0	0	0	0	373	583	-571
Main activity producer heat plants	0	0	0	-1	-10,633	0	0	0	0	0	0	0	8,721	-1,913
Autoproducer heat plants	-412	-6	0	0	-2,643	0	0	0	0	0	0	0	1,743	-1,319
Heat pumps	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Electric boilers	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Chemical heat for electricity production	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Gas works	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Petroleum refineries	0	0	-14,848	14,974	0	0	0	0	0	0	0	0	0	126
Coal transformation	-9,253	-64	0	-2	0	0	0	0	0	0	0	0	0	-9,319
Liquefaction plants	0	0	2	0	-24	0	0	0	0	0	0	0	0	-22
Non-specified (transformation)	0	0	0	-305	-12	0	0	0	0	-286	0	0	0	-603
Own use	-1,812	0	-5	-711	-1,201	0	0	0	0	-44	0	-2,492	-90	-6,355
Distribution losses	-19	-1	-19	0	-945	0	0	0	0	0	0	-1,974	-3,400	-6,358
Total Final Consump-tion	**12,928**	**18**	**19**	**14,245**	**32,978**	**0**	**0**	**0**	**0**	**520**	**0**	**11,612**	**10,111**	**82,435**
Industry sector	9,957	0	0	1,599	10,893	0	0	0	0	64	0	6,154	5,440	34,108
Transport sector	39	0	0	8,480	2,939	0	0	0	0	2	0	903	0	12,364
Residential	1,430	13	0	714	13,361	0	0	0	0	392	0	2,430	4,671	23,011
Commercial and public services	277	0	0	55	535	0	0	0	0	44	0	1,839	0	2,751
Agriculture/forestry	25	0	0	1,382	134	0	0	0	0	4	0	282	0	1,828
Fishing	0	0	0	0	0	0	0	0	0	14	0	4	0	19
Non-specified (other)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Non-energy use	1,200	5	19	2,015	5,116	0	0	0	0	0	0	0	0	8,354

Source: IEA[5] (2009)

Balance of electricity and heat

Table A.2.30: Balance of electricity and heat in Albania in 2007

	Electricity	Heat
	Unit: GWh	*Unit: TJ*
Coal and coal products	0	50
Peat	0	0
Crude, NGL and feedstocks	0	0
Petroleum products	72	92
Natural gas	0	0
Nuclear	0	0
Hydro	2,788	0
Geothermal	0	0
Solar/wind/other	0	84
Combustible renewables and waste	0	0
Heat production from non-specified comb.fuels	0	0
Electricity	0	0
Heat	0	0
Total Production	**2,860**	**226**
Imports	2,828	0
Exports	0	0
International marine bunkers	0	0
International aviation bunkers	0	0
Stock changes	0	0
Domestic supply	5,688	226
Transfers	0	0
Statistical differences	0	0
Transformation sector	0	0
Main activity producer electricity plants	0	0
Autoproducer electricity plants	0	0
Main activity producer CHP plants	0	0
Autoproducer CHP plants	0	0
Main activity producer heat plants	0	0
Autoproducer heat plants	0	0
Heat pumps	0	0
Electric boilers	0	0
Chemical heat for electricity production	0	0
Blast furnaces	0	0
Gas works	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	0	0
Petrochemical industry	0	0
Coal liquefaction plants	0	0
Gas-to-liquids (GTL) plants	0	0
For blended natural gas	0	0
Charcoal production plants	0	0
Non-specified (transformation)	0	0
Energy sector	107	135
Coal mines	0	0
Oil and gas extraction	0	0
Blast furnaces	0	0
Gas works	0	0
Gasification plants for biogas	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	0	135
Coal liquefaction plants	0	0
Liquefaction (LNG)/regasification plants	0	0
Gas-to-liquids (GTL) plants	0	0
Own use in electricity, CHP and heat plants	107	0
Used for pumped storage	0	0
Nuclear industry	0	0
Charcoal production plants	0	0
Non-specified (energy)	0	0
Distribution losses	1,972	7
Final consumption	**3,609**	**84**

	Electricity	Heat
	Unit: GWh	*Unit: TJ*
Final consumption	**3,609**	**84**
Industry sector	655	0
Iron and steel	97	0
Chemical and petrochemical	42	0
Non-ferrous metals	36	0
Non-metallic minerals	35	0
Transport equipment	0	0
Machinery	0	0
Mining and quarrying	41	0
Food and tobacco	144	0
Paper, pulp and print	59	0
Wood and wood products	0	0
Construction	81	0
Textile and leather	94	0
Non-specified (industry)	26	0
Transport sector	0	0
World aviation bunkers	x	x
Domestic aviation	0	0
Road	0	0
Rail	0	0
Pipeline transport	0	0
World marine bunkers	x	x
Domestic navigation	0	0
Non-specified (transport)	0	0
Other sectors	2,954	84
Residential	2,070	84
Commercial and public services	442	0
Agriculture/forestry	0	0
Fishing	0	0

Source: IEA[5] (2009)

Table A.2.31: *Balance of electricity and heat in Belarus in 2007*

	Electricity	Heat
	Unit: GWh	*Unit: TJ*
Coal and coal products	0	2,311
Peat	8	1,593
Crude, NGL and feedstocks	0	0
Petroleum products	174	12,271
Natural gas	31,523	240,878
Nuclear	0	0
Hydro	35	0
Geothermal	0	0
Solar/wind/other	1	0
Combustible renewables and waste	88	13,809
Heat production from non-specified comb.fuels	0	0
Electricity	0	0
Heat	0	0
Total Production	**31,829**	**270,862**
Imports	9,406	0
Exports	-5,062	0
International marine bunkers	0	0
International aviation bunkers	0	0
Stock changes	0	0
Domestic supply	36,173	270,862
Transfers	0	0
Statistical differences	0	0
Transformation sector	0	0
Main activity producer electricity plants	0	0
Autoproducer electricity plants	0	0
Main activity producer CHP plants	0	0
Autoproducer CHP plants	0	0
Main activity producer heat plants	0	0
Autoproducer heat plants	0	0
Heat pumps	0	0
Electric boilers	0	0
Chemical heat for electricity production	0	0
Blast furnaces	0	0
Gas works	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	0	0
Petrochemical industry	0	0
Coal liquefaction plants	0	0
Gas-to-liquids (GTL) plants	0	0
For blended natural gas	0	0
Charcoal production plants	0	0
Non-specified (transformation)	0	0
Energy sector	3,750	14,972
Coal mines	0	0
Oil and gas extraction	209	497
Blast furnaces	0	0
Gas works	0	0
Gasification plants for biogas	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	75	1,702
Petroleum refineries	1,206	12,118
Coal liquefaction plants	0	0
Liquefaction (LNG)/regasification plants	0	0
Gas-to-liquids (GTL) plants	0	0
Own use in electricity, CHP and heat plants	2,250	0
Used for pumped storage	0	0
Nuclear industry	0	0
Charcoal production plants	0	0
Non-specified (energy)	10	655
Distribution losses	3,724	25,829
Final consumption	**28,699**	**230,061**

	Electricity	Heat
	Unit: GWh	*Unit: TJ*
Final consumption	**28,699**	**230,061**
Industry sector	14,115	82,915
Iron and steel	1,789	432
Chemical and petrochemical	4,740	31,278
Non-ferrous metals	8	10
Non-metallic minerals	1,301	7,682
Transport equipment	54	0
Machinery	2,727	8,020
Mining and quarrying	0	0
Food and tobacco	1,147	20,795
Paper, pulp and print	340	0
Wood and wood products	406	8,595
Construction	332	0
Textile and leather	452	3,983
Non-specified (industry)	819	2,120
Transport sector	1,831	0
World aviation bunkers	x	x
Domestic aviation	0	0
Road	0	0
Rail	703	0
Pipeline transport	804	0
World marine bunkers	x	x
Domestic navigation	0	0
Non-specified (transport)	324	0
Other sectors	12,753	147,146
Residential	6,009	93,378
Commercial and public services	3,454	47,197
Agriculture/forestry	1,426	6,571
Fishing	0	0

Source: IEA[5] (2009)

Table A.2.32: Balance of electricity and heat in Bosnia and Herzegovina in 2007

	Electricity	Heat
	Unit: GWh	Unit: TJ
Coal and coal products	7,667	1,727
Peat	0	0
Crude, NGL and feedstocks	0	0
Petroleum products	156	689
Natural gas	0	1,746
Nuclear	0	0
Hydro	4,001	0
Geothermal	0	0
Solar/wind/other	0	0
Combustible renewables and waste	0	0
Heat production from non-specified comb.fuels	0	0
Electricity	0	0
Heat	0	0
Total Production	**11,824**	**4,162**
Imports	3,743	0
Exports	-4,344	0
International marine bunkers	0	0
International aviation bunkers	0	0
Stock changes	0	0
Domestic supply	11,223	4,162
Transfers	0	0
Statistical differences	110	0
Transformation sector	0	0
Main activity producer electricity plants	0	0
Autoproducer electricity plants	0	0
Main activity producer CHP plants	0	0
Autoproducer CHP plants	0	0
Main activity producer heat plants	0	0
Autoproducer heat plants	0	0
Heat pumps	0	0
Electric boilers	0	0
Chemical heat for electricity production	0	0
Blast furnaces	0	0
Gas works	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	0	0
Petrochemical industry	0	0
Coal liquefaction plants	0	0
Gas-to-liquids (GTL) plants	0	0
For blended natural gas	0	0
Charcoal production plants	0	0
Non-specified (transformation)	0	0
Energy sector	1,330	0
Coal mines	0	0
Oil and gas extraction	0	0
Blast furnaces	0	0
Gas works	0	0
Gasification plants for biogas	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	0	0
Coal liquefaction plants	0	0
Liquefaction (LNG)/regasification plants	0	0
Gas-to-liquids (GTL) plants	0	0
Own use in electricity, CHP and heat plants	1,330	0
Used for pumped storage	0	0
Nuclear industry	0	0
Charcoal production plants	0	0
Non-specified (energy)	0	0
Distribution losses	2,226	0
Final consumption	**7,777**	**4,162**

	Electricity	Heat
	Unit: GWh	Unit: TJ
Final consumption	**7,777**	**4,162**
Industry sector	2,404	0
Iron and steel	0	0
Chemical and petrochemical	0	0
Non-ferrous metals	2,318	0
Non-metallic minerals	0	0
Transport equipment	0	0
Machinery	0	0
Mining and quarrying	0	0
Food and tobacco	0	0
Paper, pulp and print	0	0
Wood and wood products	0	0
Construction	0	0
Textile and leather	0	0
Non-specified (industry)	86	0
Transport sector	0	0
World aviation bunkers	x	x
Domestic aviation	0	0
Road	0	0
Rail	0	0
Pipeline transport	0	0
World marine bunkers	x	x
Domestic navigation	0	0
Non-specified (transport)	0	0
Other sectors	5,373	4,162
Residential	4,113	0
Commercial and public services	1,260	0
Agriculture/forestry	0	0
Fishing	0	0

Source: IEA[5] (2009)

<u>Table A.2.33:</u> Balance of electricity and heat in Bulgaria in 2007

	Electricity	Heat
	Unit: GWh	Unit: TJ
Coal and coal products	22,463	27,383
Peat	0	0
Crude, NGL and feedstocks	0	0
Petroleum products	568	1,350
Natural gas	2,336	22,592
Nuclear	14,643	854
Hydro	2,874	0
Geothermal	0	0
Solar/wind/other	47	0
Combustible renewables and waste	6	7
Heat production from non-specified comb.fuels	0	0
Electricity	0	0
Heat	0	0
Total Production	**42,937**	**52,186**
Imports	3,058	0
Exports	-7,533	0
International marine bunkers	0	0
International aviation bunkers	0	0
Stock changes	0	0
Domestic supply	38,822	52,186
Transfers	0	0
Statistical differences	-301	163
Transformation sector	0	0
Main activity producer electricity plants	0	0
Autoproducer electricity plants	0	0
Main activity producer CHP plants	0	0
Autoproducer CHP plants	0	0
Main activity producer heat plants	0	0
Autoproducer heat plants	0	0
Heat pumps	0	0
Electric boilers	0	0
Chemical heat for electricity production	0	0
Blast furnaces	0	0
Gas works	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	0	0
Petrochemical industry	0	0
Coal liquefaction plants	0	0
Gas-to-liquids (GTL) plants	0	0
For blended natural gas	0	0
Charcoal production plants	0	0
Non-specified (transformation)	0	0
Energy sector	6,616	12,423
Coal mines	620	41
Oil and gas extraction	10	0
Blast furnaces	8	0
Gas works	0	0
Gasification plants for biogas	0	0
Coke ovens	15	0
Patent fuel plants	0	0
BKB plants	39	6,907
Petroleum refineries	418	0
Coal liquefaction plants	0	0
Liquefaction (LNG)/regasification plants	0	0
Gas-to-liquids (GTL) plants	0	0
Own use in electricity, CHP and heat plants	4,230	5,453
Used for pumped storage	546	0
Nuclear industry	0	0
Charcoal production plants	0	0
Non-specified (energy)	730	22
Distribution losses	4,692	5,814
Final consumption	**27,213**	**34,112**

	Electricity	Heat
	Unit: GWh	Unit: TJ
Final consumption	**27,213**	**34,112**
Industry sector	10,179	13,097
Iron and steel	1,791	10
Chemical and petrochemical	1,807	11,810
Non-ferrous metals	849	0
Non-metallic minerals	983	8
Transport equipment	95	1
Machinery	848	86
Mining and quarrying	931	42
Food and tobacco	1,057	404
Paper, pulp and print	320	405
Wood and wood products	176	0
Construction	278	34
Textile and leather	621	290
Non-specified (industry)	423	7
Transport sector	397	0
World aviation bunkers	x	x
Domestic aviation	0	0
Road	0	0
Rail	377	0
Pipeline transport	20	0
World marine bunkers	x	x
Domestic navigation	0	0
Non-specified (transport)	0	0
Other sectors	16,637	21,015
Residential	9,376	15,791
Commercial and public services	7,047	5,197
Agriculture/forestry	212	27
Fishing	2	0

Source: IEA[5] (2009)

Table A.2.34: Balance of electricity and heat in Croatia in 2007

	Electricity	Heat
	Unit: GWh	Unit: TJ
Coal and coal products	2,423	0
Peat	0	0
Crude, NGL and feedstocks	0	0
Petroleum products	2,387	2,622
Natural gas	3,064	9,042
Nuclear	0	0
Hydro	7,024	0
Geothermal	0	0
Solar/wind/other	35	0
Combustible renewables and waste	8	0
Heat production from non-specified comb.fuels	0	0
Electricity	0	0
Heat	0	0
Total Production	**14,941**	**11,664**
Imports	7,812	0
Exports	-1,451	0
International marine bunkers	0	0
International aviation bunkers	0	0
Stock changes	0	0
Domestic supply	18,606	11,664
Transfers	0	0
Statistical differences	0	0
Transformation sector	0	0
Main activity producer electricity plants	0	0
Autoproducer electricity plants	0	0
Main activity producer CHP plants	0	0
Autoproducer CHP plants	0	0
Main activity producer heat plants	0	0
Autoproducer heat plants	0	0
Heat pumps	0	0
Electric boilers	0	0
Chemical heat for electricity production	0	0
Blast furnaces	0	0
Gas works	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	0	0
Petrochemical industry	0	0
Coal liquefaction plants	0	0
Gas-to-liquids (GTL) plants	0	0
For blended natural gas	0	0
Charcoal production plants	0	0
Non-specified (transformation)	0	0
Energy sector	1,230	798
Coal mines	0	0
Oil and gas extraction	123	0
Blast furnaces	0	0
Gas works	0	0
Gasification plants for biogas	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	297	0
Coal liquefaction plants	0	0
Liquefaction (LNG)/regasification plants	0	0
Gas-to-liquids (GTL) plants	0	0
Own use in electricity, CHP and heat plants	542	798
Used for pumped storage	234	0
Nuclear industry	0	0
Charcoal production plants	0	0
Non-specified (energy)	34	0
Distribution losses	2,026	1,746
Final consumption	**15,350**	**9,120**

	Electricity	Heat
	Unit: GWh	Unit: TJ
Final consumption	2,423	0
Industry sector	0	0
Iron and steel	0	0
Chemical and petrochemical	2,387	2,622
Non-ferrous metals	3,064	9,042
Non-metallic minerals	0	0
Transport equipment	7,024	0
Machinery	0	0
Mining and quarrying	35	0
Food and tobacco	8	0
Paper, pulp and print	0	0
Wood and wood products	0	0
Construction	0	0
Textile and leather	**14,941**	**11,664**
Non-specified (industry)	7,812	0
Transport sector	-1,451	0
World aviation bunkers	0	0
Domestic aviation	0	0
Road	0	0
Rail	18,606	11,664
Pipeline transport	0	0
World marine bunkers	0	0
Domestic navigation	0	0
Non-specified (transport)	0	0
Other sectors	0	0
Residential	0	0
Commercial and public services	0	0
Agriculture/forestry	0	0
Fishing	0	0

Source: IEA[5] (2009)

Table A.2.35: *Balance of electricity and heat in Kazakhstan in 2007*

	Electricity	Heat
	Unit: GWh	*Unit: TJ*
Coal and coal products	53,880	391,083
Peat	0	0
Crude, NGL and feedstocks	0	0
Petroleum products	6,365	0
Natural gas	8,180	0
Nuclear	0	0
Hydro	8,171	0
Geothermal	0	0
Solar/wind/other	0	0
Combustible renewables and waste	0	0
Heat production from non-specified comb.fuels	0	0
Electricity	0	0
Heat	0	0
Total Production	**76,596**	**391,083**
Imports	3,270	0
Exports	-3,617	0
International marine bunkers	0	0
International aviation bunkers	0	0
Stock changes	0	0
Domestic supply	76,249	391,083
Transfers	0	0
Statistical differences	23	0
Transformation sector	0	0
Main activity producer electricity plants	0	0
Autoproducer electricity plants	0	0
Main activity producer CHP plants	0	0
Autoproducer CHP plants	0	0
Main activity producer heat plants	0	0
Autoproducer heat plants	0	0
Heat pumps	0	0
Electric boilers	0	0
Chemical heat for electricity production	0	0
Blast furnaces	0	0
Gas works	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	0	0
Petrochemical industry	0	0
Coal liquefaction plants	0	0
Gas-to-liquids (GTL) plants	0	0
For blended natural gas	0	0
Charcoal production plants	0	0
Non-specified (transformation)	0	0
Energy sector	17,468	0
Coal mines	1,223	0
Oil and gas extraction	3,664	0
Blast furnaces	0	0
Gas works	0	0
Gasification plants for biogas	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	0	0
Coal liquefaction plants	0	0
Liquefaction (LNG)/regasification plants	0	0
Gas-to-liquids (GTL) plants	0	0
Own use in electricity, CHP and heat plants	12,581	0
Used for pumped storage	0	0
Nuclear industry	0	0
Charcoal production plants	0	0
Non-specified (energy)	0	0
Distribution losses	7,371	42,727
Final consumption	**51,433**	**348,356**

	Electricity	Heat
	Unit: GWh	*Unit: TJ*
Final consumption	**51,433**	**348,356**
Industry sector	30,968	170,346
Iron and steel	8,689	0
Chemical and petrochemical	2,059	0
Non-ferrous metals	8,972	0
Non-metallic minerals	1,105	0
Transport equipment	601	0
Machinery	5,583	0
Mining and quarrying	0	0
Food and tobacco	2,588	0
Paper, pulp and print	79	0
Wood and wood products	54	0
Construction	931	0
Textile and leather	210	0
Non-specified (industry)	97	170,346
Transport sector	2,206	4,180
World aviation bunkers	x	x
Domestic aviation	0	0
Road	0	0
Rail	1,024	0
Pipeline transport	329	0
World marine bunkers	x	x
Domestic navigation	0	0
Non-specified (transport)	853	4,180
Other sectors	18,259	173,830
Residential	6,959	84,651
Commercial and public services	0	0
Agriculture/forestry	6,476	0
Fishing	0	0

Source: IEA[5] (2009)

Table A.2.36: *Balance of electricity and heat in the Republic of Moldova in 2007*

	Electricity	Heat
	Unit: GWh	*Unit: TJ*
Coal and coal products	0	65
Peat	0	0
Crude, NGL and feedstocks	36	0
Petroleum products	0	231
Natural gas	3,777	13,122
Nuclear	0	0
Hydro	33	0
Geothermal	0	0
Solar/wind/other	0	0
Combustible renewables and waste	0	150
Heat production from non-specified comb.fuels	0	0
Electricity	0	0
Heat	0	0
Total Production	**3,846**	**13,568**
Imports	2,931	0
Exports	0	0
International marine bunkers	0	0
International aviation bunkers	0	0
Stock changes	0	0
Domestic supply	6,777	13,568
Transfers	0	0
Statistical differences	0	0
Transformation sector	0	0
Main activity producer electricity plants	0	0
Autoproducer electricity plants	0	0
Main activity producer CHP plants	0	0
Autoproducer CHP plants	0	0
Main activity producer heat plants	0	0
Autoproducer heat plants	0	0
Heat pumps	0	0
Electric boilers	0	0
Chemical heat for electricity production	0	0
Blast furnaces	0	0
Gas works	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	0	0
Petrochemical industry	0	0
Coal liquefaction plants	0	0
Gas-to-liquids (GTL) plants	0	0
For blended natural gas	0	0
Charcoal production plants	0	0
Non-specified (transformation)	0	0
Energy sector	684	0
Coal mines	0	0
Oil and gas extraction	0	0
Blast furnaces	0	0
Gas works	0	0
Gasification plants for biogas	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	0	0
Coal liquefaction plants	0	0
Liquefaction (LNG)/regasification plants	0	0
Gas-to-liquids (GTL) plants	0	0
Own use in electricity, CHP and heat plants	275	0
Used for pumped storage	0	0
Nuclear industry	0	0
Charcoal production plants	0	0
Non-specified (energy)	409	0
Distribution losses	1,938	2,879
Final consumption	**4,155**	**10,689**

	Electricity	Heat
	Unit: GWh	*Unit: TJ*
Final consumption	**4,155**	**10,689**
Industry sector	855	3,057
Iron and steel	3	0
Chemical and petrochemical	28	44
Non-ferrous metals	0	0
Non-metallic minerals	229	31
Transport equipment	0	0
Machinery	34	13
Mining and quarrying	18	0
Food and tobacco	254	2,264
Paper, pulp and print	57	440
Wood and wood products	14	5
Construction	15	24
Textile and leather	51	171
Non-specified (industry)	152	65
Transport sector	65	0
World aviation bunkers	x	x
Domestic aviation	0	0
Road	0	0
Rail	0	0
Pipeline transport	13	0
World marine bunkers	x	x
Domestic navigation	0	0
Non-specified (transport)	52	0
Other sectors	3,235	7,632
Residential	1,295	5,340
Commercial and public services	745	1,929
Agriculture/forestry	50	34
Fishing	0	0

Source: IEA[5] (2009)

Table A.2.37: *Electricity Production on the Right Bank of Dniester River in the Republic of Moldova within the 1994-2007 time series, GWh*

	1990	1991	1992	1993	1994	1995	1996	1997	1998
Electricity Production – Total	1,883	1,697	1,591	1,452	1,236	1,176	1,398	1,450	1,246
Combined Heat Power Plants	1,815	1,577	1,518	1,384	1,189	1,089	1,309	1,360	1,160
Hydroelectric Power Plant	37	71	60	66	46	85	87	87	84
Other Production Units	31	49	13	2	1	2	2	3	2
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Electricity Production – Total	1,134	931	1,263	1,179	1,046	1,022	1,229	1,192	1,100
Combined Heat Power Plants	1,039	843	1,188	1,057	977	958	1,137	1,108	1,061
Hydroelectric Power Plants	91	85	73	121	64	59	85	77	33
Other Production Units	4	3	2	1	5	5	7	7	6

Source: Climate Change Office of the Ministry of Enviroment and Natural Resources[176] (2009)

Table A.2.38: Electricity Production on the Left Bank of the Dniester River within 1990-2006 time series, GWh

	1990	1991	1992	1993	1995	1996	1997	1998
Electricity production – Total	13,789	11,449	9,666	8,934	4,986.6	4,839.8	3,923.5	3,593.4
Hydroelectric Power Plant	220	227	198	308	239.7	279.4	295.0	224.0
Thermal Power Plant	13,569	11,222	9,468	8,626	4,746.9	4,560.4	3,628.5	3,369.4
	1999	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
Electricity production – Total	2,973.1	2,720.0	3,649.9	3,228.5	3,016.1	3,156.6	2,995.9	1,674.8
Hydroelectric Power Plant	285.6	256.7	284.1	286.5	223.0	266.1	295.0	275.0
Thermal Power Plant	2,687.5	2,463.3	3,365.8	2,942.0	2,793.1	2,890.5	2,700.9	1,399.8

Source: Climate Change Office of the Ministry of Enviroment and Natural Resources[176] (2009)

Table A.2.39: Balance of electricity and heat in Romania in 2007

	Electricity	Heat
	Unit: GWh	*Unit: TJ*
Coal and coal products	25,305	28,866
Peat	0	0
Crude, NGL and feedstocks	0	0
Petroleum products	1,096	8,238
Natural gas	11,559	72,196
Nuclear	7,709	0
Hydro	15,966	0
Geothermal	0	202
Solar/wind/other	3	1
Combustible renewables and waste	35	863
Heat production from non-specified comb.fuels	0	0
Electricity	0	0
Heat	0	0
Total Production	**61,673**	**110,366**
Imports	1,269	0
Exports	-3,359	0
International marine bunkers	0	0
International aviation bunkers	0	0
Stock changes	0	0
Domestic supply	59,583	110,366
Transfers	0	0
Statistical differences	0	0
Transformation sector	0	0
Main activity producer electricity plants	0	0
Autoproducer electricity plants	0	0
Main activity producer CHP plants	0	0
Autoproducer CHP plants	0	0
Main activity producer heat plants	0	0
Autoproducer heat plants	0	0
Heat pumps	0	0
Electric boilers	0	0
Chemical heat for electricity production	0	0
Blast furnaces	0	0
Gas works	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	0	0
Petrochemical industry	0	0
Coal liquefaction plants	0	0
Gas-to-liquids (GTL) plants	0	0
For blended natural gas	0	0
Charcoal production plants	0	0
Non-specified (transformation)	0	0
Energy sector	11,858	14,018
Coal mines	1,244	49
Oil and gas extraction	1,448	204
Blast furnaces	0	0
Gas works	0	0
Gasification plants for biogas	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	1,285	2,432
Coal liquefaction plants	0	0
Liquefaction (LNG)/regasification plants	0	0
Gas-to-liquids (GTL) plants	0	0
Own use in electricity, CHP and heat plants	5,508	8,645
Used for pumped storage	0	0
Nuclear industry	24	0
Charcoal production plants	0	0
Non-specified (energy)	2,349	2,688
Distribution losses	6,751	21,061
Final consumption	**40,974**	**75,287**

	Electricity	Heat
	Unit: GWh	*Unit: TJ*
Final consumption	**40,974**	**75,287**
Industry sector	22,837	12,885
Iron and steel	8,327	45
Chemical and petrochemical	3,734	7,286
Non-ferrous metals	0	0
Non-metallic minerals	2,196	569
Transport equipment	914	631
Machinery	1,789	903
Mining and quarrying	145	76
Food and tobacco	1,424	1,225
Paper, pulp and print	621	132
Wood and wood products	653	396
Construction	934	373
Textile and leather	849	654
Non-specified (industry)	1,251	595
Transport sector	1,463	0
World aviation bunkers	x	x
Domestic aviation	0	0
Road	0	0
Rail	928	0
Pipeline transport	46	0
World marine bunkers	x	x
Domestic navigation	0	0
Non-specified (transport)	489	0
Other sectors	16,674	62,402
Residential	10,389	52,562
Commercial and public services	5,721	9,071
Agriculture/forestry	562	769
Fishing	2	0

Source: IEA[5] (2009)

Table A.2.40: *Balance of electricity and heat in the Russian Federation in 2007*

	Electricity	Heat
	Unit: GWh	*Unit: TJ*
Coal and coal products	169,128	1,198,233
Peat	748	3,776
Crude, NGL and feedstocks	0	0
Petroleum products	17,234	383,232
Natural gas	486,713	4,080,775
Nuclear	160,039	14,746
Hydro	177,048	0
Geothermal	485	0
Solar/wind/other	7	0
Combustible renewables and waste	1,997	116,841
Heat production from non-specified comb.fuels	0	0
Electricity	0	0
Heat	0	347,663
Total Production	**1,013,399**	**6,145,266**
Imports	5,670	0
Exports	-18,468	0
International marine bunkers	0	0
International aviation bunkers	0	0
Stock changes	0	0
Domestic supply	1,002,535	6,145,266
Transfers	0	0
Statistical differences	0	0
Transformation sector	0	0
Main activity producer electricity plants	0	0
Autoproducer electricity plants	0	0
Main activity producer CHP plants	0	0
Autoproducer CHP plants	0	0
Main activity producer heat plants	0	0
Autoproducer heat plants	0	0
Heat pumps	0	0
Electric boilers	0	0
Chemical heat for electricity production	0	0
Blast furnaces	0	0
Gas works	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	0	0
Petrochemical industry	0	0
Coal liquefaction plants	0	0
Gas-to-liquids (GTL) plants	0	0
For blended natural gas	0	0
Charcoal production plants	0	0
Non-specified (transformation)	0	0
Energy sector	196,738	749,034
Coal mines	7,949	24,327
Oil and gas extraction	71,087	89,796
Blast furnaces	0	0
Gas works	0	0
Gasification plants for biogas	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	25,547	304,092
Coal liquefaction plants	0	0
Liquefaction (LNG)/regasification plants	0	0
Gas-to-liquids (GTL) plants	0	0
Own use in electricity, CHP and heat plants	74,274	0
Used for pumped storage	2,708	0
Nuclear industry	0	0
Charcoal production plants	0	0
Non-specified (energy)	15,173	330,819
Distribution losses	104,855	430,178
Final consumption	**700,942**	**4,966,054**

	Electricity	Heat
	Unit: GWh	*Unit: TJ*
Final consumption	**700,942**	**4,966,054**
Industry sector	352,778	1,867,081
Iron and steel	63,666	334,129
Chemical and petrochemical	44,562	547,223
Non-ferrous metals	103,877	0
Non-metallic minerals	19,894	87,074
Transport equipment	16,083	91,660
Machinery	22,614	126,391
Mining and quarrying	25,901	62,642
Food and tobacco	16,692	214,628
Paper, pulp and print	18,510	181,582
Wood and wood products	4,296	45,039
Construction	11,470	43,088
Textile and leather	3,487	27,929
Non-specified (industry)	1,726	105,696
Transport sector	86,646	0
World aviation bunkers	x	x
Domestic aviation	0	0
Road	0	0
Rail	46,466	0
Pipeline transport	26,513	0
World marine bunkers	x	x
Domestic navigation	0	0
Non-specified (transport)	13,667	0
Other sectors	261,518	3,098,973
Residential	115,930	2,218,476
Commercial and public services	129,138	754,777
Agriculture/forestry	16,180	123,943
Fishing	270	1,777

Source: IEA[5] (2009)

Table A.2.41: *Balance of electricity and heat in Serbia in 2007*

	Electricity	Heat
	Unit: GWh	Unit: TJ
Coal and coal products	25,637	7,076
Peat	0	0
Crude, NGL and feedstocks	0	0
Petroleum products	462	14,757
Natural gas	387	20,726
Nuclear	0	0
Hydro	10,037	0
Geothermal	0	0
Solar/wind/other	0	1,717
Combustible renewables and waste	0	504
Heat production from non-specified comb.fuels	0	0
Electricity	0	0
Heat	0	0
Total Production	**36,523**	**44,780**
Imports	9,106	0
Exports	-9,192	0
International marine bunkers	0	0
International aviation bunkers	0	0
Stock changes	0	0
Domestic supply	36,437	44,780
Transfers	0	0
Statistical differences	0	0
Transformation sector	0	0
Main activity producer electricity plants	0	0
Autoproducer electricity plants	0	0
Main activity producer CHP plants	0	0
Autoproducer CHP plants	0	0
Main activity producer heat plants	0	0
Autoproducer heat plants	0	0
Heat pumps	0	0
Electric boilers	0	0
Chemical heat for electricity production	0	0
Blast furnaces	0	0
Gas works	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	0	0
Petrochemical industry	0	0
Coal liquefaction plants	0	0
Gas-to-liquids (GTL) plants	0	0
For blended natural gas	0	0
Charcoal production plants	0	0
Non-specified (transformation)	0	0
Energy sector	4,155	893
Coal mines	495	0
Oil and gas extraction	0	0
Blast furnaces	0	0
Gas works	0	0
Gasification plants for biogas	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	40	0
Petroleum refineries	137	0
Coal liquefaction plants	0	0
Liquefaction (LNG)/regasification plants	0	0
Gas-to-liquids (GTL) plants	0	0
Own use in electricity, CHP and heat plants	2,441	893
Used for pumped storage	864	0
Nuclear industry	0	0
Charcoal production plants	0	0
Non-specified (energy)	178	0
Distribution losses	5,763	2,650
Final consumption	**26,519**	**41,237**

	Electricity	Heat
	Unit: GWh	Unit: TJ
Final consumption	**26,519**	**41,237**
Industry sector	6,750	22,302
Iron and steel	937	7,741
Chemical and petrochemical	858	8,809
Non-ferrous metals	290	232
Non-metallic minerals	939	172
Transport equipment	135	28
Machinery	876	175
Mining and quarrying	354	0
Food and tobacco	1,274	2,228
Paper, pulp and print	231	438
Wood and wood products	58	52
Construction	214	0
Textile and leather	238	259
Non-specified (industry)	346	2,168
Transport sector	255	0
World aviation bunkers	x	x
Domestic aviation	0	0
Road	0	0
Rail	255	0
Pipeline transport	0	0
World marine bunkers	x	x
Domestic navigation	0	0
Non-specified (transport)	0	0
Other sectors	19,514	18,935
Residential	13,933	15,171
Commercial and public services	5,369	3,638
Agriculture/forestry	212	126
Fishing	0	0

Source: IEA[5] (2009)

Table A.2.42: Balance of electricity and heat in the former Yugoslav Republic of Macedonia in 2007

	Electricity	Heat
	Unit: GWh	*Unit: TJ*
Coal and coal products	5,240	243
Peat	0	0
Crude, NGL and feedstocks	0	0
Petroleum products	479	3,241
Natural gas	0	1,800
Nuclear	0	0
Hydro	1,010	0
Geothermal	0	0
Solar/wind/other	0	0
Combustible renewables and waste	0	61
Heat production from non-specified comb.fuels	0	0
Electricity	0	0
Heat	0	0
Total Production	**6,729**	**5,345**
Imports	2,491	0
Exports	0	0
International marine bunkers	0	0
International aviation bunkers	0	0
Stock changes	0	0
Domestic supply	9,220	5,345
Transfers	0	0
Statistical differences	0	0
Transformation sector	0	0
Main activity producer electricity plants	0	0
Autoproducer electricity plants	0	0
Main activity producer CHP plants	0	0
Autoproducer CHP plants	0	0
Main activity producer heat plants	0	0
Autoproducer heat plants	0	0
Heat pumps	0	0
Electric boilers	0	0
Chemical heat for electricity production	0	0
Blast furnaces	0	0
Gas works	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	0	0
Petrochemical industry	0	0
Coal liquefaction plants	0	0
Gas-to-liquids (GTL) plants	0	0
For blended natural gas	0	0
Charcoal production plants	0	0
Non-specified (transformation)	0	0
Energy sector	963	670
Coal mines	125	0
Oil and gas extraction	0	0
Blast furnaces	0	0
Gas works	0	0
Gasification plants for biogas	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	56	402
Coal liquefaction plants	0	0
Liquefaction (LNG)/regasification plants	0	0
Gas-to-liquids (GTL) plants	0	0
Own use in electricity, CHP and heat plants	756	247
Used for pumped storage	0	0
Nuclear industry	0	0
Charcoal production plants	0	0
Non-specified (energy)	26	21
Distribution losses	1,509	295
Final consumption	**6,748**	**4,380**

	Electricity	Heat
	Unit: GWh	*Unit: TJ*
Final consumption	**6,748**	**4,380**
Industry sector	2,450	2,065
Iron and steel	1,778	320
Chemical and petrochemical	48	170
Non-ferrous metals	15	0
Non-metallic minerals	157	179
Transport equipment	11	11
Machinery	41	36
Mining and quarrying	116	2
Food and tobacco	163	912
Paper, pulp and print	12	102
Wood and wood products	9	20
Construction	16	10
Textile and leather	67	285
Non-specified (industry)	17	18
Transport sector	30	0
World aviation bunkers	x	x
Domestic aviation	0	0
Road	0	0
Rail	26	0
Pipeline transport	0	0
World marine bunkers	x	x
Domestic navigation	0	0
Non-specified (transport)	4	0
Other sectors	4,268	2,315
Residential	3,038	1,638
Commercial and public services	1,213	677
Agriculture/forestry	17	0
Fishing	0	0

Source: IEA[5] (2009)

Table A.2.43: Balance of electricity and heat in Ukraine in 2007

	Electricity	Heat
	Unit: GWh	Unit: TJ
Coal and coal products	67,101	14,842
Peat	0	0
Crude, NGL and feedstocks	0	0
Petroleum products	759	303
Natural gas	25,545	554,409
Nuclear	92,542	0
Hydro	10,143	0
Geothermal	0	0
Solar/wind/other	45	0
Combustible renewables and waste	0	0
Heat production from non-specified comb.fuels	0	0
Electricity	0	0
Heat	0	0
Total Production	**196,135**	**569,554**
Imports	3,383	0
Exports	-12,554	0
International marine bunkers	0	0
International aviation bunkers	0	0
Stock changes	0	0
Domestic supply	187,080	569,554
Transfers	0	0
Statistical differences	0	0
Transformation sector	0	0
Main activity producer electricity plants	0	0
Autoproducer electricity plants	0	0
Main activity producer CHP plants	0	0
Autoproducer CHP plants	0	0
Main activity producer heat plants	0	0
Autoproducer heat plants	0	0
Heat pumps	0	0
Electric boilers	0	0
Chemical heat for electricity production	0	0
Blast furnaces	0	0
Gas works	0	0
Coke ovens	0	0
Patent fuel plants	0	0
BKB plants	0	0
Petroleum refineries	0	0
Petrochemical industry	0	0
Coal liquefaction plants	0	0
Gas-to-liquids (GTL) plants	0	0
For blended natural gas	0	0
Charcoal production plants	0	0
Non-specified (transformation)	0	0
Energy sector	29,097	3,755
Coal mines	7,178	0
Oil and gas extraction	465	0
Blast furnaces	0	0
Gas works	118	0
Gasification plants for biogas	0	0
Coke ovens	1,039	0
Patent fuel plants	68	0
BKB plants	12	0
Petroleum refineries	1,373	0
Coal liquefaction plants	0	0
Liquefaction (LNG)/regasification plants	0	0
Gas-to-liquids (GTL) plants	0	0
Own use in electricity, CHP and heat plants	15,247	3,755
Used for pumped storage	162	0
Nuclear industry	0	0
Charcoal production plants	0	0
Non-specified (energy)	3,435	0
Distribution losses	22,952	142,389
Final consumption	**135,031**	**423,410**

	Electricity	Heat
	Unit: GWh	Unit: TJ
Final consumption	**135,031**	**423,410**
Industry sector	71,558	227,822
Iron and steel	32,015	0
Chemical and petrochemical	6,769	0
Non-ferrous metals	1,789	0
Non-metallic minerals	4,003	0
Transport equipment	1,727	0
Machinery	4,728	0
Mining and quarrying	10,499	0
Food and tobacco	4,762	0
Paper, pulp and print	1,160	0
Wood and wood products	528	0
Construction	1,493	0
Textile and leather	490	0
Non-specified (industry)	1,595	227,822
Transport sector	10,505	0
World aviation bunkers	x	x
Domestic aviation	0	0
Road	0	0
Rail	6,744	0
Pipeline transport	952	0
World marine bunkers	x	x
Domestic navigation	0	0
Non-specified (transport)	2,809	0
Other sectors	52,968	195,588
Residential	28,251	195,588
Commercial and public services	21,388	0
Agriculture/forestry	3,284	0
Fishing	45	0

Source: IEA[5] (2009)

Installed generation capacity

Table A.2.44: Installed electricity generation capacity in Albania

Power generation unit	Installed capacity (MW)	Fuel
Fierze hydro power plant (Drin River Cascade)	500	Hydro
Koman hydro power plant (Drin River Cascade)	600	Hydro
Vau I Dejes hydro power plant (Drin River Cascade)	250	Hydro
Ulza and Shkopeti hydro power plants (Mati River Cascade)	52	Hydro
Bistrica 1 and Bistrica 2 hydro power plants (Bistrica River Cascade)	28.5	Hydro
Various small hydro power plants	20	Hydro
Fier thermal power plant	159 (installed) 10 (available)	Coal

Source: AKBN[33] (2009)

Table A.2.45: Installed electricity generation capacity in Belarus

Power plants	Installed capacity (MW)
Condensation	3,824.5
Cogeneration	3,459.8
Hydropower	9.3
Smal CHP	435.4

Source: Research and Production Communal Unitary Enterprise BelVIEC (Belarus)[61] (2009)

Table A.2.46: Power plants in Bosnia and Herzegovina

Power generation unit	Installed capacity (MW)	Fuel
Federation of BiH		
Jablanica	175	Hydro
Grabovica	114	Hydro
Salakovac	207	Hydro
Small HPP	13	Hydro
Čapljina	400	Hydro
Rama	159	Hydro
Mostar	71.6	Hydro
Jajce I	58	Hydro
Jajce II	28	Hydro
Peć Mlini	30	Hydro
Tuzla G3	85	Lignite/Browncoal
Tuzla G4	175	Lignite/Browncoal
Tuzla G5	180	Lignite/Browncoal
Tuzla G6	190	Browncoal
Kakanj G5	95	Browncoal
Kakanj G6	85	Browncoal
Kakanj G7	205	Browncoal
Republic of Srpska		
Višegrad	315	Hydro
Bočac	110	Hydro
Trebinje I	180	Hydro
Trebinje II	7.6	Hydro
Dubrovnik I (50%) *	108	Hydro
Small and industry power plants	15.2	Hydro
Gacko 1	255	Lignite
Ugljevik 1	235.6	Browncoal

* HPP Dubrovnik I is on territory of RH. Electricity generation is shared 50:50.

Source: EIHP[89] (2008)

Table A.2.47: Power plants in Bulgaria with more than 100MW installed capacity

Power generation unit	Installed capacity (MW)	Fuel
Kozloduy	3,760	Nuclear
Belene	2,000	Nuclear
Maritsa Iztok 1	500	Thermal
Maritsa Iztok 2	1,470	Thermal
Maritsa Iztok 3	900	Thermal
Varna	1,260	Thermal
Bobov Dol	630	Thermal
Ruse Iztok	600	Thermal
Maritsa 3	240	Thermal
Republika	180	Thermal
Sofia	130	Thermal
Sofia Iztok	100	Thermal
Belmeken-Sestrimo	740	Hydro
Dospat-Vacha	670	Hydro
Batashki Vondnosilov Pat	230	Hydro
Kardzhali	170	Hydro
Gorna Arda	160	Hydro
Sredna Vacha	120	Hydro
Ivailovgrad	110	Hydro

Source: Center for Energy Efficiency EnEffect[104] (2009)

Table A.2.48: Installed renewable energy sources capacity in Croatia (2007)

Power Plant	Plant Name	Type	Available Power (MW)	Ownership
Hydro	HE Zakučac	Large storage plant	486.00	HEP
Hydro	RHE Velebit	Large storage plant	276.00	HEP
Hydro	HE Orlovac	Large storage plant	237.00	HEP
Hydro	HE Senj	Large storage plant	216.00	HEP
Hydro	HE Dubrovnik	Large storage plant	216.00	HEP
Hydro	HE Vinodol	Large storage plant	84.00	HEP
Hydro	HE Kraljevac	Large storage plant	46.40	HEP
Hydro	HE Peruća	Large storage plant	50.80	HEP
Hydro	HE Dale	Large storage plant	40.80	HEP
Hydro	HE Sklope	Large storage plant	22.50	HEP
Hydro	CS Buško Blato	Large storage plant	11.40	HEP
Hydro	HE Zakučac	Large storage plant	486.00	HEP
Hydro	RHE Velebit	Large storage plant	276.00	HEP
Hydro	HE Orlovac	Large storage plant	237.00	HEP
Hydro	HE Senj	Large storage plant	216.00	HEP
Hydro	HE Dubrovnik	Large storage plant	216.00	HEP
Hydro	HE Vinodol	Large storage plant	84.00	HEP
Hydro	HE Kraljevac	Large storage plant	46.40	HEP
Hydro	HE Peruća	Large storage plant	50.80	HEP
Hydro	HE Dale	Large storage plant	40.80	HEP
Hydro	HE Sklope	Large storage plant	22.50	HEP
Total large storage plants owned by HEP			1,686.90	HEP
Hydro	CHE Fužina	Small storage plant	4.00	HEP
Hydro	HE Zavrelje	Small storage plant	2.00	HEP
Hydro	CHE Lepenica	Small storage plant	1.40	HEP
Hydro	HE Zeleni Vir	Small storage plant	1.70	HEP
Total small storage plants owned by HEP			9.10	HEP
Total storage plants owned by HEP			1,696.00	HEP
Hydro	HE Varaždin	Large run-of-river	86.46	HEP
Hydro	HE Čakovec	Large run-of-river	77.44	HEP
Hydro	HE Dubrava	Large run-of-river	77.78	HEP
Hydro	HE Gojak	Large run-of-river	54.00	HEP
Hydro	HE Rijeka	Large run-of-river	36.00	HEP
Hydro	HE Miljacka	Large run-of-river	24.00	HEP
Total large run-of-river plants owned by HEP			355.68	HEP
Hydro	HE Jaruga	Small run-of-river	7.20	HEP
Hydro	HE Golubić	Small run-of-river	6.54	HEP
Hydro	HE Ozalj	Small run-of-river	5.50	HEP
Hydro	HE Krčić	Small run-of-river	0.34	HEP
Total small run-of-river plants owned by HEP			19.58	HEP
Total run-of-river plants owned by HEP			375.26	HEP
Total small hydro power plants owned by HEP			28.68	HEP
Total large hydro power plants owned by HEP			2,042.58	HEP
Total hydro power plants owned by HEP			2,071.26	HEP
Hydro	MHE Kupniča	Small hydro power plant	0.05	IPP
Hydro	MHE Čabranka I i II (Finvest)	Small hydro power plant	1.29	IPP
Hydro	MHE Čabranka (Urh)	Small hydro power plant	0.01	IPP
Hydro	HE Roški Slap (Hidrowatt)	Small hydro power plant	1.64	IPP
Hydro	Pamučna industrija Duga Resa	Small hydro power plant	1.10	IPP
Total small hydro power plants owned by IPP			4.08	IPP
Solar	Kuća Stilin	Solar power plant	0.04	IPP
Solar	Špansko-Zagreb	Solar power plant	0.01	IPP
Solar	Kadina Glavica-Drniš	Solar power plant	0.01	IPP
Solar	Čakovec	Solar power plant	0.01	IPP
Total solar power plants owned by IPP			0.06	IPP
Wind	MVE Ravne 1 (Adria Wind Power)	Wind power plant	5.95	IPP
Wind	MVE Trtar Krtolin (VTK d.o.o.)	Wind power plant	11.20	IPP
Total wind power plants owned by IPP			17.15	IPP
Total large hydro capacity in Croatia			**2,042.58**	
Total small hydro capacity in Croatia			**32.76**	
Total wind power capacity in Croatia			**17.15**	
Total solar power capacity in Croatia			**4.08**	
Total installed RES capacity in Croatia			**2,096.58**	

Source: Ministry of Economy, Labour and Entrepreneurship[126] (2007)

Table A.2.49: Installed capacity in Kazakhstan

Power plants	Installed capacity (MW)
Condensing	8,960
Combined Cycle	6,858
Gas Turbine	916.1
Hydropower	2,248.2

Source: Kazakh Power Engineering Union[147] (2009)

Table A.2.50: Installed capacity in the Republic of Moldova

Power generation unit	Installed capacity (MW)	Installed thermal capacity (Gcal/h)	Fuel	Year of construction
CHP-1 Chisinau	66	252	Gas, HFO	1951-1994
CHP-2 Chisinau	240	1,200	Gas, HFO	1976-1980
CHP-Nord, Balti	28.5	200	Gas, HFO	1956-1970
9 CHP of sugar factories	97.5		Gas, HFO	1956-1981
HPP Costest	16	0	Hydro	1978
HPP Dubasari	48	0	Hydro	1954-1966
Moldavian Thermo-electrical Power Plant (MTPP)	2,520	0	Gas, coal, HFO	1964-1982

Source: Climate Change Office of the Ministry of Enviroment and Natural Resources[176] (2009)

Table A.2.51: Installed capacity in Serbia

Power Generation Unit	Installed Capacity (MW)	Fuel
TPP Kolubara	245	Lignite
TPP Kostolac A	281	Lignite
TPP Kostolac B	640	Lignite
TPP Nikola Tesla A	1,502	Lignite
TPP Nikola Tesla B	1,160	Lignite
TPP Morova	108	Lignite
TPP Kosovo A	*617*	*Lignite*
TPP Kosovo B	*618*	*Lignite*
CHPP Zrenjanin	100	Gas
CHPP Novi Sad	208	HSFO
CHPP Sremska Mitrovica	45	HSFO
HPP Djerdap I	1,058	Hydro
HPP Djerdap II	270	Hydro
HPP Pirot	80	Hydro
HPP Vlasina	129	Hydro
HPP Bajina Basta	364	Hydro
RHPP Bajina Basta	614	Hydro
HPP Uvak	36	Hydro
HPP Kokin Brod	22	Hydro
HPP Bistrica	102	Hydro
HPP Potpec	51	Hydro

Source: EPS[255] (2008)

Annex 3 - Energy prices

Electricity tariffs

Table A.3.1: Electricity tariffs in Albania

Voltage Level	Customer Categories	Approved tariffs (ALL/kWh)[1]	Tariffs for reactive power (ALL/kWAr)[1]	Peak energy prices (ALL/kWh)[1]
High Voltage	**HV transmission customers with assets owned by them**			
	Industry	5.20	0.78	9.00
	Commerce & Services			
	Agriculture			
	Others			
	Customers supplied at distribution 110 kV substations			
	Industry	7.00	1.05	9.64
	Commerce & Services	7.00	1.05	9.64
	Agriculture	7.00	1.05	9.64
	Others	7.00	1.05	9.64
Medium Voltage	**Customers supplied at 35 kV**			
	Industry	7.50	1.13	10.00
	Commerce & Services	7.50	1.13	10.00
	Agriculture	7.50	1.13	10.00
	Others	7.50	1.13	10.00
	Customers supplied ath 20/10/6 kV			
	Industry	8.00	1.20	11.00
	Commerce & Services	8.50	1.20	11.00
	Wheat industry & bakeries	7.00	1.05	11.00
	Agriculture	8.00	1.20	11.00
	Others	8.00	1.20	11.00
	Budgetary	10.00	1.41	11.00
Low Voltage	**Customers supplied at LV**			
	Industry	9.50		
	Commerce & Services	10.00		
	Wheat industry & bakeries	7.50		
	Agriculture	9.50		
	Others	10.00		
	Budgetary	12.00		
	Average tariff for non-household customers	8.73		
	Average tariff for household customers	8.23		
	First Tier up to 300 kWh	7.00		
	Second Tier above 300 kWh	12.00		
	Fixed service tariff for customers with no energy consumption (ALL/month)	200		
	Tariff for electricity consumption in common spaces (condominium) (ALL/kWh)	7.00		

[1] (for the period 1 March 2008 to 28 February 2009)

Source: Albanian Energy Regulatory Authority (ERE)[42] (2008)

Table A.3.2: Electricity tariffs in Albania

Type of Activity	No. of Decision	Validity Period	Approved Tariff
Production	18, date 14.02.2008	1 March 2008 - 31 December 2009	0.78 ALL/kWh
Transmission	19, date 14.02.2008	1 March 2008 - 31 December 2009	0.5 ALL/kWh
Distribution	20, date 14.02.2008	1 March 2008 - 31 December 2009	2 ALL/kWh for customers at 35 kV 2.6 ALL/kWh for customers at 20/10/6 kV
Wholesale Public Supplier	75, date 26.06.2008	1 July 2008 - 31 December 2009	1.61 ALL/kWh
Existing HPP up to 10 MW	22, date 14.02.2008	1 March 2008 - 31 December 2009	6.5 ALL/kWh
New HPP up to 15 MW	82, date 24.12.2008	1 January 2008 - 31 December 2009	9.37 ALL/kWh

Source: Albanian Energy Regulatory Authority (ERE)[42] (2008)

Table A.3.3: *Electricity tariffs in the Federation of Bosnia and Herzegovina*

Tariffs for Users of Distribution System											
Tarif Elements	Unit of Measurement	Seasonal	Daily	**Medium Voltage**		**Low Voltage**					
				35kV	10kV	**Households**		**Commercials**			Public Light-ning
						tar group I	tar group I	tar group I	tar group II	tar group III	
0	1	2	3	4	5	6	7	8	9	10	11
Customer's Metering Point	KM	-	-	0	0	0	0	0	0	0	0
Billing Capacity	KM/ kW	Higher	-	10.72	17.07	6.57	6.57	11.19	11.19	11.19	1.72
		Lower	-	8.25	13.13	5.05	5.05	8.61	8.61	8.61	1.32
Active Energy	pf/ kWh	Higher	Higher	2.43	2.70	4.92	6.16	10.46	17.19	13.75	11.25
			Lower	1.22	1.35	0.00	3.08	5.23	8.59	0.00	0.00
		Lower	Higher	1.87	2.08	3.79	4.74	8.05	13.22	10.58	8.66
			Lower	0.94	1.04	0.00	2.37	4.02	6.61	0.00	0.00
Over-accepted Reactive Energy	pf/ kvarh	-	-	2.14	2.68	0.00	0.00	3.22	0.00	0.00	0.00

Source: Ministry of Foreign Trade and Economic Relations[91] (2009)

Table A.3.4: *Electricity tariffs in Bulgaria for enterprises and households (in BGN/kWh)*

Tariff		Medium voltage level		Low voltage level	
		Lowest level defined	Highest level defined	Lowest level defined	Highest level defined
Enterprises with less than 50 employees and annual turnover up to BGN 19.5 million					
3 tariffs	peak	0.11587	0.13091	0.12802	0.14233
	day	0.06711	0.07410	0.05740	0.06871
	night	0.03743	0.03952	0.01193	0.02209
2 tariffs	day	0.08937	0.10004	0.09178	0.10430
	night	0.03743	0.03952	0.01193	0.02209
1 tariff		0.08513	0.09510	0.08402	0.09693
Residential customers					
2 tariffs	day			0.07320	0.08159
	night			0.02590	0.03429
1 tariff				0.07320	0.08159

Source: The State Energy and Water Regulatory Commission (2008)

Table A.3.5: *Electricity tariffs in Croatia*

Average electricity selling prices in 2007 (VAT excluded)	
Year 2007	**Average selling price by tariff category (kn/kWh)**
TOTAL SALE	0.5318
HV - 110 kV	0.3111
MV - 35 kV	0.4354
MV - 10 kV	0.4525
Total MV	0.4500
TOTAL HV and MV	0.4260
LV - Business (blue)	0.7006
LV - Business (white)	0.5931
LV - Business (red)	0.5793
LV - Business (orange)	0.8443
Total LV - Business	0.5956
LV - Public lighting	0.4835
LV - Households (blue)	0.6613
LV - Households (white)	0.5432
LV - Households (black)	0.2692
LV - Households (orange)	0.8209
Total LV - Households	0.5727
TOTAL LOW VOLTAGE	0.5761
TOTAL TARIFF CUSTOMERS	0.5539

Source: Ministry of Economy, Labour and Entrepreneurship[126] (2007)

Table A.3.6: *Electricity and heating tariffs in the Republic of Moldova*

Electricity tariffs in EUR/kW 2008 (without taxes)	Electricity	Thermal energy
CHP-1 (generation)	1.3838 MDL/kWh	512.05 MDL/Gcal
CHP-2 (generation)	1.0428 MDL/kWh	410.44 MDL/Gcal
CHP Nord (generation)	1.0656 MDL/kWh	786.00 MDL/Gcal
RED Union Fenosa (distribution) – consumers connected to 110 kV	0.7900 MDL/kWh	
RED Union Fenosa (distribution) – all other consumers	1.1000 MDL/kWh	
RED Nord (distribution) – unified tariff	1.2000 MDL/kWh	
RED Nord-West (distribution) – unified tariff	1.2000 MDL/kWh	

Source: Climate Change Office of the Ministry of Enviroment and Natural Resources[176] (2009)

Table A.3.7: *Electricity tariffs in Romania*

Electricity tariffs in EUR/kWh (without taxes)	2003	2004	2005	2006	2007	2008
Medium sized households (2,500-5,000 kWh/a)	n.a.	n.a.	0.0655	0.0792	0.0855	0.0885
Medium sized industries (500-2,000 MWh/a)	0.0405	0.0468	0.0769	0.0773	0.0842	0.0886
Large industrial standard consumers (>24 GWh/a)	0.0386	0.0472	0.0763	0.0664	0.0749	n.a.

Source: Eurostat (2009)

Table A.3.8: Electricity tariffs for end users in Serbia

Elements for calculation		Unit	Daily tier element	RSD per unit
Compensation for metering				88.62
Power		kW		23.75
Active energy:		.		
Consumers with one tier meters	Up to 350/month	kWh		3.161
	351-1600/ month	kWh		4.741
	Above 1601/month	kWh		9.482
Consumers with two tier meters	Up to 350/month	kWh	higher	3.612
		kWh	lower	0.903
	351-1600/ month	kWh	higher	5.418
		kWh	lower	1.355
	Above 1601/month	kWh	higher	10.836
		kWh	lower	2.709

Source: UNECE[22] (2009)

Table A.3.9: Electricity tariffs in the former Yugoslav Republic of Macedonia (in MKD/kWh)

	Consumer categories	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
1	110 kV	1.2912	1.2384	1.5162	1.6696	1.6089	1.4955	1.4980	1.6426	1.7991	2.7089
2	35 kV	1.9987	2.0815	2.4475	2.6724	2.7076	2.8390	2.9394	2.7751	2.7046	2.7525
3	10 (20) kV	2.2215	2.2586	2.7965	2.8242	2.7917	2.8213	2.8908	2.8715	3.0100	3.3108
4	0.4 kV***										
4.1	Households	1.8414	1.8641	2.3725	2.4019	2.4002	2.2838	2.2854	2.2887	2.3650	2.5430
4.2	Other:										
	I tariff degree	2.5034	2.4683	3.0528	3.1025	3.0676	3.0804	3.2843	3.2865	3.4000	3.6418
	II tariff degree	3.5724	3.5731	3.4494	4.7251	4.7135	4.8706	5.0431	5.0430	5.2100	5.6057
4.3	Public lighting	2.3440	2.3153	2.9629	2.9896	2.9896	3.0937	3.2000	3.2000	3.3100	3.5339
5	Distribution consumers*** average	2.0458	2.0954	2.6934	2.7792	2.7755	2.7265	2.7693	2.7773	2.8722	3.1035
6	Whole system average	1.8537	1.9241	2.4813	2.5241	2.5241	2.5391	2.4075	2.4363	2.5606	2.9999

****There are three types of distribution consumers

Source: Energy Charter[268] (2007)

Table A.3.10: Electricity tariffs in Ukraine for customers up to 35 kV

Component	Price in 2007 (USD cents)
Weighted average electricity supply tariff	5.31
Total costs per unit of supplied electricity	5.07
Including:	
Fuel costs	1.20
Tangible costs	0.09
Labor costs	0.14
Social deductions	0.05
Depreciation costs	0.08
Electricity purchase from the energy market	3.38
Other costs	0.13
Income per unit of supplied electricity	0.24

Source: Agency for Rational Energy Use (ARENA-ECO)[294] (2009)

Annex 3.1 – Gas tariffs

Table A.3.11: Gas tariffs in Bulgaria

Gas tariffs in EUR/kWh	2004	2005	2006	2007	2008
Medium sized households (5,555-55,555 kWh/a)	0.0202	0.0202	0.0231	0.0265	0.0295
Medium sized industries (2.7-27 GWh/a)	0.0126	0.0136	0.0162	0.0188	0.0206
Large industrial standard consumers (>116 GWh/a)	0.0116	0.0118	0.0154	0.0162	n.a.

Source: Eurostat (2009)

Table A.3.12: Average selling price of natural gas in Croatia

Average selling price of natural gas from 2000-2007 (in HRK/m3, VAT included)								
Customer category	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**
Households	1.45	1.72	1.94	1.95	2.04	2.04	2.05	2.05
Services	1.45	1.72	1.98	1.99	2.08	2.06	2.07	2.07
Industry	1.38	1.72	1.94	1.94	2.04	2.05	2.05	2.04

Source: Ministry of Economy, Labour and Entrepreneurship[126] (2007)

Table A.3.13: Tariffs for gas supply in the Republic of Moldova

Consumer category	Price (2008) in MDL/1000 m^3
Cogeneration heating power stations (CHP)	3,232
Public thermal stations	3,232
Households consuming less than 30 m3	3,414
Households consuming over 30 m3 and other categories of consumers	3,813

Source: National Agency for Energy Regulation (2008)

Table A.3.14: Tariffs for gas supply in Romania

Gas tariffs in EUR/kWh (without taxes)	2003	2004	2005	2006	2007	2008
Medium sized households (5’555-55’555 kWh/a)	n.a.	n.a.	0.0145	0.0232	0.0274	0.0214
Medium sized industries (2.7-27 GWh/a)	0.0083	0.0102	0.0132	0.0224	0.0263	0.0224
Large industrial standard consumers (>116 GWh/a) – prices are indicated for second semester	0.0091	0.0113	0.0182	0.0212	0.0252	n.a.

Source: Eurostat (2009)

Table A.3.15: *Gas tariffs in Ukraine*

Prices for natural gas from resources of the Naftogaz Ukrainy National Joint Stock Company to be used by the Company's enterprises starting on 1 June 2009; the prices are calculated based on Resolutions of the National Electricity Regulation Commission No. 647 and No. 648 dated 1 June 2009 and Order of Naftogaz Ukrainy NJSC No. 194 dated 4 June 2009		Price excl. VAT(UAH) for 2009
1.	Prices for natural gas including a fee added to an approved natural gas tariff, which goes as a target charge (4%) to the price for natural gas, tariffs for its transportation, distribution and supply for:	
	Households	
	Wholesale-retail prices:	
	a) on condition that natural gas consumption volume does not exceed 2500 cubic meters a year	
	– with gas meters installed	403.00
	– with no gas meters	443.00
	b) on condition that natural gas consumption volume does not exceed 6000 cubic meters a year	
	– with gas meters installed	610.00
	– with no gas meters	671.00
	c) on condition that natural gas consumption volume does not exceed 12000 cubic meters a year	
	– with gas meters installed	1,249.00
	– with no gas meters	1,373.50
	d) on condition that natural gas consumption volume exceeds 12000 cubic meters a year	
	– with gas meters installed	1,492.00
	– with no gas meters	1,640.50
2.	Prices for natural gas including a fee added to an approved natural gas tariff, which goes as a target charge (2%) to the price for natural gas, tariffs for its transportation, distribution and supply and storage expenses on condition of reimbursement to the Naftogaz Ukrainy National Joint Stock Company of a difference from the State Budget for natural gas for:	
	Business entities generating heat energy, including block (modular) boiler houses, roof and integral boiler houses (proceeding from natural gas volume used for production and heating and hot water supply to households):	727.32
3.	Prices for natural gas exclusive of a fee added to an approved natural gas tariff, which goes as a target charge to the price for natural gas, tariffs for its transportation, distribution and supply at a regulated tariff for:	
3.1	Institutions and establishments funded from the State and local budgets	2,020.25
3.2	Industrial consumers and other business entities	2,020.25
4.	Prices for natural gas exclusive of a fee added to an approved natural gas tariff, which goes as a target charge to the price for natural gas, tariffs for its transportation, distribution and supply at a regulated tariff for: ore mining and smelting and chemical enterprises	1,899.25
5.	Prices for natural gas exclusive of a fee added to an approved natural gas tariff, which goes as a target charge to the price for natural gas, tariffs for its transportation, distribution and supply at a regulated tariff for: providing technological and other industrial needs of Ukrtransgaz Subsidiary and business entities having a license for economic activity in distribution of natural and oil gas	1,382.1

Source: Agency for Rational Energy Use (ARENA-ECO)[294] (2009)

District heating tariffs

Table A.3.16: Tariffs and related information on district heating companies in Croatia

Average selling price of natural gas from 2000-2007 (in HRK/m3, VAT included)			
Company	**Consumption category**	**Unit**	**Tariff item (VAT excl.)**
HVIDRA d.o.o., Split	Households	(kn/m^2)	2.37
	Commercial customers	(kn/m^2)	3.08
TERMOPLIN d.d., Varazdin	Households (heating)	(kn/m^2)	4.75
	Households (hot water preparation)	(kn/member of household)	21.72
	Industry and commercial customers (heating)	(kn/m^2)	9.50
TEHNOSTAN d.o.o., Vukovar	Residential customers (heating)	(kn/m^2)	5.20
	Hot water consumers (consume hot water preparation)	(kn/m^3)	20.85
	Commercial customers (subscribed capacity)	(kn/KW)	33.01
	Commercial customers (delivered heat energy)	(kn/kWh)	0.32
VIKROM d.o.o., Virovitica	Households (fixed monthly amount)	(kn/m^2)	0.90
	Heating (variable monthly amount)	(kn/m^2)	2.51
	Commercial customers (fixed monthly amount)	(kn/m^2)/monthly	2.20
	Commercial customers (variable monthly amount)	(kn/m^2)/in heating season	5.02
TOPLINA d.o.o., Slavonski Brod	Households (heating)	(kn/m^3)	2.04
	Commercial customers (heating)	(kn/m^3)	3.23
	Sanitary hot water	(kn/m^2)	17.46
TOPLANA d.o.o., Karlovac	Households	(kn/m^2)	4.55
	Commercial customers	(kn/m^2)/in heating season	16.45
	Commercial customers with installed meters	(kn/MWh)/in heating season	773.00
ENERGO d.o.o., Rijeka	Industry and commercial customers without meters	(kn/m^2)/monthly	5.86
	Industry and commercial customers with installed meters - commercial premises	(kn/MWh)	406.98
	Industry and commercial customers with installed meters - commercial premises	(kn/m^2)/monthly	1.90
	Other customers with installed meters	(kn/MWh)	319.29
	Other customers with installed meters	(kn/m^2)/monthly	1.47
	Sanitary hot water preparation	(kn/m^2)	19.74
Vinkovacki vodovod i knalizacija d.o.o., Vinkovci	Households	(kn/m^3)	5.09
	Commercial customers	(kn/kWh)	6.76
BROD-PLIN d.o.o., Slavonski Brod	Industry and commercial customers connected to DH plants (invidiual heating plants) shared meter	(kn/kWh)	0.37
		(kn/MW)	417.61
	Households connected to block boiler houses	(kn/kWh)	0.23
	Shared meter in individual heating plants	(kn/MW)	263.50

Source: Ministry of Economy, Labour and Entrepreneurship[126] (2007)

<u>Table A.3.17:</u> Tariffs and related information on district heating companies in Serbia

DH Company	Heating Prices									
	Residential facilities	Type of billing	Payed for	Subsidiesed users	Type of billing	Payed for	Office space	Type of billing	Payed for	Until
BEOGRAD	59.60	din/m^2	12 months				5.05	din/kW	12 months	01.01.2009
NOVI SAD	61.55	din/m^2	12 months				4.66	din/kWh	consumed energy	01.01.2009
							129.03	din/kWh	installed capacity	
KRAGUJEVAC	46.98	din/m^2	12 months	72.08	din/m^2	12 months	239.6	din/m^2	6 months	01.02.2009
BOR	38.20	din/m^2	12 months	79.29	din/m^2	12 months	105.71	din/m^2	12 months	23.12.2008
SUBOTICA	5.10	din/kWh					11.96	din/kWh	during the heating season	01.01.2009
	62.14	din/m^2	12 months							
NIŠ	38.78	din/m^2	12 months				96.95	din/m^2	12 months	06.11.2007
PANČEVO	55.13	din/m^2	12 months				110.26	din/m^2	12 months	19.05.2009
KRALJEVO	52.00	din/m^2	12 months	174	din/m^2	6 months	259	din/m^2	6 months	01.07.2009
UŽICE	51.00	din/m^2	12 months	104	din/m^2	12 months	150	din/m^2	12 months	01.12.2008
SMEDEREVO	52.47	din/m^2	12 months	104.94	din/m^2	12 months	157.4	din/m^2	12 months	01.05.2009
	3.52	din/kWh					4.22	din/kWh		
ŠABAC	2.82	din/kWh	during the heating season	3.55	din/kWh	during the heating season	5.69	din/kWh	during the heating season	01.02.2009
				4.26			7.03			
	53.30	din/m^2	12 months	76.19	din/m^2	12 months	121.87	din/m^2		
				91.38			152.32			
PRIBOJ	49.00	din/m^2	12 months	98	din/m^2	12 months	216.09	din/m^2	12 months	01.10.2008
LESKOVAC	34.40	din/m^2	12 months				62	din/m^2	10 months	01.01.2009
							95.34			
							138			
PIROT	40.64	din/m^2	12 months	101.59	din/m^2	12 months	121.92	din/m^2	12 months	01.01.2009
MAJDANPEK	47.56	din/m^2	12 months	95.14	din/m^2	12 months	142.73	din/m^2	12 months	01.01.2009
ČAČAK	56.61	din/m^2	12 months	84.92	din/m^2	12 months	113.22	din/m^2	12 months	23.04.2009
				169.8						
KRUŠEVAC	47.77	din/m^2	12 months	8.63	din/kWh		10.05	din/kWh		01.01.2009
SREMSKA MITROVICA	69.42	din/m^2	12 months	130.81	din/m^2	12 months	171.52	din/m2	12 months	01.03.2009
	5.62	din/kWh		6.85	din/kWh		9.01	din/kWh		
JAGODINA	59.10	din/m^2	12 months	54.55	din/m^3	6 months	99.15	din/m^2	6 months	15.12.2008
ZAJEČAR	56.48	din/m^2	12 months	141.22	din/m^2	12 months	169.47	din/m^2	12 months	01.02.2009
VALJEVO	56.08	din/m^2	12 months	67.29	din/m^2	12 months	112.16	din/m^2	12 months	31.03.2009
KLADOVO	55.80	din/m^2	12 months				111.58	din/m^2	12 months	01.01.2009
LOZNICA	53.92	din/m^2	12 months				112.56	din/m^2	12 months	01.02.2009
RUMA	54.27	din/m^2	12 months	54.27	din/m^2	12 months	130.24	din/m^2	12 months	01.04.2009
VRBAS	60.42	din/m^2	12 months	90.63	din/m^2	12 months	151.05	din/m^2	12 months	01.04.2009
KIKINDA	4.04	kWh	during the heating season	4.67	kWh	during the heating season	8.07	kWh	during the heating season	01.01.2009
	20.10	din/m^2	summer	24.14	din/m^2	summer	40.22	din/m^2	summer	winter
	97.61	din/m^2	winter	117.13	din/m^2	winter	195.23	din/m^2	zimski	

NEGOTIN	53.03	din/m^2	12 months	265.22	din/m^2	6 months	318.27	din/m^2	6 months	01.07.2008
LUČANI	46.26	din/m^2	12 months	183.19	din/m^2	6 months	201.52	din/m^2	6 months	01.01.2009
							219.83			
TRSTENIK	50.60	din/m^2	12 months	101.2	din/m^2	12 months	151.8	din/m^2	12 months	06.03.2009
SOMBOR	61.15	din/m^2	12 months				6.887	din/kWh	during the heating season	01.03.2009
NOVI PAZAR	41.66	din/m^2	12 months	166.85	din/m2	6 months	237.96	din/m^2	6 months	01.12.2008
VRANJE	53.02	din/m^2	12 months				159.14	din/m^2	12 months	01.01.2009
G,MILANOVAC	51.08	din/m^2	12 months				204.41	din/m^2	6 months	01.03.2009
NOVA VAROŠ	50.76	din/m^2	12 months	111.67	din/m^2	12 months	152.28	din/m^2	12 months	01.04.2009
BAJINA BAŠTA	46.29	din/m^2	12 months	92.59	din/m^2	12 months	138.88	din/m^2	12 months	01.01.2009
KOSJERIĆ	55.54	din/m^2	12 months	166.63	din/m^2	6 months	255.5	din/m^2	6 months	15.10.2008
KNJAŽEVAC	55.21	din/m^2	12 months	88.37	din/m^2	12 months	110.42	din/m^2	12 months	01.04.2009
BATOČINA	48.30	din/m^2	12 months	27.88	din/m^3	12 months	46.47	din/m^2	12 months	01.01.2009
BEOČIN	67.35	din/m^2	12 months				202	din/m^2	12 months	01.03.2009
PEĆINCI	54.44	din/m^2	12 months				108.89	din/m^2	12 months	01.11.2005
PRIJEPOLJE	97.50	din/m^2	6 months	289.8	din/m^2	6 months	310.3	din/m^2	6 months	01.12.2007
KOVIN	58.42	din/m^2	12 months							01.12.2008
POŽAREVAC	1.78	din/kWh	during the heating season				3.55	din/kWh	during the heating season	01.10.2008
	25.63	din/m^2	12 months				47.31	din/m^3	12 months	
LAZAREVAC	35.53	din/m^2	12 months				59.22	din/m^2	12 months	01.10.2008
OBRENOVAC	32.90	din/m^2	12 months				54.83	din/m^2	12 months	01.03.2008
ZRENJANIN	28.57	din/m^2	12 months	fixed part					01.04.2009.	
	5.89	din/kWh	during the heating season							
	64.28	din/m^2	12 months	89.28	din/m^2	12 months	7.14	din/kW	6 months	
PETROVAC/ M	16.98	din/m^2	12 months	25.48	din/m3	12 months	33.97	din/m3	12 months	02.02.2009
VELIKA PLANA	52.92	din/m^2	12 months	86.09	din/m2	12 months	117.38	din/m^2	12 months	08.03.2009.
BEČEJ	5.26	din/kWh	during the heating season	7.84	din/kWh	during the heating season	12.88	din/kWh	during the heating season	01.01.2009.
BAČKA PALANKA	121.98		din/kW	02.07.2007.						
	3226.00	din/kWh	during the heating season	3.226	din/kWh	during the heating season	5.807	din/kWh	during the heating season	
MALI ZVORNIK	54.93	din/m^2	12 months	164.79	din/m2	6 months	219.65	din/m2	6 months	01.01.2009
BLACE	43.75	din/m^2	12 months				43.75	din/m2	12 months	15.10.2008
TEMERIN	106.60	din/m^2	6 months	106.6	din/m2	6 months	213.22	din/m2	6 months	10.2008

Source: Ministry of Mining and Energy of the Republic of Serbia[254] (2009)

Table A.3.18: Information on heat tariffs in Ukraine

Regional Centre	Actual Costs (excl. VAT), UAH/Gcal		Approved tariffs, (incl. VAT), UAH		Tariff Introduction Date
	Households	Business Consumers	Heat energy tariff for Households, UAH/Gcal	Heat energy tariff, for Business Consumers, UAH/Gcal	
Simferopol	197.52	413.89	209.74	616.3	01.12.2008
Lutsk	192.95	408.96	257.21	596.9	01.04.2009
Dnipropetrovsk	190.89	325.70	244.31	417.04	01.11.2008
Donetsk	248.3	248.30	236.25	412.01	01.10.2008
Uzhgorod	497.33	693.55	250.93	778.89	01.11.2007
Zaporizhia	173.18	377.7	220.91	576.40	01.01.2009
Ivano-Frankivsk	205.10	461.56	256.06	579.98	01.12.2008
Bila Tserkva	187.98	270.70	245.23	604.01	01.12.2008
Kirovograd	232.86	400.53	270.07	669.73	01.12.2008
Lugansk	241.38	402.94	279.51	575.4	01.03.2009
Lviv	201.41	385.30	279.29	579.40	01.01.2009
Mykolaiv	198.6	403.42	245.41	483.25	01.12.2008
Odesa	221.48	508.41	332.34	652.3	01.01.2009
Poltava	191.26	393.38	263.70	656.04	01.05.2009
Rivne	235.61	235.61	256.40	591.92	20.04.2009
Sumy	211.75	346.38	217.61	495.52	01.12.2008
Ternopil	184.07	400.44	226.35	579.71	25.03.2009
Kharkiv	205.56	422.65	265.12	586.43	01.12.2008
Kherson	184.52	405.25	285.78	601.40	01.12.2008
Khmelnytsky	157.50	354.80	165.10	519.67	01.11.2006
Cherkasy	160.95	218.25	220.24	583.23	24.02.2009
Chernivtsi	165.61	383.60	246.42	542.64	01.01.2009
Chernigiv	229.26	383.36	210.00	671.99	01.10.2008
Kyiv	569.93	904.96	160.23	364.85	01.06.2009
Sevastopol	251.78	469.95	83.40	639.29	16.07.2006

Source: Agency for Rational Energy Use (ARENA-ECO)[294] (2009)

Annex 4 - Energy intensity

Energy indicators in 2007

Table A.4.1: Energy intensity indicators of Albania in 2007

Energy intensity indicators 2007	Energy intensity of industry	Energy intensity of household	Energy intensity of services	Energy intensity of transport	Energy intensity of agriculture	Energy intensity of GDP at purchasing power parities
Albania	0.087	0.025	0.009	0.042	0.044	0.126
Average Project Region	0.192	0.064	0.031	0.033	0.055	0.275
Average EU-27	0.112	0.039	0.019	0.029	0.093	0.147

Source: Enerdata (2007)

Table A.4.2: Energy intensity indicators of Belarus in 2007

Energy intensity indicators 2007	Energy intensity of industry	Energy intensity of household	Energy intensity of services	Energy intensity of transport	Energy intensity of agriculture	Energy intensity of GDP at purchasing power parities
Belarus	0.152	0.121	0.060	0.027	0.102	0.313
Average Project Region	0.192	0.064	0.031	0.033	0.055	0.275
Average EU-27	0.112	0.039	0.019	0.029	0.093	0.147

Source: Enerdata[6](2007)

Table A.4.3: Energy intensity indicators of Bulgaria in 2007

Energy intensity indicators 2007	Energy intensity of industry	Energy intensity of household	Energy intensity of services	Energy intensity of transport	Energy intensity of agriculture	Energy intensity of GDP at purchasing power parities
Bulgaria	0.189	0.039	0.025	0.045	0.062	0.273
Average Project Region	0.192	0.064	0.031	0.033	0.055	0.275
Average EU-27	0.112	0.039	0.019	0.029	0.093	0.147

Source: Enerdata[6] (2007)

Table A.4.4: Energy intensity indicators of Croatia in 2007

Energy intensity indicators 2007	Energy intensity of industry	Energy intensity of household	Energy intensity of services	Energy intensity of transport	Energy intensity of agriculture	Energy intensity of GDP at purchasing power parities
Croatia	0.088	0.050	0.022	0.035	0.063	0.145
Average Project Region	0.192	0.064	0.031	0.033	0.055	0.275
Average EU-27	0.112	0.039	0.019	0.029	0.093	0.147

Source: Enerdata[6] (2007)

Table A.4.5: *Energy intensity indicators of Kazakhstan in 2007*

Energy intensity indicators 2007	Energy intensity of industry	Energy intensity of household	Energy intensity of services	Energy intensity of transport	Energy intensity of agriculture	Energy intensity of GDP at purchasing power parities
Kazakhstan	0.347	0.040	0.008	0.030	0.148	0.440
Average Project Region	0.192	0.064	0.031	0.033	0.055	0.275
Average EU-27	0.112	0.039	0.019	0.029	0.093	0.147

Source: Enerdata[6] (2007)

Table A.4.6: *Energy intensity indicators of the Republic of Moldova in 2007*

Energy intensity indicators 2007	Energy intensity of industry	Energy intensity of household	Energy intensity of services	Energy intensity of transport	Energy intensity of agriculture	Energy intensity of GDP at purchasing power parities
Republic of Moldova	0.166	0.083	0.095	0.049	0.041	0.362
Average Project Region	0.192	0.064	0.031	0.033	0.055	0.275
Average EU-27	0.112	0.039	0.019	0.029	0.093	0.147

Source: Enerdata[6] (2007)

Table A.4.7: *Energy intensity indicators of Romania in 2007*

Energy intensity indicators 2007	Energy intensity of industry	Energy intensity of household	Energy intensity of services	Energy intensity of transport	Energy intensity of agriculture	Energy intensity of GDP at purchasing power parities
Romania	0.175	0.045	0.018	0.021	0.013	0.178
Average Project Region	0.192	0.064	0.031	0.033	0.055	0.275
Average EU-27	0.112	0.039	0.019	0.029	0.093	0.147

Source: Enerdata[6] (2007)

Table A.4.8: *Energy intensity indicators of the Russian Federation in 2007*

Energy intensity indicators 2007	Energy intensity of industry	Energy intensity of household	Energy intensity of services	Energy intensity of transport	Energy intensity of agriculture	Energy intensity of GDP at purchasing power parities
Russian Federation	0.246	0.120	0.040	0.036	0.079	0.377
Average Project Region	0.192	0.064	0.031	0.033	0.055	0.275
Average EU-27	0.112	0.039	0.019	0.029	0.093	0.147

Source: Enerdata[6] (2007)

Table A.4.9: *Energy intensity indicators of the former Yugoslav Republic of Macedonia in 2007*

Energy intensity indicators 2007	Energy intensity of industry	Energy intensity of household	Energy intensity of services	Energy intensity of transport	Energy intensity of agriculture	Energy intensity of GDP at purchasing power parities
The former Yugoslav Republic of Macedonia	0.128	0.041	0.030	0.022	0.021	0.170
Average Project Region	0.192	0.064	0.031	0.033	0.055	0.275
Average EU-27	0.112	0.039	0.019	0.029	0.093	0.147

Source: Enerdata[6] (2007)

Table A.4.10: Energy intensity indicators of Ukraine in 2007

Energy intensity indicators 2007	Energy intensity of industry	Energy intensity of household	Energy intensity of services	Energy intensity of transport	Energy intensity of agriculture	Energy intensity of GDP at purchasing power parities
Ukraine	0.333	0.099	0.016	0.026	0.049	0.364
Average Project Region	0.192	0.064	0.031	0.033	0.055	0.275
Average EU-27	0.112	0.039	0.019	0.029	0.093	0.147

Source: Enerdata[6] (2007)

Energy indicators from 1997 to 2007

Table A.4.11: Energy intensity indicators of Albania from 1997 to 2007

Energy intensity Albania	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Energy intensity of industry	0.091	0.087	0.119	0.108	0.095	0.094	0.078	0.063	0.068	0.086	0.087
Energy intensity of household	0.063	0.054	0.041	0.043	0.038	0.036	0.032	0.037	0.035	0.027	0.025
Energy intensity of services	0.012	0.007	0.013	0.013	0.013	0.028	0.023	0.011	0.019	0.009	0.009
Energy intensity of transport	0.018	0.023	0.042	0.041	0.041	0.045	0.046	0.042	0.052	0.044	0.042
Energy intensity of agriculture	0.001	0.001	0.060	0.057	0.057	0.064	0.038	0.039	0.026	0.043	0.044
Energy intensity of GDP at purchasing power parities	0.127	0.122	0.151	0.143	0.135	0.146	0.144	0.133	0.145	0.131	0.126

Source: Enerdata[6] (2007)

Table A.4.12: Energy intensity indicators of Belarus from 1997 to 2007

Energy intensity Belarus	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Energy intensity of industry	0.411	0.375	0.330	0.305	0.278	0.259	0.241	0.211	0.189	0.170	0.152
Energy intensity of household	0.280	0.242	0.216	0.210	0.211	0.192	0.177	0.148	0.142	0.133	0.121
Energy intensity of services	0.124	0.114	0.122	0.084	0.084	0.070	0.073	0.073	0.069	0.063	0.060
Energy intensity of transport	0.055	0.052	0.045	0.038	0.034	0.033	0.032	0.029	0.029	0.029	0.027
Energy intensity of agriculture	0.131	0.130	0.129	0.138	0.122	0.115	0.108	0.099	0.105	0.105	0.102
Energy intensity of GDP at purchasing power parities	0.559	0.505	0.475	0.459	0.440	0.427	0.411	0.381	0.348	0.337	0.313

Source: Enerdata[6] (2007)

Table A.4.13: Energy intensity indicators of Bulgaria from 1997 to 2007

Energy intensity Bulgaria	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Energy intensity of industry	0.473	0.358	0.290	0.259	0.250	0.229	0.234	0.219	0.206	0.197	0.189
Energy intensity of household	0.069	0.075	0.063	0.058	0.052	0.054	0.053	0.047	0.044	0.042	0.039
Energy intensity of services	0.016	0.018	0.026	0.025	0.028	0.025	0.025	0.022	0.024	0.026	0.025
Energy intensity of transport	0.034	0.039	0.038	0.034	0.034	0.034	0.037	0.037	0.038	0.038	0.045
Energy intensity of agriculture	0.052	0.047	0.048	0.054	0.047	0.045	0.047	0.044	0.052	0.052	0.062
Energy intensity of GDP at purchasing power parities	0.423	0.393	0.348	0.341	0.339	0.315	0.309	0.286	0.287	0.278	0.273

Source: Enerdata[6] (2007)

Table A.4.14: Energy intensity indicators of Croatia from 1997 to 2007

Energy intensity Croatia	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Energy intensity of industry	0.116	0.110	0.106	0.106	0.105	0.098	0.093	0.096	0.093	0.092	0.088
Energy intensity of household	0.062	0.061	0.066	0.062	0.060	0.058	0.060	0.058	0.058	0.053	0.050
Energy intensity of services	0.023	0.023	0.023	0.023	0.025	0.025	0.025	0.025	0.025	0.023	0.022
Energy intensity of transport	0.033	0.033	0.035	0.034	0.033	0.033	0.034	0.034	0.034	0.034	0.035
Energy intensity of agriculture	0.059	0.061	0.079	0.080	0.074	0.067	0.074	0.066	0.067	0.068	0.063
Energy intensity of GDP at purchasing power parities	0.179	0.180	0.179	0.169	0.165	0.163	0.165	0.160	0.154	0.148	0.145

Source: Enerdata[6] (2007)

Table A.4.15: Energy intensity indicators of Kazakhstan from 1997 to 2007

Energy intensity Kazakhstan	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Energy intensity of industry	0.696	0.656	0.536	0.600	0.550	0.430	0.462	0.440	0.432	0.362	0.347
Energy intensity of household	0.014	0.014	0.014	0.052	0.052	0.051	0.053	0.047	0.042	0.041	0.040
Energy intensity of services	0.018	0.035	0.028	0.014	0.013	0.012	0.009	0.009	0.009	0.009	0.008
Energy intensity of transport	0.045	0.050	0.036	0.048	0.037	0.038	0.033	0.033	0.031	0.031	0.030
Energy intensity of agriculture	0.158	0.200	0.145	0.154	0.125	0.133	0.150	0.145	0.148	0.143	0.148
Energy intensity of GDP at purchasing power parities	0.605	0.616	0.546	0.584	0.500	0.491	0.497	0.477	0.478	0.468	0.440

Source: Enerdata[6] (2007)

Table A.4.16: Energy intensity indicators of the Republic of Moldova from 1997 to 2007

Energy intensity in the Republic of Moldova	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Energy intensity of industry	0.282	0.234	0.238	0.228	0.198	0.181	0.174	0.222	0.221	0.188	0.166
Energy intensity of household	0.169	0.156	0.118	0.102	0.100	0.103	0.096	0.108	0.098	0.090	0.083
Energy intensity of services	0.115	0.132	0.149	0.084	0.089	0.095	0.103	0.117	0.114	0.105	0.095
Energy intensity of transport	0.062	0.057	0.037	0.039	0.039	0.047	0.051	0.050	0.048	0.048	0.049
Energy intensity of agriculture	0.121	0.095	0.069	0.045	0.042	0.048	0.052	0.041	0.039	0.038	0.041
Energy intensity of GDP at purchasing power parities	0.669	0.636	0.526	0.457	0.472	0.418	0.434	0.410	0.403	0.367	0.362

Source: Enerdata[6] (2007)

Table A.4.17: Indices on consumption of energy resources and energy intensity in the Republic of Moldova (excluding Transnistria), 2000-2008

	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	
Intern consumption of energy resources, ktoe	1,853	1,735	1,892	1,978	2,144	2,278	2,271	2,160	
Distribution of electricity – total, GWh	3,379	3,390	3,781	4,629	4,383	4,196	4,074	4,031	
Consumption of electricity – total, GWh	2,244	2,206	2,449	2,527	2,634	2,921	3,215	3,364	
Industrial output (current prices), million lei	8,167	10,42	12,62	15,96	17,59	20,77	22,37	26,17	
Energy intensity of industrial production, toe/1000	0.227	0.166	0.15	0.124	0.122	0.11	0.102	0.083	
Electricity intensity of industrial production, kWh/1	0.414	0.325	0.3	0.29	0.249	0.202	0.182	0.154	
Per capita average annual energy consumption,	0.509	0.478	0.522	0.548	0.595	0.633	0.633	0.604	
Per capita average annual electricity	929	934	1044	1282	1216	1166	1136	1127	
GDP, million lei (current prices)	16,02	19,05	22,55	27,61	32,03	37,65	44,75	53,35	
Import of energy resources, ktoe	1,776	1,676	1,785	1,956	2,096	2,185	2,157	2,115	
Share of import to the intern energy consumption,	95.8	96.6	94.4	98.9	97.7	95.9	95.1	97.9	
GDP per 1 kg oe of intern energy consumption, lei	8.65	10.98	11.92	13.96	14.94	16.52	19.71	24.7	
GDP per 1 kWh of intern electricity consumption,	7.14	8.64	9.21	10.93	12.16	12.89	13.92	15.86	

Source: National Bureau of Statistics of the Republic of Moldova (2008), Energy Balance of the Republic of Moldova, 2007: Statistical Book. Chisinau: Statistica, 2008 (Statistica Moldovei), page 51

Table A.4.18: Energy intensity indicators of Romania from 1997 to 2007

Energy intensity in Romania	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Energy intensity of industry	0.350	0.318	0.268	0.259	0.257	0.257	0.242	0.224	0.212	0.190	0.175
Energy intensity of household	0.090	0.088	0.082	0.078	0.062	0.060	0.060	0.054	0.053	0.048	0.045
Energy intensity of services	0.005	0.009	0.009	0.008	0.012	0.006	0.011	0.012	0.016	0.020	0.018
Energy intensity of transport	0.028	0.028	0.024	0.024	0.027	0.026	0.026	0.025	0.023	0.022	0.021
Energy intensity of agriculture	0.056	0.053	0.030	0.032	0.017	0.018	0.014	0.012	0.011	0.013	0.013
Energy intensity of GDP at purchasing power parities	0.290	0.277	0.248	0.244	0.237	0.228	0.225	0.204	0.196	0.190	0.178

Source: Enerdata[6] (2007)

Table A.4.19: Energy intensity indicators of Russian Federation from 1997 to 2007

Energy intensity in the Russian Federation	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Energy intensity of industry	0.422	0.410	0.391	0.378	0.354	0.339	0.307	0.288	0.275	0.264	0.246
Energy intensity of household	0.278	0.283	0.301	0.289	0.269	0.230	0.225	0.197	0.145	0.137	0.120
Energy intensity of services	0.044	0.051	0.052	0.043	0.036	0.034	0.032	0.030	0.047	0.043	0.040
Energy intensity of transport	0.045	0.051	0.049	0.044	0.044	0.043	0.041	0.040	0.038	0.037	0.036
Energy intensity of agriculture	0.198	0.209	0.176	0.147	0.126	0.097	0.092	0.083	0.089	0.082	0.079
Energy intensity of GDP at purchasing power parities	0.578	0.595	0.575	0.533	0.513	0.487	0.470	0.440	0.422	0.405	0.377

Source: Enerdata[6] (2007)

Table A.4.20: Energy intensity indicators of the former Yugoslav Republic of Macedonia from 1997 to 2007

Energy intensity of the former Yugoslav Republic of Macedonia	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Energy intensity of industry	0.148	0.165	0.130	0.132	0.121	0.115	0.126	0.113	0.126	0.133	0.128
Energy intensity of household	0.052	0.046	0.049	0.047	0.046	0.043	0.048	0.044	0.042	0.042	0.041
Energy intensity of services	0.015	0.027	0.039	0.024	0.020	0.031	0.041	0.035	0.036	0.032	0.030
Energy intensity of transport	0.044	0.029	0.031	0.026	0.026	0.028	0.026	0.025	0.024	0.023	0.022
Energy intensity of agriculture	0.059	0.047	0.035	0.041	0.046	0.026	0.022	0.045	0.026	0.022	0.021
Energy intensity of GDP at purchasing power parities	0.234	0.253	0.231	0.227	0.200	0.218	0.224	0.215	0.187	0.181	0.170

Source: Enerdata[6] (2007)

Table A.4.21: Energy intensity indicators of Ukraine from 1997 to 2007

Energy intensity Ukraine	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Energy intensity of industry	0.708	0.655	0.637	0.603	0.567	0.538	0.489	0.435	0.401	0.373	0.333
Energy intensity of household	0.257	0.224	0.238	0.219	0.199	0.186	0.171	0.145	0.125	0.116	0.099
Energy intensity of services	0.021	0.021	0.022	0.022	0.020	0.019	0.017	0.019	0.015	0.017	0.016
Energy intensity of transport	0.050	0.046	0.038	0.035	0.034	0.034	0.031	0.029	0.028	0.027	0.026
Energy intensity of agriculture	0.073	0.073	0.063	0.051	0.042	0.044	0.051	0.048	0.073	0.049	0.049
Energy intensity of GDP at purchasing power parities	0.655	0.629	0.626	0.583	0.535	0.516	0.504	0.447	0.446	0.399	0.364

Source: Enerdata[6] (2007)

Annex 5 - LIST OF REPRESENTATIVES OF NATIONAL PARTICIPATING INSTITUTIONS, NATIONAL COORDINATORS AND GOVERNMENT REPRESENTATIVES

Table A.5.1: National Participating Institutions

Country	Name	Institution
Albania	Taulant Musabelliu (Erideta Bashi, Alma Saraci)	National Agency of Natural Resources (AKBN)
Belarus	Tatyana Pospelova	Research and Production Communal Unitary Enterprise BELVIEC
Bosnia and Herzegovina	Mladen Zirojevic (Biljana Trivanovic)	Ministry of Foreign Trade and Economic Relations (MOFTER) (Department for Energy)
Bulgaria	Zdravko Genchev (Pavel Manchev)	Center for Energy Efficiency EnEffect
Croatia	Zeljko Juric Sandra Antesevic Maricic	Energy Institute Hrvoje Pozar
Kazakhstan	Kalyk Abdullaev	Energy Efficiency Center Energy Institute of Ch. Chokin
Republic of Moldova	Vasile Scorpan Marius Tsaranu	Ministry of Environment and Natural Resources Climate Change Office
Romania	Corneliu Rotaru	Agency for Energy Conservation Ministry of Economy and Trade
Russian Federation	Sergey Koblov (Evgeniy Nadezhdin)	International Sustainable Energy Development Centre (ISEDC)
Serbia	Antonela Solujic (Vladimir Kolarevic)	Ministry of Mining and Energy Group for Energy Efficiency and Renewable Energy Sources
The former Yugoslav Republic of Macedonia	Lazar Gechevski (Ognen Dimitrov) (Vladimir Sarac)	Energy Agency of the Republic of Macedonia
Ukraine	Mykola Raptsun (Sergey Surnin)	Agency for Rational Energy Use and Ecology (ARENA-ECO)

Table A.5.2: *National Coordinators*

Country	Name	Institution
Albania	Taulant Musabelliu	National Agency of Natural Resources (AKBN)
Belarus	Leonid Shenets	State Committee on Standardization Department of Energy Efficiency
Bosnia and Herzegovina	Biljana Trivanovic	Ministry of Foreign Trade and Economic Relations (MOFTER)
Bulgaria	Kostadinka Todorova	Ministry of Energy and Energy Resources
Croatia	Zeljko Juric	Energy Institute Hrvoje Pozar
Kazakhstan	German Trofimov	Power and Engineering Union
Republic of Moldova	Vasile Scorpan	Ministry of Environment and Natural Resources Climate Change Office
Romania	Corneliu Rotaru	Agency for Energy Conservation Ministry of Economy and Trade
Russian Federation	Sergey Mikhaylov	Ministry of Industry and Energy Department of the State Energy Policy
Serbia	Antonela Solujic	Ministry of Mining and Energy Head of Department for Energy Efficiency
The former Yugoslav Republic of Macedonia	Lazar Gechevski	Energy Agency of the Republic of Macedonia
Ukraine	Mykola Raptsun	Agency for Rational Energy Use and Ecology (ARENA-ECO)

Table A.5.3: Government representatives

Country	Name	Institution
Albania	Durim Kraja	Ministry of economy, trade and energy
Belarus	Leonid Shenets	State Committee on Standardization Department of Energy Efficiency
Bosnia and Herzegovina	--	--
Bulgaria	--	--
Croatia	Djordje Balabusic	Ministry of Economy, Labour and Enterpreneuship
Kazakhstan	Duisenbay Turganov	Ministry of Energy
Republic of Moldova	Violeta Ivanov	Ministry of Environment and Natural Resources
Romania	Darius Mesca	Ministry of Economy and Trade
Russian Federation	Mikhail Soloviev	Ministry of Industry and Energy Department of the State Energy Policy
Serbia	Radomir M. Naumov	Ministry of Mining and Energy Energy Department
The former Yugoslav Republic of Macedonia	Violeta Keckarovska Dejan Zrmanovski	Ministry of Economy Department of Energy & Mineral Resources Energy Efficiency and Renewable Energy Sources Unit
Ukraine	Heorhiy Veremiychyk	Ministry of Environmental Protection Kyoto Protocol Supervision Division

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