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# PROGRESS WITH IMPLEMENTING ENERGY EFFICIENCY POLICIES IN THE G8

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INTERNATIONAL ENERGY AGENCY





## Executive summary

*Energy efficiency has a critical role in addressing energy security, environmental and economic challenges*

*The IEA recommendations present an opportunity for significant energy savings.*

*This analysis investigates progress with implementing energy efficiency policies in G8 countries up to 31 March 2009.*

*There are many positive examples of energy efficiency policy implementation.*

At the 2008 G8 Summit in Hokkaido, leaders reaffirmed the critical role improved energy efficiency can play in addressing energy security, environmental and economic objectives. They went even farther than in previous Summits and committed to maximising implementation of the 25 IEA energy efficiency recommendations prepared for the G8 (hereafter the 'G8/IEA energy efficiency recommendations'). The imperative to enhance energy efficiency remains a priority for all countries.

To support governments with their implementation of energy efficiency, the IEA recommended the adoption of a broad range of specific energy efficiency policy measures to the G8 Summits in 2006, 2007 and 2008. The consolidated set of recommendations from these Summits covers 25 fields of action across seven priority areas: cross-sectoral activity, buildings, appliances, lighting, transport, industry and power utilities.<sup>1</sup> If governments want to significantly improve energy efficiency, the IEA considers that no single policy implemented in isolation will be effective at achieving this aim. The IEA Secretariat recommends that governments implement a full set of appropriate measures. The IEA estimates that if implemented globally without delay, the **proposed actions could save around 8.2 GtCO<sub>2</sub>/yr by 2030** – equivalent to twice the EU's yearly emissions.

This report evaluates the progress of the G8 countries in implementing energy efficiency policy, including the 25 G8/IEA recommendations. **Information in this report is current up to 31 March 2009.** Conclusions are based on country completion of a detailed questionnaire measuring energy efficiency policy implementation and subsequent IEA review and analysis. In November 2009, the Secretariat intends to conduct an evaluation of the progress reporting process.

The IEA finds many positive examples of energy efficiency policy implementation in G8 countries. These governments are investing in a wide array of well-known energy efficiency policies from national strategies to minimum energy performance standards for appliances and equipment. There are also signs of energy efficiency policy innovations. These include the development of incentives to promote and trade energy savings and innovative financial instruments to encourage energy efficiency investment.

<sup>1</sup> For further information on the full set of recommendations, see [http://www.iea.org/textbase/papers/2008/cd\\_energy\\_efficiency\\_policy/index\\_EnergyEfficiencyPolicy\\_2008.pdf](http://www.iea.org/textbase/papers/2008/cd_energy_efficiency_policy/index_EnergyEfficiencyPolicy_2008.pdf)

*Yet the current suite of energy efficiency policies is not enough.*

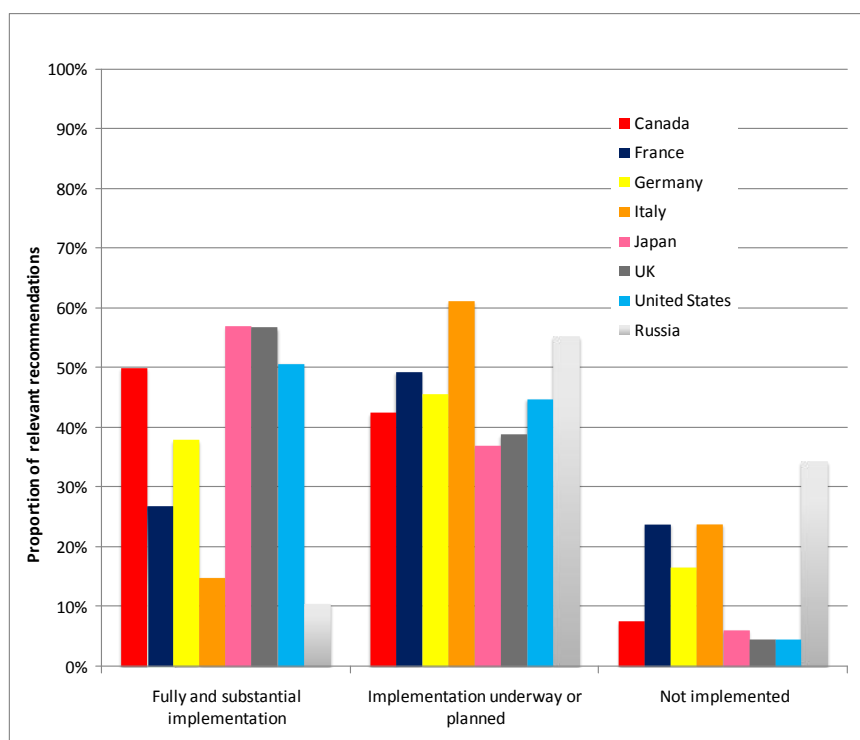
*Countries need to increase the rate of energy efficiency improvement significantly and urgently.*

*No G8 country has fully or substantially implemented more than 55% of the IEA recommendations. In other words, around 40% of the energy efficiency potential from the IEA recommendations remains to be captured.*

*On a sectoral basis, across all G8 countries, policies for transport stand out as having the least substantial implementation.*

Yet, is the current suite of energy efficiency policies enough to meet the pressing economic, environmental and energy security challenges? It appears the answer to this is no. Evidence in IEA publications such as the *World Energy Outlook* (International Energy Agency, 2008) and *Energy Technology Perspectives* (International Energy Agency, 2008) suggests that there is a need to increase the rate of energy efficiency improvement significantly and urgently across all countries, even beyond what can be achieved with the current 25 G8/IEA recommendations.

**Figure 1:** Proportion of relevant<sup>2</sup> recommendations by level of implementation, all G8 countries, all recommendations



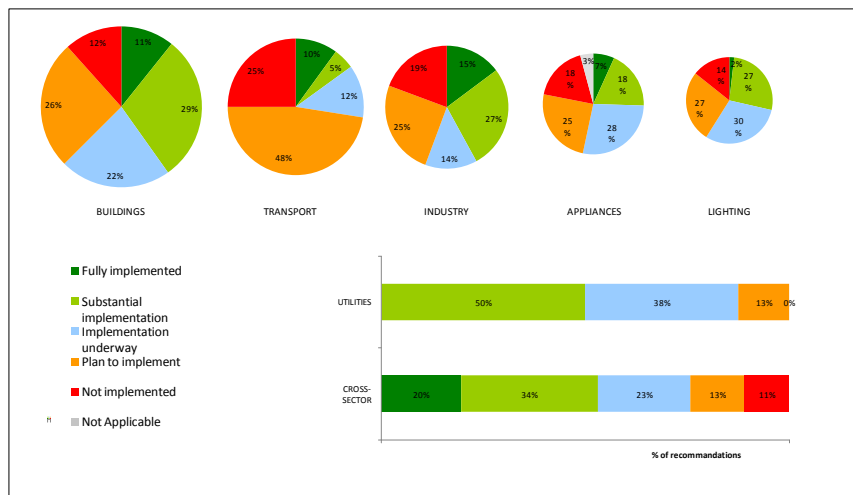
There is certainly room for further energy efficiency action in G8 countries. For example, no G8 country has “fully or substantially”<sup>3</sup> implemented more than 55% of the relevant G8/IEA recommendations (Figure 1). Another way of looking at this is that around 40% of the potential<sup>4</sup> energy savings from the G8/IEA recommendations, or measures that achieve similar outcomes, remains to be captured. On a sectoral basis, across all G8 countries, policies for transport stand out as having the least substantial implementation (see Figure 2) – although in transport, many policies are “planned”. The IEA concludes that all G8 countries urgently need to expand their implementation of energy efficiency policies, including the G8/IEA recommendations.

<sup>2</sup> That is, proportion of all recommendations minus “not-relevant” recommendations.

<sup>3</sup> That is, if we consider only those recommendations that have been fully or substantially implemented.

<sup>4</sup> That is, cost-effective technical potential.

**Figure 2:** Progress with implementing G8/IEA 25 energy efficiency recommendations, all recommendations, all G8 countries<sup>5</sup>



*Energy efficiency faces pervasive barriers.*

*Energy efficiency has to compete alongside other demands.*

*But energy efficiency can deliver significant co-benefits.*

Why is it that G8 countries have not captured the full energy efficiency potential of the possible suite of policies? Energy efficiency continues to face pervasive barriers including lack of access to capital for energy efficiency investments, insufficient information, principal-agent problems and externality costs that are not reflected in energy prices. G8 leaders’ commitment to maximising implementation of energy efficiency policies may also have been challenged by the current economic crisis. Energy efficiency programmes must compete for funding with other priorities such as employment, health and social security. When making decisions about how to allocate limited resources, governments should keep in mind that the benefits of implementing energy efficiency extend beyond energy security and climate change mitigation. Experience shows that energy efficiency investments can deliver significant co-benefits – including job creation and health improvements. Several G8 countries have recognised these co-benefits and allocated substantial stimulus funds to energy efficiency efforts. The IEA supports this increase in funding for energy efficiency and urges other governments also to enhance the resources allocated to energy efficiency. Allocating resources to energy efficiency can kill many birds with one stone.

<sup>5</sup> Pie charts have been scaled to reflect relative global energy savings potential of each sector. For example, lighting recommendations are estimated to deliver roughly half the energy savings of buildings. Because we do not calculate energy efficiency potential for the utilities and cross-sectoral recommendations these are presented as bar charts.

*The IEA calls for Worldwide Implementation Now of energy efficiency.*

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This report identifies a full range of energy efficiency activities in G8 countries. However, more effort is needed to meet pressing energy-related challenges. To address the action gap the IEA concludes that energy efficiency policy action is needed across two dimensions: implementation in G8 countries, and broader leadership of global energy efficiency action beyond the G8.

The G8 can play a critical role in promoting “**Worldwide Implementation Now**” of energy efficiency. What will it be? W.I.N or lose the opportunity?



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## Introduction

### Background

The imperative to significantly improve energy efficiency remains a priority for all countries. Recent meetings of the G8 Leaders<sup>6</sup> and the IEA Ministerial meeting<sup>7</sup> reaffirmed the critical role that improved energy efficiency can play in addressing energy security, and environmental and economic objectives.

The IEA prepared a set of energy efficiency recommendations for the G8. These recommendations covered the adoption of a broad range of specific energy efficiency policy measures to the G8 Summits in 2006, 2007 and 2008. The consolidated set of recommendations from these Summits covers 25 fields of action across seven priority areas: cross-sectoral activity, buildings, appliances, lighting, transport, industry and power utilities.<sup>8</sup> These recommendations are referred to hereafter as the G8/IEA recommendations.

Implementation of **G8/IEA energy efficiency recommendations can lead to significant cost-effective energy and CO<sub>2</sub> savings**. The IEA estimates that if implemented globally without delay, **the proposed actions could save around 8.2 GtCO<sub>2</sub>/yr by 2030**. This is equivalent to one fifth of global “business as usual” energy-related CO<sub>2</sub> emissions in 2030. Taken together, these measures set out an ambitious road map for improving energy efficiency at a global scale.

Political will to implement the G8/IEA energy efficiency recommendations is high. G8 leaders meeting in St Petersburg (2006) agreed to examine the recommendations in more detail. In Heiligendamm (2007), they welcomed the recommendations and agreed to “...take forward the concrete recommendations on energy efficiency presented by the IEA and consider drawing on these when preparing national energy efficiency plans”. In 2008 at Hokkaido-Toyako G8-leaders made their strongest statement yet: they committed to “maximise implementation of the IEA 25 recommendations on energy efficiency.”

### The G8/IEA 25 energy efficiency recommendations

The G8/IEA 25 energy efficiency recommendations were developed under the Gleneagles Plan of Action. All recommendations drew on extensive ongoing IEA technical/economic modelling, reviews of international policy experience, literature reviews and dialogues with stakeholders.

All recommendations were subject to a rigorous set of criteria. That is, a proposal was justified if it:

- was likely to save a large amount of energy at low cost and with considerable economic advantages to consumers;
- addresses existing market imperfections or barriers by enabling consumers to make informed decisions and fully benefit from their investments;
- addresses a significant gap in existing policy;
- is supported by a degree of agreement that internationally coordinated actions will lower costs to governments, manufacturers and consumers.

<sup>6</sup> 2005 Gleneagles, 2006 St Petersburg, 2007 Heiligendamm and 2008 Hokkaido-Toyako.

<sup>7</sup> Paris, May 2007.

<sup>8</sup> For further information on the full set of recommendations, please see [http://www.iea.org/textbase/papers/2008/cd\\_energy\\_efficiency\\_policy/index\\_EnergyEfficiencyPolicy\\_2008.pdf](http://www.iea.org/textbase/papers/2008/cd_energy_efficiency_policy/index_EnergyEfficiencyPolicy_2008.pdf)



The IEA Secretariat draws readers' attention to two important observations about the set of recommendations. First, it is important to view the recommendations as a cohesive suite of measures because the barriers to energy efficiency are pervasive, dispersed and complex. As such, if governments want to significantly improve energy efficiency, the IEA considers that no single policy implemented in isolation will be effective at achieving this aim. The IEA Secretariat recommends that governments implement the full set of measures, although we recognize that in some cases:

- a) there may be other means to achieve the objectives of a recommended measure, and/or
- b) the measures may not be relevant to a country's circumstances.

Second, implementation is key to reaping the rewards from these recommendations. Consequently, this document responds to the request to report on progress with implementing energy efficiency policy.

## Purpose and structure of this report

The overall purpose of this "progress report" is to assist G8 countries to improve their energy efficiency. In doing so, this report aims to encourage countries to implement **all** cost-effective energy efficiency policies with a particular focus on the G8/IEA 25 recommendations.

The report provides an overview of the areas of energy efficiency policy where the IEA considers a country is maximising its implementation effort, and where further action is required.

The report is divided into several sections. The first section provides an overview of the current energy efficiency policy context across all G8 countries. This is followed by a section that summarises how well G8 countries are progressing with implementing the G8/IEA 25 energy efficiency policy recommendations. The section outlines the policy innovations and challenges, or areas requiring further activity across the whole energy efficiency policy portfolio in all G8 countries. It also summarises the level of progress across the combined G8 bloc with implementing the G8/IEA 25 recommendations. The results for each of the G8 countries are the subject of the "Country Reports" section. Each country report provides an overview of the country energy efficiency policy context, specific policy innovations and areas requiring further action. The report concludes with a call for further, targeted action.

## Approach

The analysis contained in this report is based on information gathered from several sources:

- the IEA Energy Efficiency Policies and Measures database;<sup>9</sup>
- country responses to the IEA questionnaire relating to progress with implementing G8/IEA 25 energy efficiency recommendations;
- the IEA energy efficiency indicators database;
- IEA in-depth energy policy reviews;
- regular country energy efficiency policy reports submitted to the IEA Energy Efficiency Working Party;
- IEA expert knowledge of current policy and recent developments in G8 countries.

<sup>9</sup> [http://www.iea.org/textbase/pm/index\\_effi.asp](http://www.iea.org/textbase/pm/index_effi.asp)

Information in this report is current up to 31 March 2009.

The approach used in this report applies a five-step colour grading system (Table 1).

**Table 1:** Colour grading system used for reporting progress with implementing energy efficiency policies

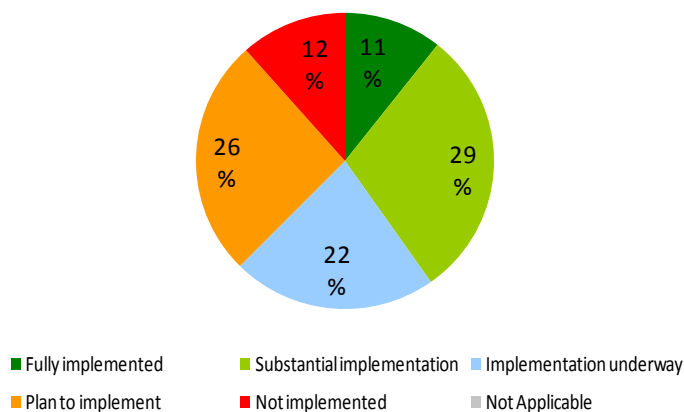
Progress level	Description
Fully implemented	The Secretariat considers that the IEA energy efficiency policy recommendation or that a similar policy has been fully implemented according to the criteria and delivered the expected outcomes.
Substantial implementation	The policy recommendation has been implemented with some minor limitations or an alternative policy has delivered the expected outcomes to a significant degree.
Implementation underway	Either the policy recommendation is being implemented and the policy is at a stage where regulations/instruments have been developed and implemented but with significant limitations; Or, a similar policy has partially delivered the expected outcomes.
Plan to implement	The implementation of the policy recommendation, or a policy likely to deliver similar outcomes, is planned. This is indicated by regulations/instruments that have already been developed but are not yet operational.
Not implemented	
Not applicable	Policy recommendation demonstrated to be not applicable

For each recommendation the IEA defined criteria for achieving each progress level.

All G8 countries completed a self-evaluation questionnaire, and used the five-step grading system to evaluate their own progress with implementing the energy efficiency recommendations or equivalent measures that achieved similar outcomes. Countries could also provide evidence to indicate that they considered the recommendation to be ‘not applicable’ to their country’s context. The completed self-evaluation questionnaires were reviewed and amended by the IEA Secretariat where it was considered appropriate.

The results from the questionnaire are presented in pie charts like the one shown below (Figure 3). When the pie chart shows the results for a single country or sector, interpretation is relatively straightforward. In the case of a single country, Figure 3 could be interpreted to show that the country has “fully implemented” 12% of the IEA buildings recommendations or equivalent measures. In the case where the pie chart shows the results of all seven countries for a single recommendation, Figure 3 can be interpreted to show that a quarter of the countries have “implementation underway” for that building recommendation or an equivalent measure. When the pie chart summarises the results for many countries and several recommendations, interpretation is more complex. Figure 3 in this case shows that, out of a table of all 7 countries and all building recommendations, 12% of the cells are dark green. In other words, 12% of the country-by-recommendation matrix is “fully implemented”.

Figure 3: Progress with implementing building recommendations, all G8 countries



Two points need to be made about the presentation of information in this document. First, the charts and figures presented in this document showing implementation progress are only one indicator of energy efficiency action. To get a full picture of energy efficiency improvement in G8 countries it is important to also consider information presented in other IEA analyses, such as the IEA energy efficiency indicators work.

Second, it is important to note that this is the first time the IEA has reported on energy efficiency policy implementation. The report is thus the product of “learning by doing”. In November 2009, the IEA Secretariat intends to conduct an evaluation of the energy efficiency progress reporting process.

## Energy efficiency policy context

Since the oil shocks of the 1970s, G8 countries have promoted energy efficiency improvements across all sectors of their economies. As a result of these policies and structural changes in their economies, these countries have been able to decouple primary energy use from economic growth. This is shown in the decline in overall primary energy intensity<sup>10</sup> (Figure 31 and Figure 32) in all G8 countries, although to a limited extent in Japan and Italy. The UK, Italy and Japan have the lowest primary energy intensities of any G8 country (when GDP is calculated in PPP<sup>11</sup> and MER<sup>12</sup> respectively) and their intensities have stayed relatively constant throughout the 1990-2007 period. Russia has had the largest improvement in energy intensity during the 1990-2007 period.

The rate of energy intensity decline in most of the G8 countries has not been constant over time. As with other countries, IEA analysis suggests that the rate of energy intensity decline in most G8 countries tended to be higher in the two decades before the 1990s (International Energy Agency, 2007), Russia being the notable exception to this trend. It appears that “the oil price shocks of the 1970s and the resulting energy policies did considerably more to control growth in energy demand and CO<sub>2</sub> emissions than the energy efficiency and climate policies implemented in the 1990s” (International Energy Agency, 2007, p. 151). However, since the early 2000s, the rate of energy intensity improvement has tended to increase – possibly associated with the increase in energy prices and greater attention to climate change issues.

The current energy efficiency policy context globally is dominated by three issues – the financial crisis, energy security and climate change concerns. Energy efficiency continues to form a critical part of G8 governments’ responses to these issues.

Of particular interest at the moment is the financial crisis. In an attempt to respond to the financial crisis, G8 countries are implementing stimulus packages – the majority of which include measures for the development of clean energy and energy efficiency. Examples of energy efficiency related components of stimulus packages include (International Energy Agency, 2009):

- The UK government announced that £50 million of investment in the Warm Front programme, which supplies insulation and heating measures to vulnerable households, would be brought forward from 2010-11 into 2009-10. The programme would also receive £100 million of additional funding in 2008-09 and 2009-10. The government has also provided an additional £60 million for energy efficiency and heating measures in social homes, as part of an accelerated decent homes programme.
- As part of stimulus measures for the industrial sector, the Italian government has introduced a financial incentive scheme for the replacement of old vehicles with newer, more efficient and less polluting ones.

<sup>10</sup> Energy intensity is the amount of energy used per unit of activity. It is commonly calculated as the ratio of energy use to GDP. Energy intensity is often taken as a proxy for energy efficiency, although this is not entirely accurate since changes in energy intensity are a function of changes in several factors including the structure of the economy and energy efficiency. For a detailed discussion of the energy intensity indicator, please see International Energy Agency, 2007.

<sup>11</sup> Purchasing Power Parity.

<sup>12</sup> Market Exchange Rates.

- In France, economic stimulus measures have included an incentive scheme for the scrapping of old vehicles, and the launch of a zero-interest loan programme for residential energy efficiency improvements.
- In Germany, the government announced EUR 13.3 billion for investments in local and regional authorities. The measures focus on investments in educational institutions – with measures to reduce CO<sub>2</sub> emissions and to enhance energy efficiency including the use of renewable energies having priority. The government also increased funding to the KfW CO<sub>2</sub> building modernisation programme. In 2009 a total of 1.5 billion euros of federal funds will be available for low-interest loans and grants to support the improvement of energy efficiency of residential buildings and buildings of the local infrastructure. As part of measures to stimulate the auto industry, Germany created an exemption from payment of motor vehicle taxes for 2 years for vehicles meeting Euro 5 and Euro 6 standards.
- In the United States, economic stimulus packages passed in October 2008 and February 2009 contain significant increases in funding for energy efficiency across a range of measures. The October 2008 stimulus package comprised mainly tax credits aimed at energy efficiency, while the February 2009 programme includes over USD 30 billion in funding for energy efficiency-related initiatives.
- In Canada, the 2009 Federal Budget provided an additional CAD 300 million over two years for the eco ENERGY Retrofit Incentive for Houses programme, as well as creating a new Clean Energy Fund supporting clean energy RD&D projects.
- In its stimulus packages, Japan committed funding of JPY 1.6 trillion for a low-carbon society, which includes JPY 370 billion for the replacement of older vehicles with new fuel efficient cars and JPY 295 billion for assisting with the purchase of energy efficient appliances. Japan's package also includes funding to subsidise enterprises that introduce energy efficient facilities and equipment, improving SMEs with energy efficient diagnosis and investing R&D into innovative energy efficiency technologies.

Economic, energy security and environmental challenges have served as catalysts for energy efficiency policy development in the G8 countries. As a result, many of the G8 countries have been active in developing and implementing energy efficiency policies for several decades, but particularly since the early 2000s. In Europe, G8 countries have taken a particularly active role in responding to, and transposing, energy efficiency-related directives across all sectors from the European Commission. This activity included preparing the National Energy Efficiency Action Plans (under the Energy Services Directive), transposing and recasting the Energy Performance of Buildings Directive and extending the energy efficiency and labelling requirements for energy-using products and electrical appliances through transposing the Eco-Design and Labelling Directives.

In North America, Canada is implementing the ecoENERGY Efficiency Initiative that promotes smarter energy use across buildings, industry and transport sectors. The United States government has begun updating energy efficiency standards for vehicles, lighting, domestic appliances and federal buildings as well as supporting utility demand response programmes.

Japan also continues to place energy efficiency at the heart of its energy policy. Through its Act on the Rational Use of Energy, Japan requires approximately 14 000 designated energy management factories to submit annual reports on their status of rationalisation of energy use, to draw up medium and long-term plans for capital expenditures for energy-efficient equipment and appoint energy managers. Through its recent amendment of the Act, Japan has extended this requirement to the commercial sector. Japan has also extended its successful Top Runner Programme that promotes competition among private companies to improve energy consumption efficiency.



In Russia, energy efficiency has recently received increased policy attention. Russia has an existing Federal Programme for an Energy Efficient Economy for the period 2002-2005 with an outlook to 2010. In addition, the June 2008 Presidential decree on “Certain Measures for Improving the Energy and Ecological Efficiency of the Russian Economy” outlined measures for reducing energy intensity (energy use per unit of GDP) by 40% by 2020 compared with 2007 levels. As a result, Russia is currently revising its energy efficiency framework policy and currently has a draft Federal Law on Energy Saving and Energy Efficiency Increase before the DUMA.



## Strengths and innovations with energy efficiency policy in G8 countries

There are many areas of strength in G8 countries' energy efficiency policy portfolio. These are summarised in Table 2.

**Table 2:** Summary of strengths and innovations in G8 country energy efficiency policy

Cross sectoral	All countries have some degree of national energy efficiency strategy or action plan. Innovative financial instruments. High-quality indicator analysis exists in most countries (particularly Canada and UK).
Buildings	Strong building codes and promotion of passive energy houses are found in Germany. Policies for existing buildings exist in all countries. Building certification is currently in place in all countries except Russia. Russia is planning a building certification scheme.
Appliances	All G8 countries except Russia have active minimum energy performance standards (MEPS) and associated labelling. Russia is planning MEPS and labelling schemes. Standby power requirements are either implemented or are planned in all G8 countries except Russia. Minimum energy standards exist for set-top boxes in all G8 countries except Russia.
Lighting	All G8 countries except Russia are currently implementing policies to phase out incandescent lamps.
Transport	Fuel efficiency standards are in place for heavy-duty vehicles in Japan. Policies aimed at rolling resistance of tyres are planned in all G8 countries except Russia. Stringent fuel efficiency standards for light-duty vehicles exist in EU member states, Japan and the USA. Measures that promote proper inflation of tyres are implemented in USA and Canada. Eco-Drive policies are active in all G8 countries except Russia.
Industry	Coverage of industry energy statistics is improving in all countries, and is particularly well developed in Canada.
Utilities	Innovative policies to create incentives for utilities to promote energy efficiency exist in USA, UK, France, Italy.

### Cross-sectoral

Most G8 countries have well-developed national energy efficiency strategies with clear targets or goals. For example, EU member states Germany, France, the United Kingdom and Italy created or updated existing national energy efficiency action plans (NEEAPs) in compliance with the European Community's Energy Services Directive 2006/32/EC. Of particular note is the United Kingdom's NEEAP which sets an ambitious energy savings target of 18% in 2016. However, there are several areas of concern with the current suite of NEEAPs (discussed below).

Non-EU G8 countries also set targets for energy efficiency improvements. In July 2008, Canada's Council of the Federation<sup>13</sup> committed to achieving a 20% increase in energy efficiency by 2020. In addition, in 2007, Canada's Council of Energy Ministers (Federal-provincial-territorial) released the report *Moving Forward on Energy Efficiency*, to guide and promote energy efficiency while recognising the unique context of different jurisdictions.

<sup>13</sup> The Council includes all provincial and territorial Premiers.

Similarly, Japan has adopted the “Front Runner Plan” for energy conservation. This plan sets forth specific measures for achieving its goal of improving energy consumption efficiency by at least 30% by 2030 compared with 2003.

The United States government has issued many national energy plans since the mid-1970s – all of which include comprehensive energy efficiency measures (including both descriptions of the wide range of policies and programmes in place, as well as proposals for new actions). The latest such plan, the National Energy Policy (NEP), was issued in 2001. There are also related sector – or programme-specific – plans. For example, the National Action Plan for Energy Efficiency (NAPEE) was developed as a strategy for encouraging electric and natural gas utility-based energy efficiency programmes.

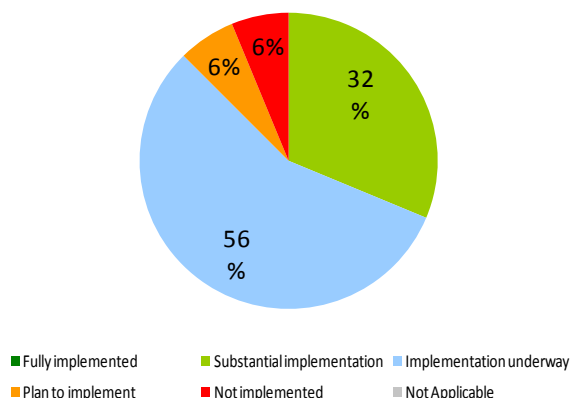
Similarly, Russia has recently announced a target of reducing energy intensity (energy use per unit of GDP) by 40% by 2020 compared with 2007 levels. To achieve this goal, Russia has formulated a comprehensive action plan for the implementation of improvements in energy efficiency across the Russian economy.

Obstacles such as access to capital and perceived risk associated with energy efficiency projects often limit investment in energy efficiency. Many G8 countries are implementing policies to address this issue. Notable examples include Japan’s Flat 35 and Germany’s KfW energy efficiency programme. In 1996, the Japanese government introduced energy efficiency criteria to the Flat 35 scheme for building renovation loans. To receive the loan, applicants need to demonstrate that their building renovation meets at least the 1980 thermal regulation for buildings. The Flat 35 scheme serves a triple purpose by offering preferential loans to the customer, reinforcement and certification of the thermal regulation, and security to the commercial financial institution offering the loan to customers.

Germany’s *Kreditanstalt für Wiederaufbau* (Bank for reconstruction- KfW) provides another example of innovative energy efficiency investment financing. The KfW is a non-profit public banking group that promotes, among other things, energy conservation. The KfW manages a highly successful loans programme for the refurbishment of old buildings and ecological construction. The aim of this programme is to help customers meet the increased upfront costs when renovating a building. Through this programme, financing for energy efficiency projects is channelled exclusively through regular banks; private individuals cannot apply directly to the KfW. The loan agreement is signed by the applicant and his or her bank which pays out the KfW loan and transfers the applicant’s repayment instalments to the KfW Förderbank. Apart from the interest, no further costs such as handling fees are incurred. Despite the success of these examples, a lot remains to be done to fully overcome financial barriers to energy efficiency (see below).



**Figure 4:** Progress with implementing indicators related recommendations, all G8 countries



Another area of strength of G8 countries is their attention to collecting the indicators necessary for developing high-quality policy (Figure 4). None of the G8 countries score “fully implemented” on the indicator recommendations – suggesting that there is still room for further effort in this area<sup>14</sup>. Nonetheless, all G8 countries demonstrate either “implementation underway” or “substantial implementation”.

One area not covered by the energy efficiency recommendations but that can nonetheless generate significant energy savings is public procurement. Several G8 countries, including Italy, Japan, the UK, and the United States have active energy savings components in public procurement programmes.

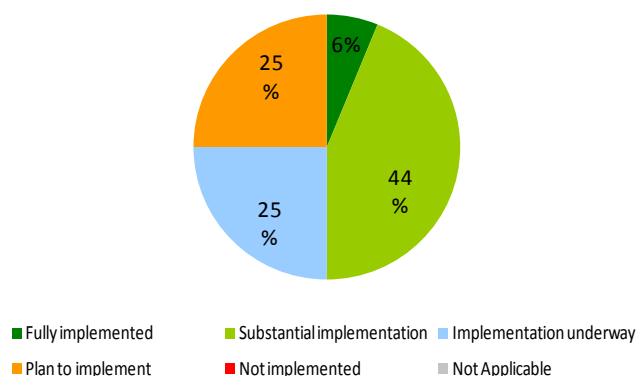
## Buildings

Energy efficiency requirements for buildings are a key feature of all G8 country energy efficiency policies. In terms of energy efficiency requirements for new buildings, Germany has the most advanced standards. Germany’s current energy efficiency standards for buildings are strong and these are currently being raised by 30 % and will likely be raised again in 2012 by 30 %. Once these amendments are in force, it is expected that Germany’s building code energy requirements will be close to the optimum 30 year least life-cycle cost. Germany also has a strong suite of policies aimed at promoting and supporting passive and other highly efficient new buildings. This includes subsidies and policies that ensure capacity development and information campaigns. Passive houses are hence taking a growing share of the market in Germany and related passive house technologies are becoming more commonly available in most parts of the country.

<sup>14</sup> Note that the assessment of the degree of implementation of the energy efficiency indicator recommendations is based on the percentage completion of the IEA energy efficiency data template. While this method of evaluation gives a broad overview of the degree of energy efficiency data availability, it has two limitations. First, some aspects of the energy efficiency data template maybe irrelevant for a country. Second, we make no assessment of the quality of data. The IEA is currently revising the template. As a result, any future progress report will be better able to account for these two issues.

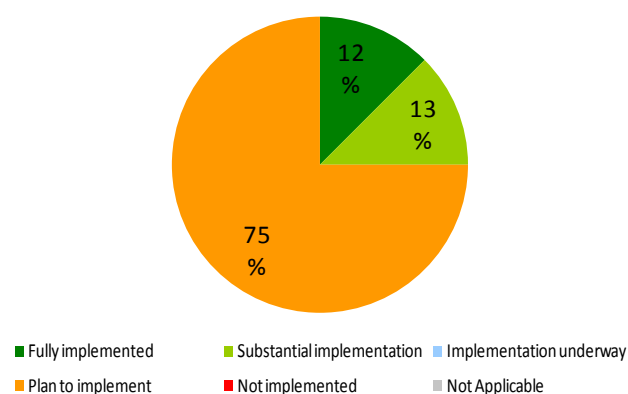
Enhancing the energy efficiency of existing buildings is particularly challenging. While all countries would acknowledge that more needs to be done in this area, it is encouraging to see that all G8 countries have made policy progress in this area. The majority of policy recommendations relating to existing buildings achieve a score of either “implementation underway” or “substantial implementation” (see Figure 5). No country received “not implemented”. One example among many of a policy to encourage building energy efficiency retrofits is Japan’s Budget Law 2007 (Articles 351 and 352), which includes funding of EUR 15 million for two years to underwrite a provision allowing a tax deduction for the implementation of projects to enhance the energy efficiency of buildings. Eligible expenditures include those aimed at reducing thermal losses, the installation of solar collectors for hot water production, condensing boiler installation and the construction of high-efficiency new buildings. Small building renovations are also eligible.

**Figure 5:** Progress with implementing recommendations relating to existing buildings, all G8 countries



Another encouraging recent policy development is the preparation for, and in some cases implementation of, building energy certification. All G8 countries have at least voluntary energy certification systems or plans to implement building energy certificates. Two countries (UK and Germany) already have mandatory certification schemes in place (Figure 6).

**Figure 6:** Progress with implementing building certification recommendations, all G8 countries

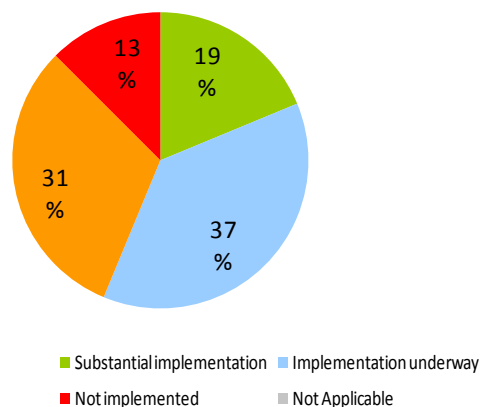


## Appliances

G8 countries are actively creating and implementing energy efficiency policies for appliances. The result has been several notable successes in improving the energy efficiency of appliance stock. For example, most G8 countries have active minimum energy performance standards and associated labelling for a growing list of appliances. Japan has a tradition of promoting energy-efficiency in appliances through its Top Runner Programme. Since 1998 Top Runner has been expanded to target

21 categories of equipment and appliances including commercial-use equipment. Importantly, the Top Runner Programme has recently been expanded to areas of expected high-growth: DVD recorders with integral TV tuners, routers and switches.

**Figure 7:** Progress with implementing recommendations relating to standby power, all G8 countries



Many G8 countries have also made progress with regulating standby power (see Figure 7). In Europe, a stand-by standard where the “off mode” cannot exceed one Watt will come into force in January 2010.

In Europe, minimum efficiency standards for several types of appliances and products will be introduced in the next few years. These standards will be set by EU regulations that are to be based on the Eco-Design Directive (2005/32/EC). At this stage, the EU Commission has plans for proposing such standards for 19 product groups.

In Japan, the standby power consumption of ordinary appliances has been reduced to one Watt or less for ordinary appliances and equipment in accordance with a voluntary target set with industry. Regarding some categories of appliances and equipment, the standby power consumption has been reduced sharply as Top Runner standards are applied to the total of the power consumption in the operation and standby modes. Canada has also made progress with reducing standby power. In January 2009, Natural Resources Canada's (NRCan) Office of Energy Efficiency (OEE) proposed to amend Canada's Energy Efficiency Regulations to designate certain products that use standby power as “energy-using products”, and to establish minimum energy performance standards for them. The amendment would affect compact audio products, televisions, video playing/recording products, computer printers and multifunction devices.

A recently enacted US law requires the US Department of Energy to set standards that cover standby power. Standby power will either be included in standards governing all of a product's energy use or it will be included in a separate standard for standby energy use. US federal agencies are required to purchase products that consume no more than one Watt in standby mode, if available.

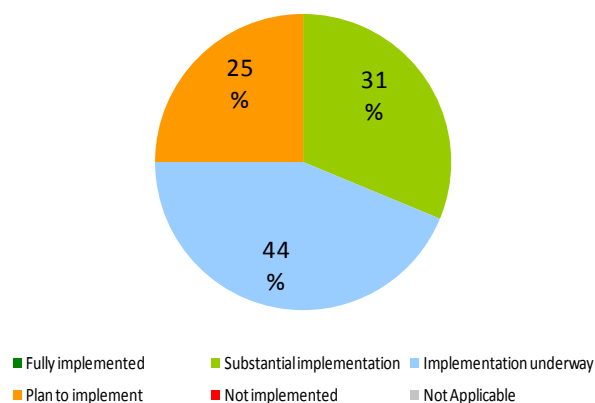
Finally, it is encouraging to see that most G8 countries are showing substantial support for the development and use of international measurement standards (where appropriate) in order to assist performance comparison and benchmarking for traded products.

## Lighting

All G8 countries have pursued policies to increase the energy efficiency in the lighting sector. The IEA has identified phasing out conventional incandescent lamps as a first priority for energy-efficient lighting policy. Globally incandescent lamps are estimated to have accounted for 970 TWh of final electricity consumption in 2005 (International Energy Agency, 2006). In the hypothetical case that all these lamps were to be replaced by compact fluorescent lamps (CFLs), cumulatively this would reduce global net lighting costs by USD 1.3 trillion from 2008 to 2030, and avoid 6.4 GtCO<sub>2</sub> emissions at negative abatement cost. It is encouraging to see that implementation is underway or planned to phase out conventional incandescent lamps in all G8 countries (Figure 8).

**Figure 8:** Progress with implementing recommendations relating to phase-out of inefficient incandescent lamps, all G8 countries

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## Transport

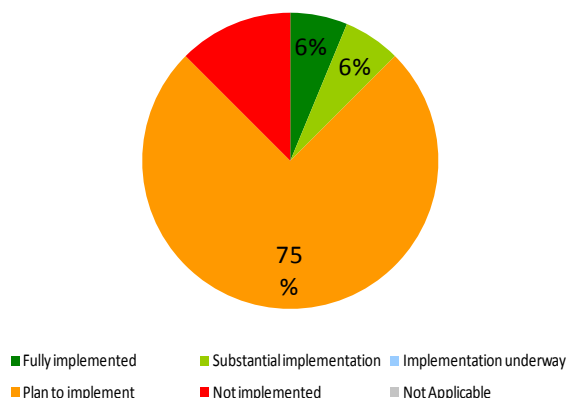
The transport sector is often regarded as one of the most challenging areas in which to achieve energy efficiency improvements. Despite this, there are clearly some important policy developments in the G8 countries in this sector.

A significant innovation in transport energy efficiency policy is Japan's fuel efficiency standards for heavy-duty vehicles. In March 2006 Japan established Top Runner fuel efficiency standards for heavy vehicles (trucks and buses) with 2015 as the target year. Vehicle makers are required to improve fuel economy so as to ensure that the weighted-average<sup>15</sup> economy exceeds the standard value by the target year. Japan is the only country in the world with such fuel efficiency standards for heavy-duty vehicles. The IEA encourages other countries to develop similar standards.

Another important policy development is the promotion of low rolling resistance and appropriate inflation levels for tyres. Roughly 20% of a motor vehicle's fuel consumption is used to overcome tyre rolling resistance. Additional fuel is required when tyres are under-inflated. There is now consensus that policies can achieve as much as a 5% reduction in overall vehicle fuel consumption in this area. All G8 countries except Russia now have in place relevant policies that are planned to be implemented (see Figure 9). Of particular note are the policies being implemented in Canada and the United States that address tyre pressure.

<sup>15</sup> Weighted average by number of vehicles shipped for each weight and vehicle category.

**Figure 9:** Progress with implementing recommendations relating to tyres, all G8 countries



Encouraging eco-drive policies is also important. IEA analysis suggests that over the mid-term (<3 years), average fuel savings of 10% are feasible from promoting eco-drive policies. All G8 countries except Russia have made some policy progress in this area. France and Italy plan to introduce eco-driving following the lead of the European Commission. Canada, Germany, the UK and the United States have demonstrated that they have eco-drive programmes underway. For example, Canada is promoting eco-driving through its ecoENERGY programme that provides tools and resources for existing licensed and learner drivers. Canada's ecoENERGY for Fleets programme will provide more than 200 000 professional drivers of heavy trucks, buses, construction and other vehicles with training in energy efficient vehicle operating techniques.

Japan has the most extensive eco-driving programme. Japan is promoting eco-driving as an effective means to reduce CO<sub>2</sub> emissions under its Kyoto Protocol Target Achievement Plan. The National Police Agency, the Ministry of Economy, Trade and Industry, the Ministry of Land, Infrastructure, Transport and Tourism and the Ministry of Environment established the Eco-Drive Promotion Liaison Committee – a framework for cooperation in promoting eco-driving. In addition, the Act on the Rational Use of Energy calls for transport business operators to promote eco-driving, and the government provides training as well as subsidies for the introduction of EMS (Eco-Driving Management Systems).

In France, Germany, Italy and the UK, recently approved EU regulation caps CO<sub>2</sub> emissions from new passenger cars at 130 g/km from 2015 onwards. This requirement will be phased in so that in 2012, 65% of each manufacturer's newly registered cars must comply on average with the limit value. This will rise to 75% in 2013, 80% in 2014, and 100% from 2015 onwards. Although the law focuses on CO<sub>2</sub> emissions and therefore also encourages the use of biofuels that are less efficient to use than oil, it is in any case expected to greatly improve overall energy efficiency in new passenger cars.

Countries are also pursuing other innovative policies that are not part of the set of energy efficiency recommendations. France, Germany, Italy and Japan have implemented vehicle scrapping schemes to increase the rate of vehicle-stock turnover. For example, in February 2009 Italy enacted a law that provides financial assistance for the replacement of passenger cars and goods vehicles with new reduced-pollution vehicles. Similarly, in the United States, funding for public procurement includes high-efficiency vehicles and tax credits for plug-in hybrid vehicles. The UK has also introduced new differentiated Vehicle Excise Duties for 2009 and 2010 in an attempt to influence vehicle purchase decisions.



## Industry

G8 countries generally report a high degree of coverage of industrial energy-use statistics. In particular, Canada's system of industry energy data collection is world-class and long-standing. As a result, Canada has one of the highest completion levels among member countries of the IEA energy statistics templates for industrial data.

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Many countries are also continuing, or expanding, their promotion of energy management in industry. These policies commonly include the provision of energy management tools, training, energy manager certification and quality assurance. Nevertheless, there is some concern about the level of energy management support in several G8 countries (see below).

## Utilities

Several G8 countries have implemented innovative policies that attempt to create incentives for utilities to promote energy efficiency. These policies range from setting energy savings targets for utilities (such as Energy Efficiency Resource Standards as applied in several States of the USA or the UK Energy Efficiency Commitment) to schemes that allow the certification of energy savings and trading among obligated utilities (such as White Certificate schemes in France and in Italy). Nevertheless, there is concern that many of the potential tools to engage utilities in promoting energy efficiency are not being used to the full extent (see below). Evidence suggests that creating incentives to encourage energy efficiency action by utilities are extremely cost-effective (Waide and Buchner 2008).



## Challenges and areas for improvement in energy efficiency policy

**Table 3:** Summary of areas for improvement in G8 country energy efficiency policy

Cross sectoral	Further room for improving national energy efficiency strategies and action plans. Ensure greater effort in enforcement, compliance and evaluation. Expand efforts in financing, particularly with development of savings verification and measurement protocols, establishing public-private partnerships, and implementing findings of subsidy reviews.
Buildings	Establish stronger energy efficiency requirements for buildings. Strengthen support for passive energy houses and zero energy buildings. Increase efforts to promote energy-efficient windows and glazing.
Appliances	Establish policies to address the growing television-related energy demand. Develop measures to address home digital networks.
Lighting	Support for adoption of high-efficiency alternatives to fuel based lighting.
Transport	Ensure the implementation of planned policies. Create fuel efficiency standards for heavy duty vehicle.
Industry	Establish energy efficiency standards for electric motors. Pay more attention to energy management policies. Create policies to assist small and medium-sized enterprises.
Utilities	Devote more attention to providing incentives for utilities to promote energy efficiency in all G8 countries.

### Cross-sectoral

G8 countries need to improve their cross sectoral energy efficiency policies in several critical areas. First, there is considerable room for improvement of the quality of national energy efficiency strategies and action plans in several countries. For example, a review of the current suite of EU NEEAPs identifies several limitations in many of the plans. These limitations include a lack of ambition, innovation, or prioritisation of policies as well as what appears to be a lack of coherence among fragmented measures. Some of these limitations apply equally to all G8 country energy efficiency strategies and action plans. This is of concern because these strategies and action plans can help guide and encourage energy efficiency policy development and implementation by:

- placing energy efficiency policy within the broader policy context;
- prioritising resource allocation across the energy efficiency portfolio;
- capturing synergies between policies and avoiding duplication;
- allocating responsibility for implementation, monitoring and evaluation.

The IEA encourages all G8 countries to review their energy efficiency strategies to ensure they meet international best practice guidelines (see for example IEA (2009)). There is growing consensus that national energy efficiency strategies should include several elements including:

- a systems perspective (placing energy efficiency within a broader policy context);
- clear rationales and expectations for goals and scope;
- a focus on critical priorities;
- an action plan;

- targets;
- a learning approach;
- accountability;
- consultation and stakeholder engagement.

The need for high-quality energy efficiency strategies is particularly important in those G8 countries where there is a separation of energy regulatory powers between the national, regional and local governments. In these contexts, energy efficiency strategies can provide coordination between levels of government. This co-ordination can help reduce duplication and costs associated with strategy development.

A second area of concern relates to the verification, enforcement and evaluation of domestic energy efficiency laws and policies. Verification and enforcement are vitally important activities to guarantee energy savings are maximised and to ensure the credibility of implemented schemes. So far, verification and enforcement efforts have varied across G8 countries and by product. There is evidence of considerable non-compliance in some instances, indicating that further investment in enforcement activities is warranted. In particular, the IEA is concerned that several G8 countries are lagging behind in ensuring the transparency and public reporting of monitoring and enforcement activities. The IEA urges all countries to strengthen legal and physical capacity to adequately enforce energy efficiency policy measures and maximise their effectiveness.

Similarly, evaluation of energy efficiency policies is critical for making sure these deliver objectives in a cost-effective manner. While all G8 countries engage in energy efficiency evaluation, the IEA has identified some gaps. For example, the innovative white certificates programmes in France and Italy urgently need to be evaluated so as to share the lessons learned from these programmes with other countries.

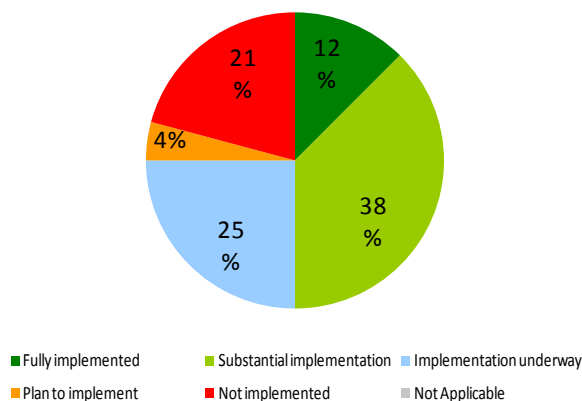
It is encouraging to see that all G8 countries have developed, to a greater or lesser extent, policies promoting energy efficiency investment. These policies are essential for addressing the many impediments to the adoption of cost-effective energy efficiency investments such as:

- the small size of many of the projects
- the unconventional format of many energy-efficient investments (often the ancillary benefits of energy-efficient technologies are difficult to quantify and thus not amenable to standard cost-benefit analysis);
- initial cost barriers (customers avoid energy-efficient investments because the initial costs of these technologies may be greater than other options, despite the fact that their operating costs may be significantly lower);
- perceived high risk of energy efficiency projects;
- financiers' lack of familiarity with energy efficiency investments; and
- the lack of market information on available financial products for energy-efficient investments.

However, there are two areas of potential concern. First, most G8 countries “plan to implement” a common energy-savings verification and measurement protocol, but have not yet done so. National protocols are essential for reducing uncertainties in quantifying the benefits of energy efficiency investment and therefore stimulating increased private sector funding of energy efficiency. A common protocol would enhance international comparability of policy performance. Given the importance of this protocol, the IEA urges G8 countries to expedite their activities in this area.

Second, G8 countries' progress levels suggest more should be done to promote public-private partnerships (PPP) as a mechanism for encouraging energy efficiency investments (see Figure 10). International experience suggests PPP are a highly effective tool for addressing the issue of perceived risk associated with energy efficiency investments (International Energy Agency, 2008). The IEA is concerned that several countries have not implemented the recommended public-private tools and structures to facilitate energy efficiency financing.

**Figure 10:** Progress with implementing recommendations relating to public-private partnerships in energy efficiency finance, all G8 countries



All G8 countries have either completed or plan a review of their current subsidies and fiscal incentive programmes relating to energy efficiency. The challenge facing G8 countries is to ensure the planned reviews are actually conducted and that the findings from these reviews are implemented in the current economic climate.

A final general point relating to cross-sectoral energy efficiency policies is worth making about the need to raise public awareness of the measures currently available. All G8 countries have a range of energy efficiency policies. However, it is likely that many citizens of G8 countries are not aware of the full suite of assistance available to improve energy efficiency. A major challenge for G8 countries will be to raise this awareness.

## Buildings

Promoting energy efficiency in new buildings is highly cost effective and needs to be at the forefront of energy efficiency policies. Despite the significant attention given to improving energy efficiency in buildings (see above), there are several critical areas that still need attention. All G8 countries (except Germany) need to set stronger energy efficiency requirements for buildings. Only Germany has energy efficiency requirements that are approaching the optimal 30-year least life-cycle cost level. At the other end of the spectrum, one G8 country appears to have some levels set at less than a five-year least life-cycle cost.

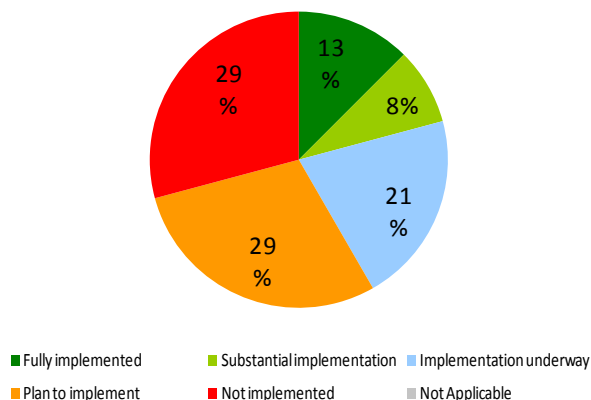
Energy efficiency standards set the minimum energy performance of new buildings. However, there is also a need to encourage maximum energy-efficiency performance in new buildings and to ensure that these buildings are available in the market place. Construction of these high energy efficiency performance buildings that use very low, or even no net energy, is technically and commercially feasible. Over time, these very low energy-consumption buildings such as “passive energy houses” (PEH) (that use 65-80% less energy than a standard house) are often less expensive than or close to the cost of traditional design. “Zero energy buildings” (ZEB) are currently more expensive than traditional buildings, but their costs are dropping. The technology for low-energy buildings has been widely available for some time.

Despite the financial benefits of low running costs and technical feasibility, only one G8 country actively supports the introduction of these buildings; only two G8 countries set market share targets; and no G8 country currently has updated building codes at a PEH or ZEB level (although some are planning to achieve such levels in codes soon) (see Figure 11).

Greater effort to support highly energy efficient buildings, such as PEH and ZEB, would bolster G8 countries' efforts in the area of building energy-efficiency, particularly in cold climate zones.

Installation of energy-efficient glazing provides significant energy-savings potential, particularly through the replacement of windows in existing buildings. Indeed, installing energy-efficient windows, when old windows are being replaced, provides one of the most effective means of improving the energy efficiency of existing building stock, as windows are often replaced several times during the life of a building. Furthermore, retrofitting energy-efficient windows appears cost effective in all climates.

**Figure 11:** Progress with implementing passive energy house and zero energy building recommendations, all G8 countries



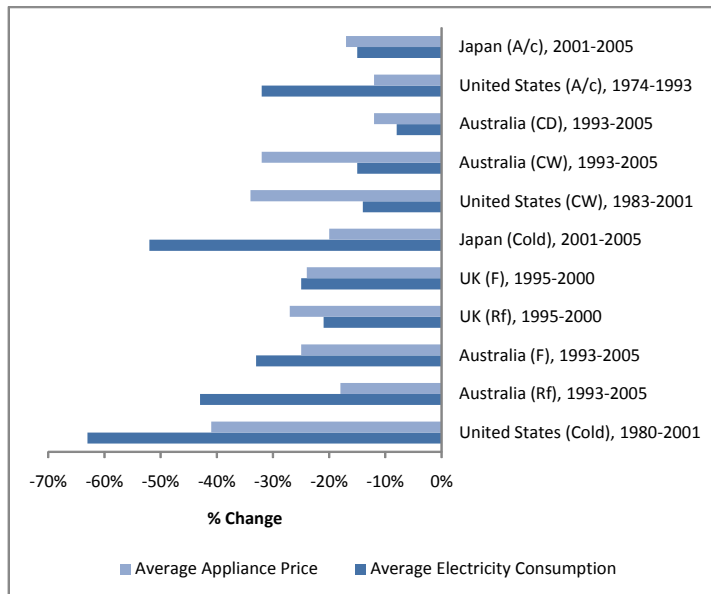
G8 countries demonstrate mixed performance with respect to promoting energy-efficient glazing. No G8 country has fully implemented either the recommendation relating to establishing minimum energy efficiency standards for windows and glazing or requiring labelling of windows. Indeed, several countries have not implemented part of the glazing recommendation package. Given the potential for these policies to assist countries achieve energy savings targets, the IEA urges the G8 to increase their efforts in this area.

## Appliances

As indicated above, all G8 countries except Russia have made considerable effort in promoting energy efficient appliances. This is demonstrated by the improvements in appliance efficiency levels in those countries over the last two decades (Figure 12).

This review of progress identifies two areas of concern. The area of appliances that appears to have received least attention from G8 countries relates to television technology (Figure 13). While all G8 countries except Russia have “implementation underway” to promote energy-efficient televisions and set-top boxes, there are significant limitations with many of these policies. In addition, G8 countries except Japan (where Top Runner standards for televisions have recently been strengthened) have made limited progress in stimulating new television technology that halves energy use. Indeed, two G8 countries report “not implemented” for this policy mechanism. Similarly, most G8 countries report “not implemented” for the recommendation relating to ensuring that television service provider licensing agreements specify the need to provide service at a minimum of energy use.

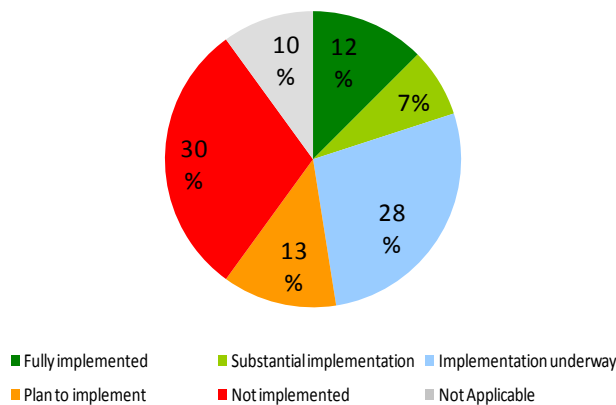
**Figure 12:** Recorded fall in average electricity consumption and prices for several major appliance types in selected countries (source IEA, 2009)



Source: IEA 2007.

Key:  
 A/c = Air conditioners  
 CD = Clothes dryers  
 CW = Clothes washers  
 Cold = Refrigerators and freezers  
 F = Freezers  
 Rf = Refrigerators

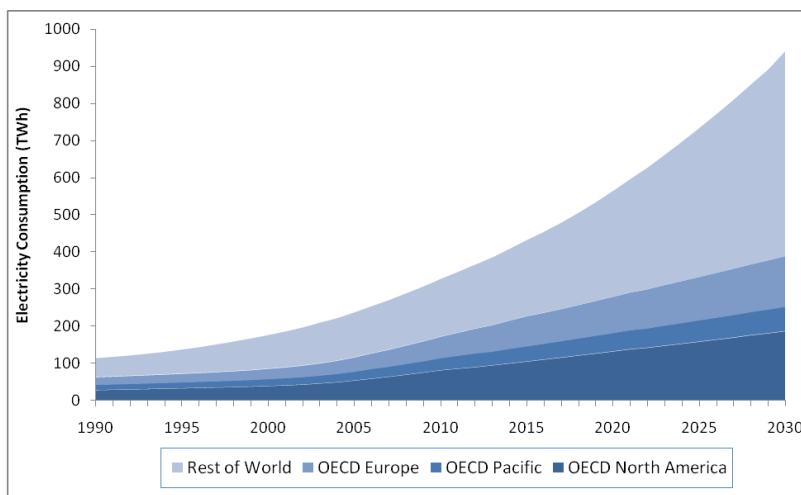
**Figure 13:** Progress with television-related recommendations (“set-top” boxes and digital television adaptors, television products and TVSP contracts), all G8 countries



The relative lack of policy attention to this area is concerning because of the rapid growth in energy use associated with television technology. Televisions have undergone a rapid transformation in recent years as flat-screen technology replaces bulkier traditional screens. Spurred on by falling retail prices, consumers continue to purchase televisions with larger screens for primary use, while often keeping existing televisions. Consequently, the number of televisions is growing in most countries. Televisions are also switched on for longer periods of time, although they may not be watched. Increased use of games consoles and programme-recording devices have tended to extend viewing hours.

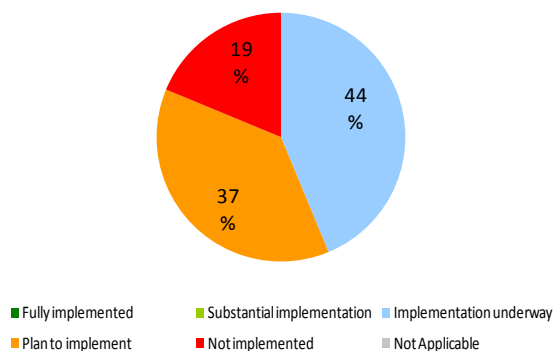
These developments are leading to increases in energy use of approximately 5% per year, which will cause the global energy consumption of televisions to nearly triple by 2030 if current trends continue (see Figure 14 below). The G8 urgently needs to develop stronger policies to address this emerging challenge.

Figure 14: Estimated electricity consumption by televisions, 1990-2030 (source IEA, 2009)



The second area that requires increased policy attention by G8 countries concerns measures relating to improving the energy efficiency of network-connected electronic devices. While several G8 countries plan to implement policies to constrain the energy use associated with electronic networks, it is troubling to see that two G8 countries have, as yet, developed no policies to address an important aspect of this emerging issue – the need for industry-wide protocols for network power management (Figure 15).

Figure 15: Progress with network-connected electronic device recommendations, all G8 countries



Measures to encourage effective power management of home digital networks are required to ensure that energy consumption from networked devices does not escalate. Preliminary research in the United States suggests that electricity consumption from home-entertainment devices may grow by 100% over the next 10 years, without industry-wide protocols to enable power management commands to be communicated between devices within a network. This issue requires attention now, before the proliferation of proprietary standards, so that technology under development has the technical potential to access low-power modes (International Energy Agency, 2008).

## Lighting

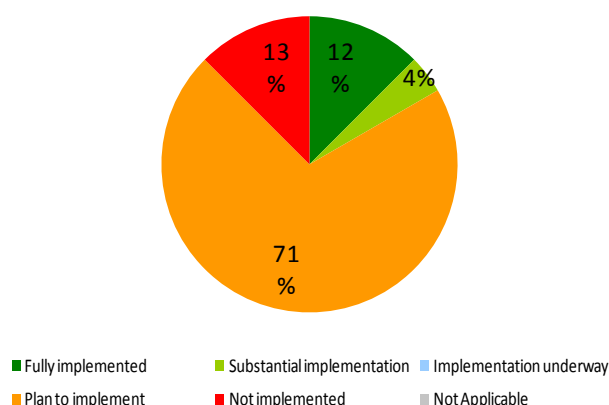
G8 governments have been active in promoting energy efficient lighting in many areas. However, there is one area of recommended lighting energy efficiency policy that has received limited attention. More must be done to stimulate the adoption of higher efficiency alternatives to fuel-based lighting in off-grid communities in many parts of the developing world.



Globally, 1.6 billion people have no access to electricity through the grid (International Energy Agency, 2008). As a consequence, these people rely on fuel-based lighting technologies, such as kerosene lamps, to provide illumination. Such lighting is extremely inefficient and costly. Furthermore, it provides inadequate illumination levels for many applications such as reading and gives rise to significant in-door air pollution. In areas where access to the grid is not viable in the near term, new solid-state lighting technology can provide high-quality solar-powered task lighting at a significantly lower economic, environmental and health cost over its life-cycle than fuel-based lighting. Presently, there are limited distribution channels for this technology and the initial costs can be prohibitively high for those with little or no access to credit and constrained cash flow. A global effort that not only supports the transition away from fuel-based lighting to more sustainable alternatives, but also provides access to technology and financing, would have a positive impact on the lives of hundreds of millions of people. It would also move us closer to attaining a variety of international development and energy policy goals. The IEA encourages G8 countries to undertake such efforts in the context of their overseas development assistance and related activities.

## Transport

**Figure 16:** Progress with implementing recommendations relating to tyres and fuel efficiency standards for light duty vehicles, all G8 countries



While there are a few stand-out transport policies in the G8, there is clearly room for more effort. Many of the transport energy efficiency policies in the G8 are in the “plan to implement” category. This is particularly the case relating to tyres and energy efficiency standards for light-duty vehicles (see Figure 16). The IEA urges the G8 to pursue the implementation of these policies with vigour so as to capture the significant energy-savings potential these policies can deliver.

The other area of policy action that is urgently needed in G8 countries is establishing fuel-efficiency standards (and related policies including labelling and financial incentives) for heavy-duty vehicles. Heavy-duty vehicles are responsible for 30% of world-wide fuel use (International Energy Agency, 2008). The heavy-duty transport sector has already achieved significant improvements in vehicle fuel efficiency, but large potential improvements remain. Many barriers prevent the rapid introduction of cost-effective energy efficient technologies, such as lack of information, fluctuating fuel prices, and risk aversion by both manufacturers and buyers. G8 countries should urgently implement policies aimed at accelerating fuel-efficiency improvements in trucks and other heavy-duty vehicles.

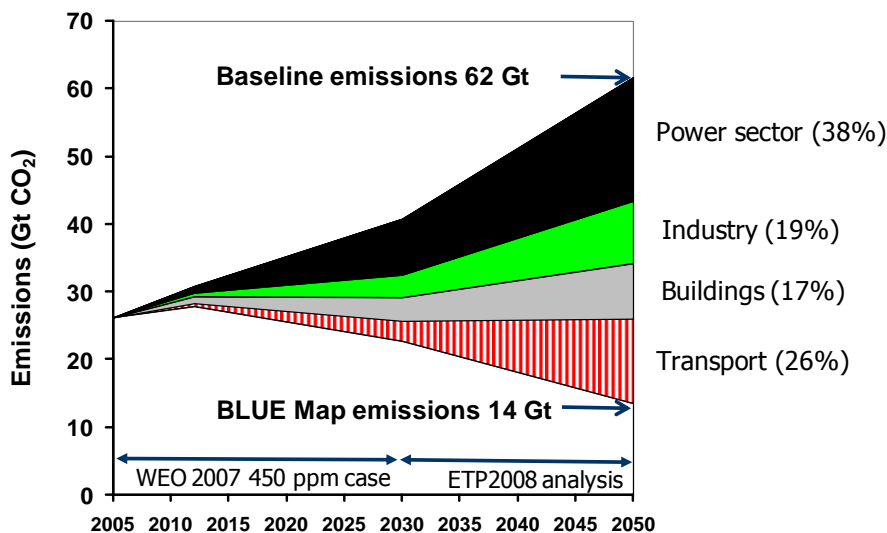
Russia, in particular, requires additional effort to promote energy efficiency of its transport fleet. Russia has not implemented any of the G8/IEA recommendations or measures that would achieve similar outcomes. The IEA encourages Russia to develop and implement appropriate policies to enhance the energy efficiency of its transport fleet as soon as possible.



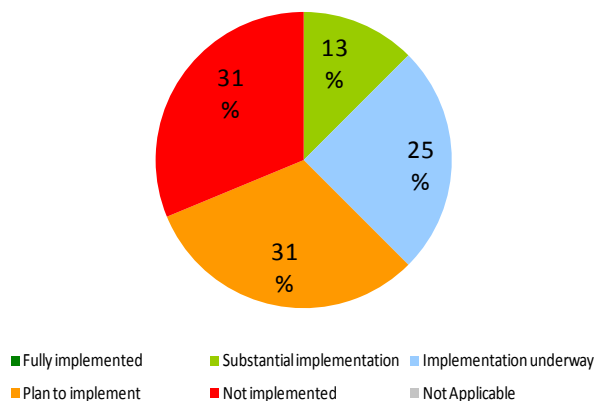
## Industry

Industry accounts for nearly one third of total global primary energy supply and 36% of CO<sub>2</sub> emissions. The large primary-materials industries – chemicals, petro-chemicals, iron and steel, cement, paper, pulp and paper and other minerals and metals – account for more than two thirds of this amount. IEA analysis shows that substantial opportunities to improve industrial energy efficiency remain (Figure 17).

**Figure 17:** Projected sector CO<sub>2</sub> savings potentials (source: IEA, 2008)



**Figure 18:** Progress with implementing industrial electric motor energy efficiency standards recommendations, all G8 countries



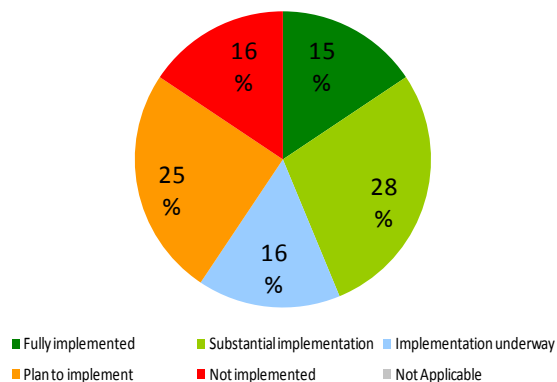
In order to capture this energy efficiency potential, G8 countries need to increase their efforts in three areas. First, the IEA is concerned that not all countries have established standards for industrial electric motors, or examined the barriers to the optimisation of energy efficiency in motor-driven systems (Figure 18). However, there is significant potential for energy savings through enhanced energy efficiency policies for motors. The IEA estimates that if all countries adopt best practice minimum energy performance standards for industrial electric motors, between 240 and 475 TWh of electricity demand could be saved by 2030.

Second, the IEA is encouraged to see that, in general, there is significant progress with promoting energy management in industry (Figure 19). However, the lack of formal energy management policy in Russia, France and Germany is of concern.

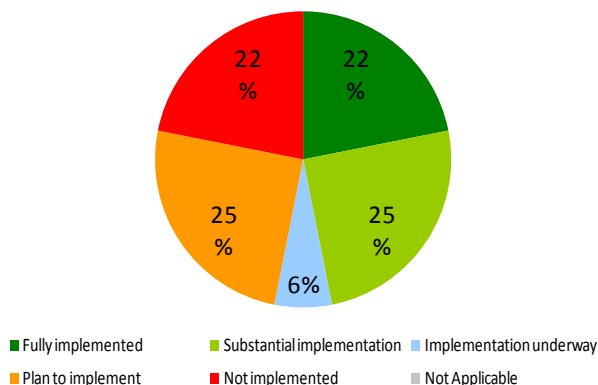
Finally, the policies for small and medium-sized enterprises (SMEs) are well-developed in a few countries – for example Canada, Japan, the UK and the United States. However, the IEA is concerned

that more attention is needed in two areas (Figure 20). First, benchmarking information needs to be made available to SMEs. Second, appropriate incentives need to be developed and implemented to encourage SMEs to make least-life-cycle cost capital acquisition decisions. For both of these areas, several countries have “not implemented” appropriate policies.

**Figure 19:** Progress with implementing energy management recommendations, all G8 countries



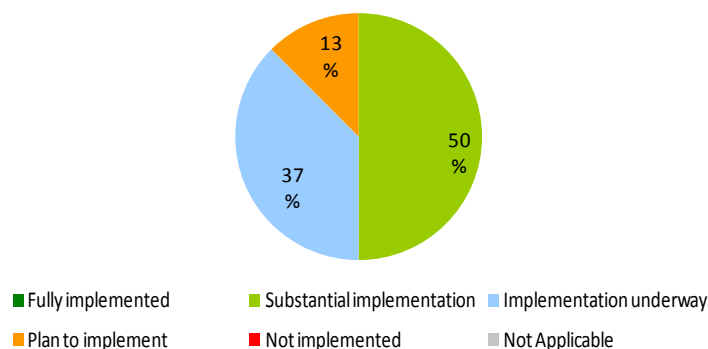
**Figure 20:** Progress with implementing recommendations relating to small and medium-sized enterprises, all G8 countries



## Utilities

It is encouraging to see that all countries have implemented, or plan to implement, at least one of the suggested utility-related policies (Figure 21). However, The IEA encourages all G8 countries to continue considering how they can motivate utilities to promote energy efficiency. Experience suggests that well-designed utility programs can deliver significant energy savings cost effectively.

**Figure 21:** Progress with implementing utility recommendations, all G8 countries<sup>16</sup>



<sup>16</sup> This chart is based on the four elements of the utility recommendation (see Annex 1: Consolidated list of 25 IEA energy efficiency recommendations). As each of the utility recommendation elements is optional, we have calculated this pie chart based on that element that achieves the highest level of policy implementation in each country.

## Summarising progress with G8 implementation of G8/IEA 25 energy efficiency policy recommendations

This section provides a brief overview of progress across all G8 countries with implementing the G8/IEA 25 energy efficiency policy recommendations. Its purpose is to provide a backdrop for further detailed discussion in the later section presenting country-by-country progress reports.

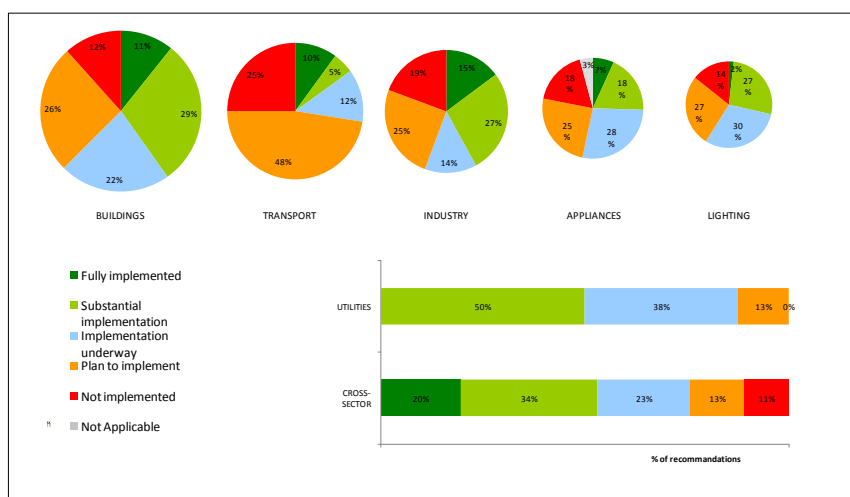
It is important to recall that the recommendations were developed based on identified policy gaps and priorities. This has two implications. First, the recommendations do not cover the broad range of possible energy efficiency policy activity that is ongoing in countries. Rather, they are meant to focus attention on the priority energy efficiency policies and policy gaps identified by IEA analysis.

Second, precisely because the recommendations focus on existing policy gaps, the results presented in this section and the following “country report” section will indicate that further effort will be required in each country to reach full implementation of the measures. This information is presented in the spirit of attempting to assist countries to improve their energy efficiency policy portfolios and capture the significant energy savings potentials. The information presented below is based on information available to the IEA as of 31 March 2009.

### Combined G8 progress

Figure 22 summarises the progress made by all G8 countries with implementing the G8/IEA 25 energy efficiency recommendations. The pie charts have been scaled to reflect relative global energy savings potential of each sector. For example, the lighting recommendations are estimated to deliver approximately one third as much energy savings as the buildings recommendations. Because we do not calculate energy efficiency potential for the utilities and cross sectoral recommendations these are presented as bar charts.

**Figure 22:** Progress with implementing G8/IEA 25 energy efficiency recommendations, all recommendations, all G8 countries



From this overview, it is clear that there is room for further implementation in all sectors. The G8 countries have demonstrated the least policy implementation in respect to transport. In contrast, when the categories “fully implemented” and “substantial implementation” are considered together, the areas with the most developed policies are utilities, cross –sectoral, buildings and industry.

## Comparison of degree of progress with implementing the G8/IEA recommendations

It is also instructive to compare the degree of progress with implementing the recommendations, or measures that achieve similar outcomes, and captured the potential energy savings. No G8 country has “fully or substantially”<sup>17</sup> implemented more than 55% of the relevant G8/IEA recommendations (Figure 23). Another way of looking at this is that around 40% of the potential<sup>18</sup> energy savings from the IEA recommendations, or measures that achieve similar outcomes, remains to be captured.

**Figure 23:** Proportion of applicable recommendations<sup>19</sup> by level of implementation progress

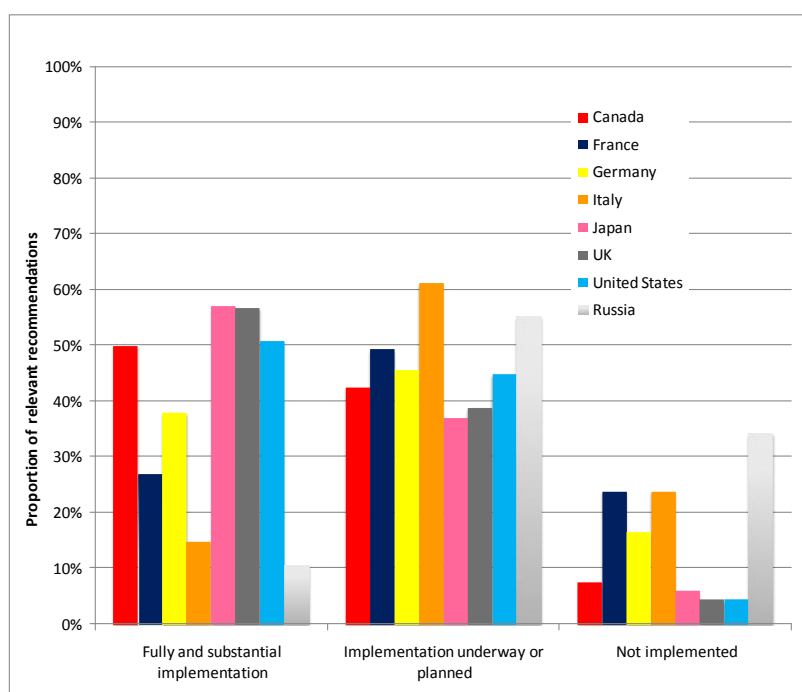


Figure 23 indicates that a high proportion of the potential energy savings to be derived from relevant energy efficiency policies is not been captured. Having said this, many of the G8 countries plan to implement a significant proportion of the recommendations. This is encouraging in the sense that it indicates high aspirations for future energy efficiency policies. However, the IEA sees this as posing a challenge for countries: a plan to implement is not implementation itself. The IEA encourages countries to ensure that these planned policies are put into action without delay.

<sup>17</sup> That is, if we consider only those recommendations that have been fully or substantially implemented.

<sup>18</sup> That is, cost-effective technical potential.

<sup>19</sup> That is, proportion of all recommendations minus “not-relevant” recommendations.

## Comparison of G8 implementation progress by sector

In the appliance and lighting areas (Figure 26 and Figure 27 respectively), policy activity is dominated by actions categorised as either “implementation underway” or “plan to implement”. The IEA encourages all countries to extend, improve and implement the planned energy efficiency policies.

The dominant feature of the G8 transport energy efficiency policies (Figure 28) is that a significant portion is still only planned. While planned policy implementation is commendable, it is important that these plans eventually gain traction and are implemented.

The comparison of industry energy efficiency policy implementation (Figure 29) reveals two sets of countries. One group of countries has relatively well-developed industrial policies (Canada, Japan, the UK and United States). On the other hand, Russia, France, Germany and, to some extent, Italy appear to be implementing fewer of the IEA energy efficiency recommendations or equivalent measures. In particular, these countries score relatively poorly on policies for energy management and policies for small and medium-sized enterprises. In addition, France and Germany need to increase efforts to address energy efficiency in industrial electric motors (the recommendation on examining barriers to the optimisation of energy efficiency in electric motor-driven systems and related policies). These countries could do well to enhance their energy efficiency policies in the industrial sector.

Figure 30 shows how individual countries compare in implementing incentives for utilities to deliver energy efficiency. Most G8 countries have at least policy “implementation underway”. No country is regarded as having fully exploited the opportunities to motivate utilities to promote energy efficiency.

**Figure 24:** Comparison of country progress with implementing applicable cross-sectoral recommendations

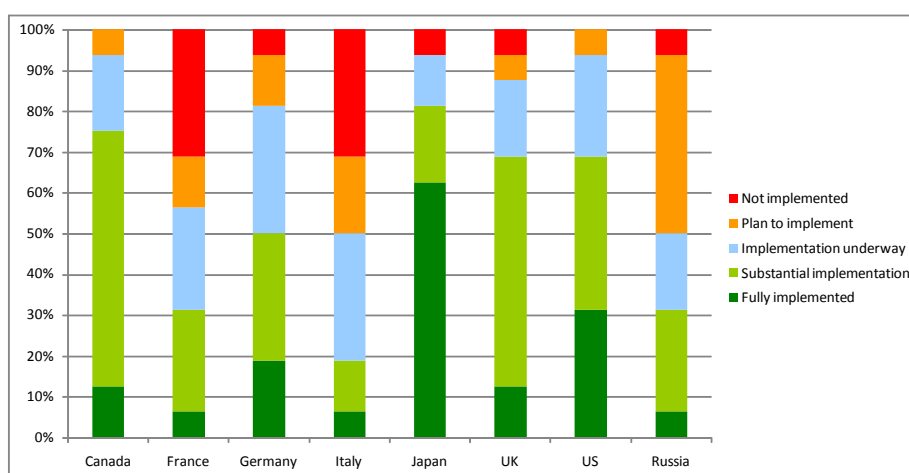


Figure 25: Comparison of country progress with implementing applicable buildings recommendations

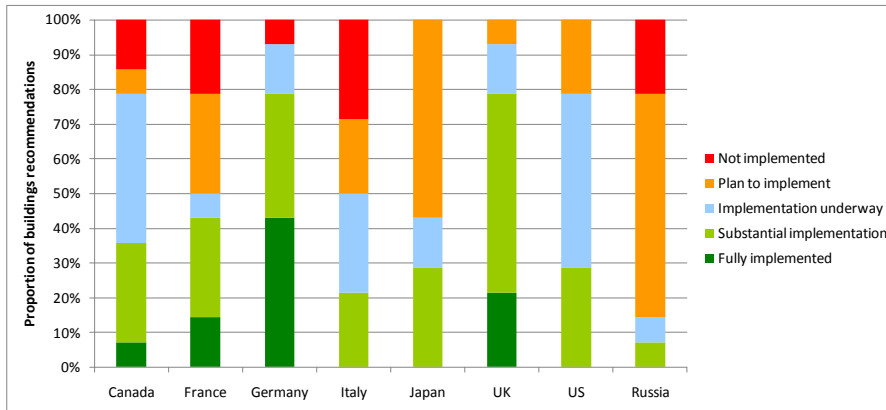


Figure 26: Comparison of country progress with implementing applicable appliance recommendations

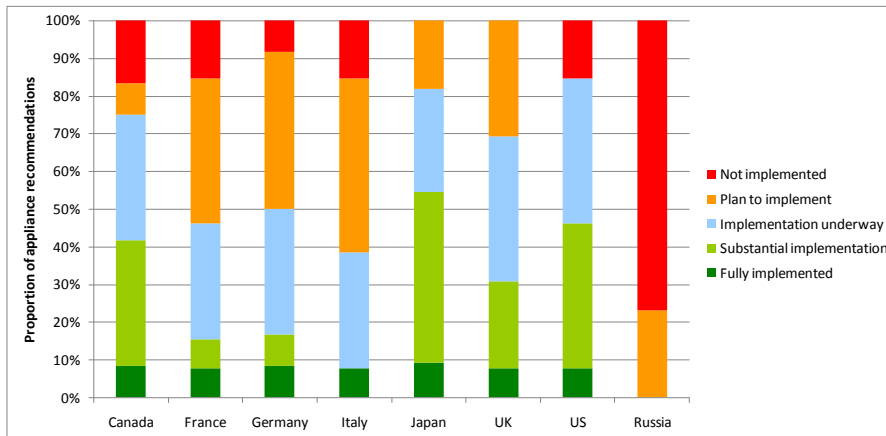


Figure 27: Comparison of country progress with implementing applicable lighting recommendations

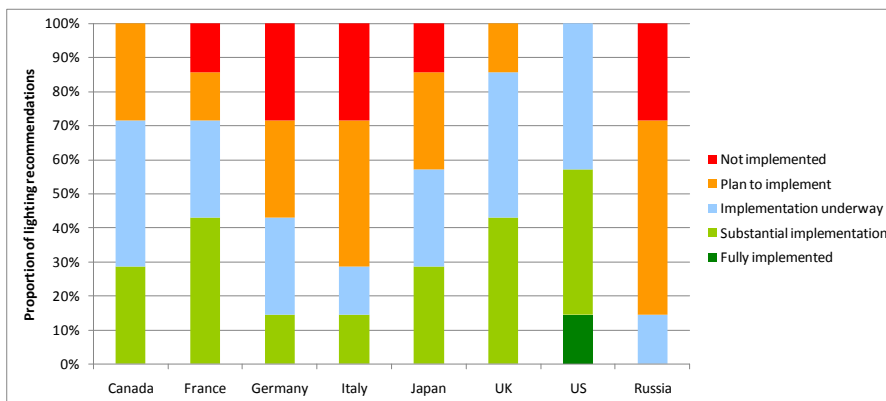


Figure 28: Comparison of country progress with implementing applicable transport recommendations

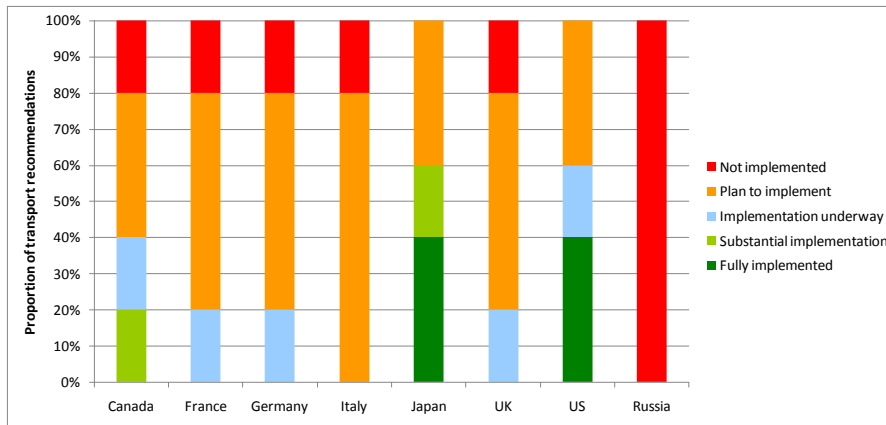


Figure 29: Comparison of country progress with implementing applicable industry recommendations

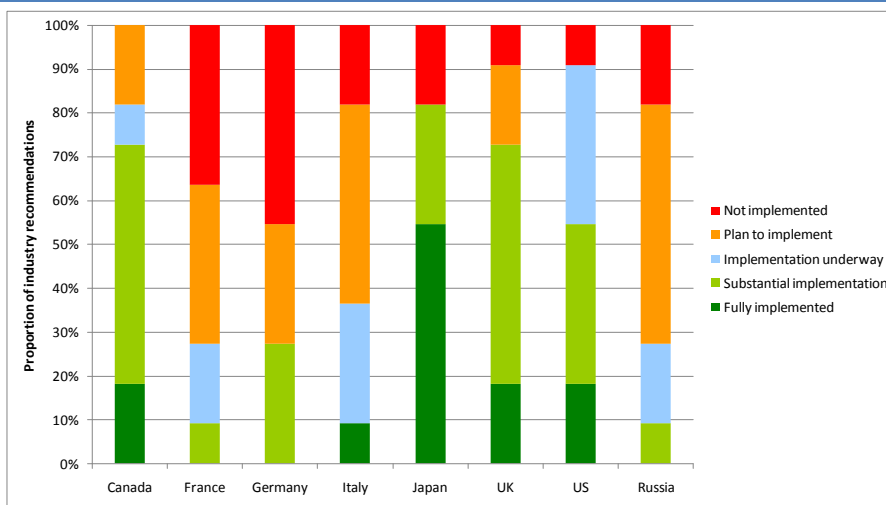
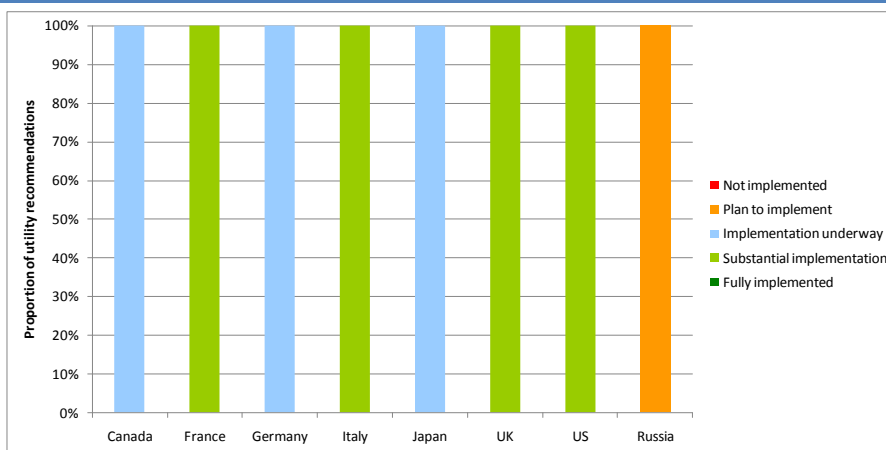


Figure 30: Comparison of country progress with implementing applicable utility recommendations<sup>20</sup>



<sup>20</sup> This chart is based on the four elements of the utility recommendation (see Annex 1: Consolidated list of 25 IEA energy efficiency recommendations). As each of the utility recommendation elements is optional, we have calculated this pie chart based on that element that achieves the highest level of policy implementation in each country.

## Country reports

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This section outlines each G8 country's progress with implementing energy efficiency policy.

The overall aim of these country progress reports is to assist countries in enhancing their energy efficiency policy. Specifically, the reports provide an overview of each country's progress in implementing energy efficiency policy, with particular focus on the G8/IEA 25 recommendations. It is important to note that these country reports do not attempt to mention every energy efficiency policy in each country. Rather, they focus on a selection of successful and innovative policies as well as areas for critical further action.

Before proceeding with individual country reports, we present an overview of final energy intensity changes in G8 countries (see Figure 31 and Figure 32 below). Figure 31 shows that the UK, Italy and Japan have the lowest energy intensities of G8 countries depending on whether GDP is measured in terms of purchasing power parity (PPP) or market exchange rates (MER). Furthermore, all countries, with the exception of Italy and Japan, have demonstrated relatively consistent declines in energy intensity over the past two decades, with Russia and the United Kingdom making the largest reductions.

**Figure 31:** Changes in Energy Intensity (GDP measured in PPP) in G8 Countries from 1990-2007

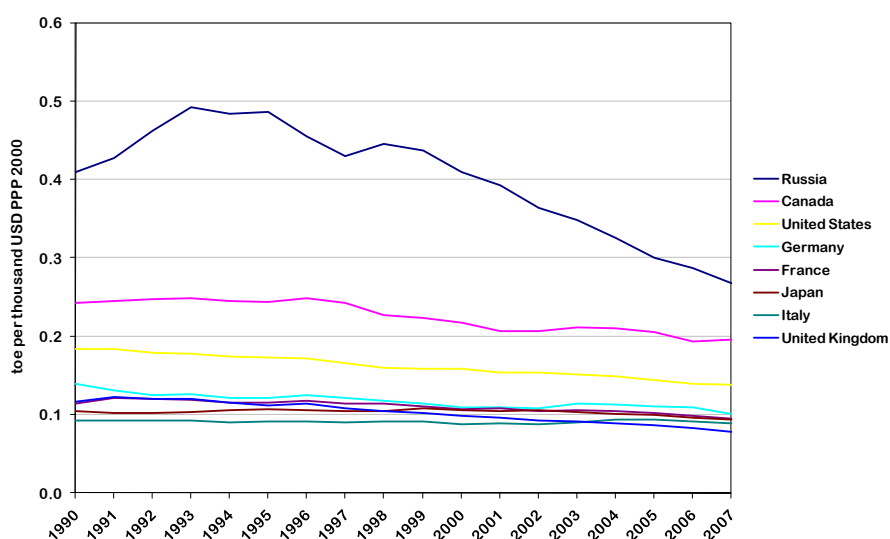




Figure 32: Changes in Energy Intensity (GDP measured in MER) in G8 Countries from 1990-2007

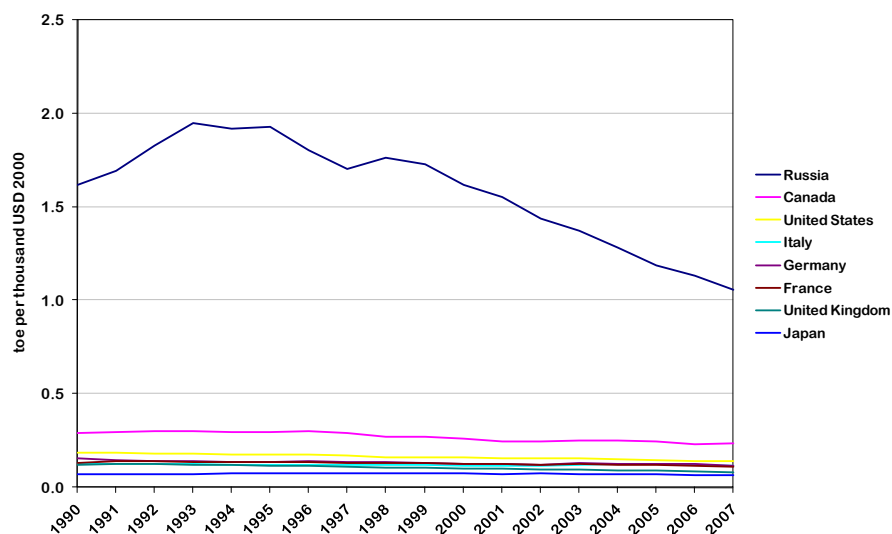
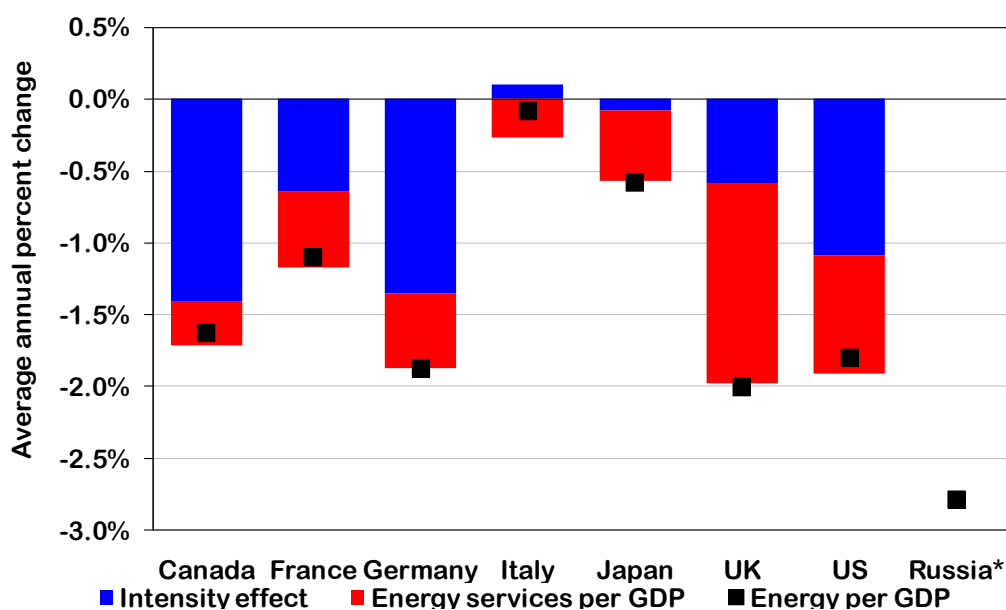


Figure 33: Decomposition of final energy intensity changes for G8 countries, 1990-2005<sup>21</sup>



Furthermore, it is possible to “decompose” or separate out the changes in energy efficiency and changes in economic structure that affect aggregate energy intensity (Figure 33). For example, Figure 33 shows that France’s aggregate energy intensity decreases by around 1.1% from 1990-2005. This decrease was made up of a 0.6% decline due to improved energy efficiency and a 0.5% decline due to changes in economic activity and structure. Figure 33 is referred to in more detail for each country report below.

<sup>21</sup> The following sectors are not included in this analysis: mining and quarrying, fuel processing, and electricity, gas and water supply. Industries in the category “other industries” are analysed only to a very limited extent in this study.

Data is not available to decompose changes in Russia's energy intensity. However, given the recent increase in international hydrocarbon prices and the subsequent growth in Russia's GDP, 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.

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It is also worthwhile noting that G8 countries have taken an energy efficiency leadership role in establishing the International Partnership for Energy Efficiency Cooperation (IPEEC). The aim of this partnership is to create a forum for sharing best practices in energy efficiency among participating nations – which will include countries beyond the G8.



## Energy Efficiency Progress Report – Canada

### Context

Canada's primary energy and electricity consumption per unit of GDP is the highest among IEA countries. This is largely due to its high concentration of output in energy-intensive sectors, cold climate and high living standard with minimal constraints on space occupation. Final energy consumption has grown continuously over the past decade, though at a lower rate than the economy as a whole. Energy intensity has been improving as a result, at an average rate of 1.26% per year between 1990 and 2007 (see Figure 31). Figure 33 shows that around 1.4% of annual intensity improvements from 1990-2005 were due to end-use energy intensity gains, the rest were accounted for by changes in sector mix. New targets have been set to cut emissions of the major GHG-emitting industries by a total of 150 Mega tonnes CO<sub>2</sub> by 2020. Canada is also aiming to improve efficiency in the transport sector, with recent legislation regulating the fuel efficiency of cars and light trucks.

### Strengths and innovations

Canada is committed to working to increase energy efficiency. In August 2008, individual Canadian provinces and territories committed to achieving a 20% increase in energy efficiency by 2020, largely through improvements to building codes, broader regulation of energy-using products, green building policies for new government-funded facilities, and home energy audits and retrofit assistance. In addition, federal and provincial or territorial governments are collaborating in different ways to achieve combined energy efficiency objectives. Provincial and territorial governments are using federal energy efficiency tools to complement their own energy efficiency programmes and policies.

Canada is a world leader in the development and analysis of energy efficiency indicators. Building on this analysis, the federal government, via the Office of Energy Efficiency (OEE) works to improve energy conservation and energy efficiency in every sector of the Canadian economy. The OEE has developed a series of ecoENERGY programmes to help and promote the efficient use of energy; the annual federal budgetary processes have provided significant funding for energy efficiency programmes. The ecoENERGY Efficiency Initiative is investing more than CAD 675 million between 2007 and 2011 to promote smarter energy use in every sector of the Canadian economy. While most schemes are voluntary they are complemented by amendments to the Energy Efficiency Regulations, which will either set a minimum energy performance standard for a series of new products or will make existing standards more stringent for others. These current series of amendments started to come into force in 2007.<sup>22</sup> Also, national standards for lighting efficiency will be implemented through regulations under Canada's Energy Efficiency Act, and developed with industry and provincial and territorial governments.<sup>23</sup> The standard will phase-out inefficient incandescent lighting in common uses by 2012.

<sup>22</sup> Regulations under the Energy Efficiency Act, in effect since 1995, set minimum energy-performance levels for a number of energy-using products such as appliances, lighting, and heating and air-conditioning products. Broadening and strengthening the Act means that 80% of the energy used in homes and businesses will soon be regulated.

<sup>23</sup> This policy intention was announced in April 2007 and pre-published in the Canada Gazette in March 2008.

The ecoENERGY for Buildings and Houses programme includes a package of instruments. These instruments include new design tools and training so designers, builders, owners and operators can learn about and use best practices and new technologies; energy rating and labelling systems; and updating the Model National Energy Code for Buildings in cooperation with provinces and territories, with a view to encouraging other levels of government to adopt more stringent building energy codes by 2010/11.

In terms of energy management, Canada is a leader in supporting industrial energy efficiency programmes that encourage industries to improve energy management activities and adopt more energy efficient end-use technologies and practices.

In the transport sector, twelve provincial and territorial bodies responsible for driver education use the Autosmart Driver Kit developed by the Office of Energy Efficiency (OEE) to educate young drivers on fuel efficiency. For example, Manitoba Public Insurance has recently incorporated an Autosmart component into its curriculum and many provinces display the OEE publications in their licensing bureaus.

### *Challenges and areas for improvement*

Despite Canada's energy efficiency policy achievements, there are additional means by which Canada could continue to improve its energy efficiency policy portfolio. Promoting energy efficiency in Canadian buildings is one area requiring further effort. First, specific policies in support of highly energy-efficient buildings, such as passive houses and zero energy buildings would improve Canada's building energy efficiency, particularly in the cold climate zones. Second, Canada should aim to base the level of energy efficiency requirements in its building codes on 30-year least life-cycle cost, so as to ensure the path to passive house or zero energy as a standard for building regulation. Introducing similar energy efficiency requirements for building refurbishment would also help to capture the large potential energy savings in existing buildings. It is encouraging that all governments (federal, provincial, territorial) have agreed to work collaboratively to enhance the Model National Energy Code for Buildings (MNECB) by 25% by 2011. This target is already included in the Ontario Building Code, effective from January 2012. Unfortunately, this level still falls far below the 30-year least life-cycle cost recommendation of the G8/IEA.

Third, these initiatives should be complemented by a package of measures (including an evaluation of existing subsidies, financing and other instruments) to address the most important barriers to energy efficiency in buildings, both existing and new.

At a cross-sectoral level, co-operation between provincial and federal energy ministers on developing a national energy efficiency action plan could be further strengthened. The Foundation for Action policy document agreed by Canada's Council of Energy Ministers in 2007 provided a basis for further cooperation. Unfortunately, the document does not provide a clear nation-wide strategy on energy efficiency, nor time-bound quantitative targets for energy savings. Several provinces have established such targets within provincial-level strategies. However, this is not the case in all provinces and where adopted, timeframes and measurements are not consistent. In this context, nation-wide targets and/or harmonised measurements and timeframes would be desirable to help maximise opportunities for energy savings across the country.

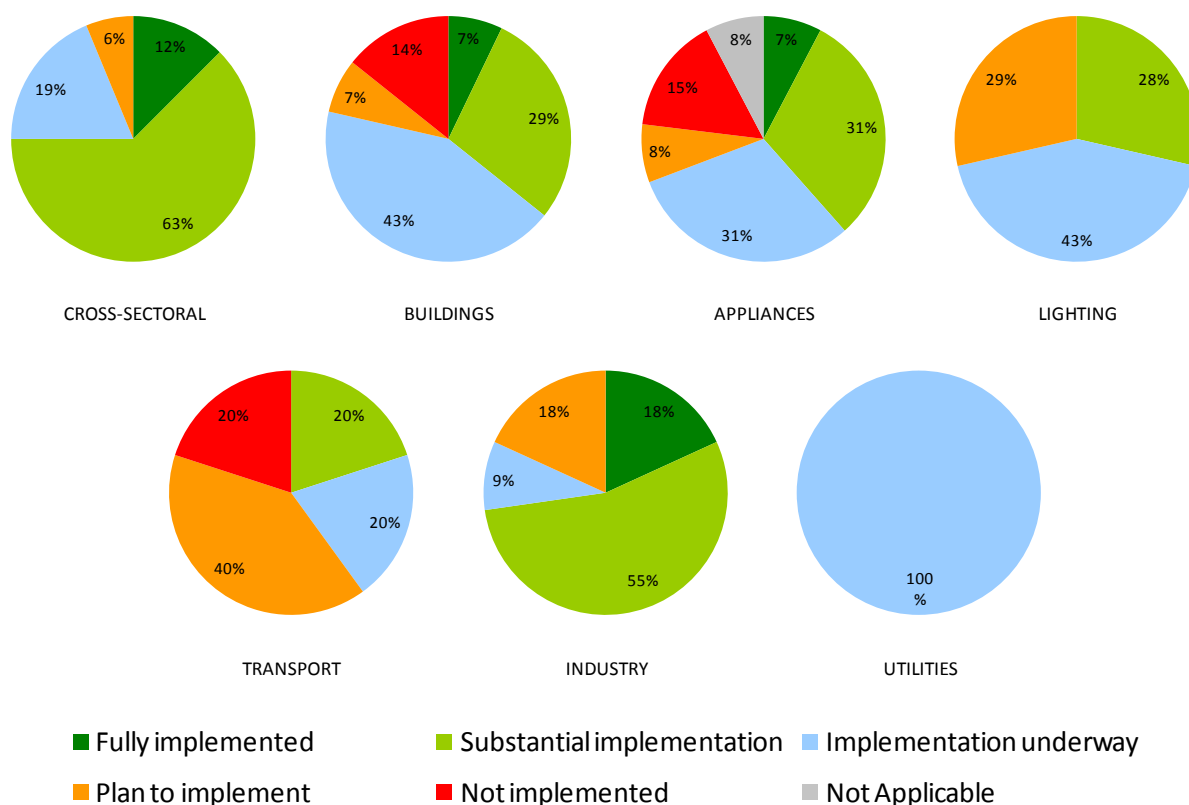
Canada has made some progress in the transport sector. Canada uses a mix of voluntary standards for vehicle fuel efficiency that are harmonised with US fuel efficiency regulations, a voluntary Memorandum of Understanding with the Canadian automotive industry to reduce greenhouse gas emissions through to 2012 and federally promoted eco-driving and tyre maintenance schemes. This



success should be built upon and further attention given to two areas. First, consideration needs to be given to mandatory fitting of tyre-pressure monitoring systems (TPMS) for heavy-duty vehicles (HDVs) and possible strengthening of the requirement for TPMS for light-duty vehicles (LDVs) from the fuel efficiency point of view. Explicit regulations for the fuel economy of heavy-duty vehicles are also needed.

International experience suggests that utilities can assist with delivering cost-effective energy savings. Canada should give further consideration to establishing incentives for utilities to promote energy efficiency.

### Canada's progress with implementing G8/IEA energy efficiency recommendations



## Energy Efficiency Progress Report – France

### Context

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France has pursued energy efficiency policies along with energy diversification since the oil shocks of the 1970s. These efforts are estimated to have saved 15 million tonnes of oil equivalent (toe) to date. Energy efficiency currently forms a key part of France's climate change mitigation, energy security and environmental policies. The government aims to reduce energy intensity by 2% per year by 2015, and 2.5% per year by 2030. Energy intensity has been steadily improving; final energy intensity decreased on average by 1.06% annually between 1990-2007 (see Figure 31). Around 0.6% of annual intensity improvements from 1990-2005 were due to end-use energy intensity gains, the rest were accounted for by changes in sector mix (see Figure 33 above). The national government is now aiming for specific energy efficiency improvements in the transport and buildings sectors.

### Strengths and innovations

France has a range of sound energy efficiency policies in place. In the area of lighting, France's building codes specify installed lighting energy limits related to recommended lighting levels. These building codes are further supported by mandatory building energy labelling and whole building energy performance requirements. Regarding the buildings sector more generally, the national government's 2007 Grenelle de l'environnement includes elements for a very active policy for efficient buildings at a national level. This includes a programme to facilitate a breakthrough of technology to ensure that by 2020, a majority of new buildings have extreme low energy consumption or are positive-energy buildings,<sup>24</sup> with an intermediate target that at least a third of all new construction be low, or positive, energy by 2013. The Grenelle strategy also provides for demonstration projects for positive energy buildings in the coming years and a gradual reduction of energy consumption in all new buildings. These ambitious objectives are now implemented in the Plan Bâtiment, whose core incentive, the Eco-Prêt à Taux Zéro (Zero-interest loan), will help spur investments to improve energy efficiency in existing private homes.

Funding for the zero-interest loan for energy efficiency improvements was doubled as part of France's economic stimulus plan. In addition, the 2009 Finance Law also provides a zero-interest loan for the purchase of a new or existing home which is significantly increased if the home exceeds current building code requirements (low- and positive-energy buildings). In addition, tax credits for interest paid on home acquisition or construction loans have been modified to ensure all construction meets latest thermal efficiency standards, and are increasingly preferential when current standards are exceeded.

France has had innovative financing products for the residential sector since 2007, when in partnership with banks low-interest loans for residential energy conservation projects were offered, financed through a special tax-free savings account.

In the appliances and transport sectors, EU Regulations and Directives apply. Recent special stimulus measures targeting automakers provide EUR 400 million in R&D for the development of innovative, low-carbon and efficient vehicles.

<sup>24</sup> This means that they produce more energy than they consume.



The Eco-Design Directive will improve the energy efficiency of all new products outside of the transport sector. Indirectly, further efficiencies will also be achieved in heavy industry and the heat and power sector as a result of the implementation of the European Union Emissions Trading Scheme.

### *Challenges and areas for improvement*

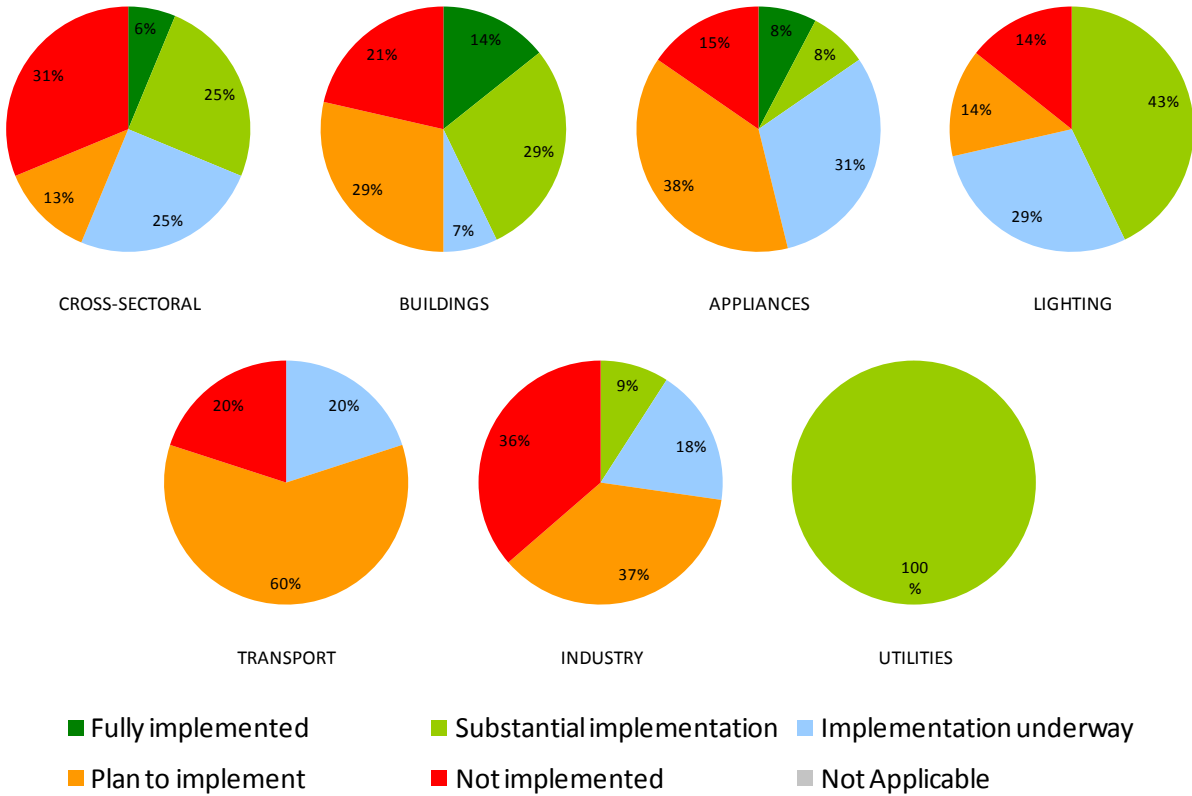
Despite achievements in energy efficiency in France, many areas for improvement of France's energy efficiency policy remain. The collection of data on buildings energy efficiency could be improved and studies of barriers in this sector are urgently needed. Ideally, such information can be used to develop a comprehensive policy package of measures to improve the energy efficiency of the new and existing building stock based on the declarations and targets set in the Grenelle. Still, the new renovated house ("Maison Rénovée") certification, which makes use of the Energy Efficiency Diagnosis (DPE) building efficiency grading scheme, is a significant step towards the establishment of a standardised efficiency measure in the construction sector.

With regard to transportation, an EU cap for fleet average CO<sub>2</sub> emissions of 130 g/km from new passenger cars will apply in full from 2015 onwards. Concerning the maintenance of tyre inflation pressure, which is an important fuel-saving measurement, the European Commission's proposal for the mandatory fitting of tyre pressure monitoring systems should be extended to heavy duty vehicles. It is also noted that the new car taxation scheme (bonus-malus system) is already in place in France and could be extended to favour green tyres, which improve fuel economy through better design.

Finally, enforcement of domestic laws and policies that transpose the EU energy efficiency directives is the responsibility of member states. Enforcement is important for maximising energy savings and for ensuring the credibility of the schemes. France needs to ensure that it has comprehensive legal and physical capacity so as to adequately enforce these policy measures and optimise their effectiveness.

## France's progress with implementing IEA energy efficiency recommendations

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## Energy Efficiency Progress Report – Germany

### Context

Since the oil shocks of the 1970s, Germany has promoted energy efficiency improvements across its economy, and particularly in the residential sector. Germany decoupled energy consumption from growth relatively early on in the 1970s, and since 1990, energy consumption has remained steady. Overall energy intensity has also been steadily improving since 1990, due to a combination of policy packages aimed at improving energy efficiency, as well as structural changes in the economy. Energy intensity has improved on average 1.89% per year between 1990 and 2007 (see Figure 31). Around 1.4% of this decline was due to energy efficiency improvements (see Figure 33 above).

Following its commitment under the European Union Energy Services Directive, Germany's 2007 National Energy Efficiency Action Plan (NEEAP) aims to achieve 9% energy efficiency improvement between 2007 and 2016, incorporating a target of 933 PJ, with an interim target of 510 PJ for 2010. Germany's measures target energy efficiency improvements in all sectors, with most projected energy savings coming from the residential sector, seen as holding untapped and cost-effective improvement potential.

### Strengths and innovations

Germany has made significant strides in its energy efficiency policy in recent years. With regard to the buildings sector, Germany is a global leader. Energy requirements in German building codes are set at the national level. The existing standards are currently being raised by 30% and will likely be raised again in 2012 by 30%. Once these improvements are achieved, it is expected that Germany's building code energy requirements will be close to the optimum of a 30-year least life-cycle cost. At the same time, Germany has different policies to support passive and other highly-efficient new buildings. These include subsidies and policies that ensure capacity development and information activities. Passive houses are hence taking a growing share of the market in Germany and related passive house technologies are becoming more commonly available in most parts of the country.

Additionally, Germany has a range of policies in place for the energy efficient refurbishment of existing buildings, including a high target to increase the refurbishment process in the old building stock. The German government just increased funding to the Kreditanstalt für Wiederaufbau (KfW) CO<sub>2</sub> building modernisation programme. In this example of innovative energy efficiency investment financing, the KfW, a non-profit public banking group, manages a loans programme for the refurbishment of old buildings and ecological construction. The goal of this programme is to help customers meet the increased upfront costs of energy efficiency refurbishment.

The Eco-Design Directive will also improve the energy efficiency of all new products outside of the transport sector. Indirectly, further efficiencies will also be achieved in heavy industry and the heat and power sector as a result of the implementation of the European Union Emissions Trading Scheme.

In the area of lighting, Germany, like other EU countries, has an established comparative energy label for household lamps and plans to develop new standards for office, residential and outdoor lighting products under the EU Eco-Design Directive. Germany also has relatively advanced architectural practices for "day lighting".

With regard to transportation, an EU cap for fleet average CO<sub>2</sub> emissions of 130 g/km from new passenger cars will apply in full from 2015 onwards. Concerning the maintenance of tyre inflation pressure, which is an important fuel-saving measurement, the European Commission's proposal for the mandatory fitting of tyre pressure monitoring systems should be extended to heavy duty vehicles.

### *Challenges and areas for improvement*

Despite its recent achievements, there remains room for Germany to further improve its energy efficiency policy portfolio. With regard to buildings, although policies exist to increase energy efficiency requirements for new buildings, national targets could be set to ensure a certain market share for passive houses, zero energy buildings and other ultra low-energy consuming new constructions by 2020, or building codes could be set to meet this target in all new buildings.

Enforcement of domestic laws and policies that transpose the EU's energy efficiency directives is the responsibility of member states. Enforcement is important for ensuring energy savings are maximised and for ensuring the credibility of the schemes. Germany needs to ensure that it has comprehensive legal and physical capacity so as to adequately enforce these policy measures and maximise their effectiveness.

In the industrial sector, Germany should move forward with its plans to adopt mandatory minimum energy performance standards for electric motors in line with international best practice. It should also examine barriers to the optimisation of energy efficiency in electric motor-driven systems and then implement comprehensive policy portfolios aimed at overcoming such barriers.

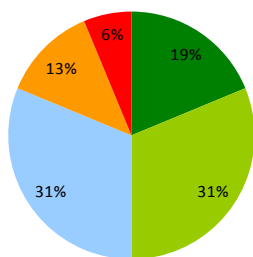
Germany should also continue to strengthen its policies to assist small and medium-sized enterprises (SMEs) implement energy efficiency. The increase in resources allocated to the special fund for energy efficiency in SMEs is important. The government should further strengthen this by ensuring that the planned project "Partnership for Climate Protection, Energy Efficiency and Innovation"<sup>25</sup> is implemented without delay and that this project encourages energy audits, provision of energy efficiency benchmarking information as well as the adoption of least-life-cycle cost capital acquisition.

Germany also needs to consider enhancing the incentives for utilities to promote energy efficiency. This can include establishing policies to decouple utility revenue and profits from energy sales or allowing energy efficiency measures to be bid into energy pools.

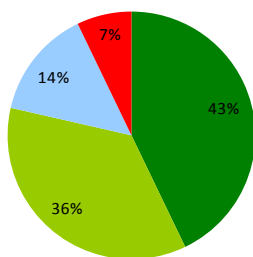
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<sup>25</sup> A collaborative project between the Federal Ministry of Economics and Technology (BMWi) and the Federal Ministry for the Environment, Nature Conservation and Nuclear Safety (BMU) together with the Association of German Chambers of Industry and Commerce (DIHK).

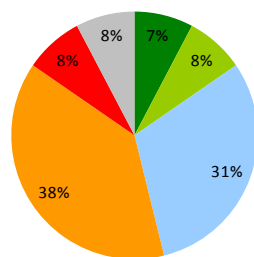
## Germany's progress with implementing G8/IEA energy efficiency recommendations



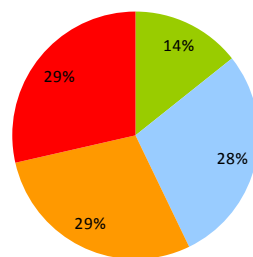
CROSS-SECTORAL



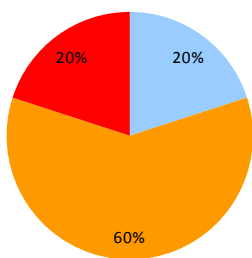
BUILDINGS



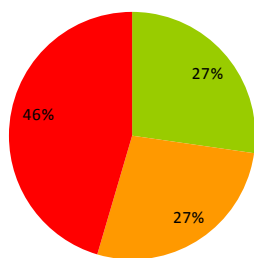
APPLIANCES



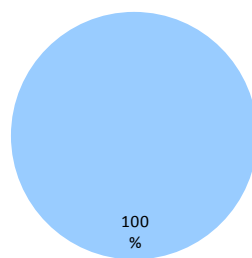
LIGHTING



TRANSPORT



INDUSTRY



UTILITIES

- Fully implemented
- Substantial implementation
- Implementation underway
- Plan to implement
- Not implemented
- Not Applicable

## Energy Efficiency Progress Report – Italy

### Context

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As President of the G8, and host of the 2009 Summit, Italy is ideally placed to provide leadership on energy efficiency policy. Recently, Italy has taken stronger national action in this regard, introducing in 2007, its national energy efficiency action plan (NEEAP) which set an overall energy efficiency target of 9.6% by 2016.

Compared to other IEA countries and major economies, Italy's energy intensity has traditionally been low (in terms of TPES per unit of GDP). Italy's energy intensity was at or below that of all other G8 countries from 1990 to 2007. However, while the energy intensity of many other IEA countries has constantly improved over the past thirty years, Italy's energy intensity has remained relatively stable since the early 1980s and is now at a similar level to the average for IEA European countries. From 1990-2007, Italy's energy intensity improved on average 0.25% per year (see Figure 31). Intensity improvement is due more to reduced activity than to improved end-use energy efficiency, with the latter actually decreasing, largely because of increased energy intensity in the services sector (see Figure 33).

### Strengths and innovations

In the recent past, the Italian administration has made a number of amendments to energy efficiency policy, some of which could have a significant impact on energy efficiency. The White Certificates Scheme was amended by Inter-ministerial Decree, and its duration extended from 2009 to 2014. The White Certificates scheme is an ambitious instrument to take advantage of Italy's energy efficiency potential, aimed at promoting energy efficiency and delivering emission reductions in all energy end-use sectors.

The transposition of EU Energy Services Directive into domestic law has continued. These changes have been, in some cases, supported by fiscal changes in annual budget laws.

The Eco-Design Directive will also improve the energy efficiency of all new products outside of the transport sector. Indirectly, further efficiencies will also be achieved in heavy industry and the heat and power sector as a result of the implementation of the European Union Emissions Trading Scheme.

Italy has been particularly proactive in providing financial support for energy efficiency. The 2008-2011 Economic and Financial Programming Document recently approved by the Italian Government provides for the pursuit and extension of fiscal measures to encourage energy efficiency of buildings and energy use equipment. Draft Law no. 691 (currently being discussed in Parliament) also provides specific authority for the Government to boost energy saving and renewable energy sources.

Also, articles 351 and 352 of Budget Law 2007 included funding of EUR 15 million for three years (2007-2009) to underwrite a provision allowing a tax deduction worth 55% of the total amount of 2007 expenditures for the implementation of projects to enhance the energy efficiency of buildings.

The Budget Law 2008 confirmed the above fiscal incentives and added further measures including; the extension of the above scheme to 2010 and the expansion of the range of eligible measures to include expenditure related to the replacement of heating plants with heat pump and geothermal



low enthalpy systems. Specific measures targeted at the industrial sector in the Budget Law of 2007, Articles 1110 to 1115, include a provision to facilitate the establishment of a revolving fund of EUR 200 million per year to provide financial assistance to the sector to encourage the installation of higher performance technologies and the development of new low emissions or zero emissions energy sources and technologies.

Budget Law 2007 included provisions for the establishment of a Sustainable Mobility Fund of EUR 90 million per year for three years (2007-2009) to provide incentives for the enhancement of energy efficiency and the environmental sustainability of motor vehicles.

## Challenges and areas for improvement

Despite Italy's achievements in energy efficiency, there remain many possibilities for the country to improve its energy efficiency policy portfolio. Although the government has made recent efforts to establish a national energy efficiency action plan, Italy still lacks a comprehensive and consistent, evidence-based energy efficiency strategy. This should include short and long-term targets, within an overall framework reaching at least up to 2020.

One indicator of potential risks from the absence of an energy efficiency strategy is the overlapping of incentives, in particular in the case of the building sector. Here the recent fiscal incentives significantly overlap the white certificates incentives, while further regional incentives could also apply. The risk of double- or triple-funding of measures is increased by the lack of a co-ordinating body between the different agencies responsible for energy efficiency at the national, regional and provincial level. The Italian government should therefore consider establishing a robust monitoring mechanism preventing access to multiple subsidies for the same measure.

Further actions are also required in the financial sector to ensure future investment in energy efficiency. The Italian government can do more to encourage financial institutions to provide training to their staff on energy efficiency products. There is also a need for the Italian government to support the development of criteria and financial tools for evaluating energy efficiency projects.

The white certificates scheme has delivered significant positive results so far, including the gradual development of new forms of partnership among various stakeholders. However, the scheme would benefit further from the development of complementary initiatives aimed at helping consumers get access to information on energy saving opportunities. The commendable efforts by government and the energy regulator to improve the working of the scheme are compromised by the absence of a comprehensive evaluation of the cost effectiveness and lessons from the white certificates scheme.

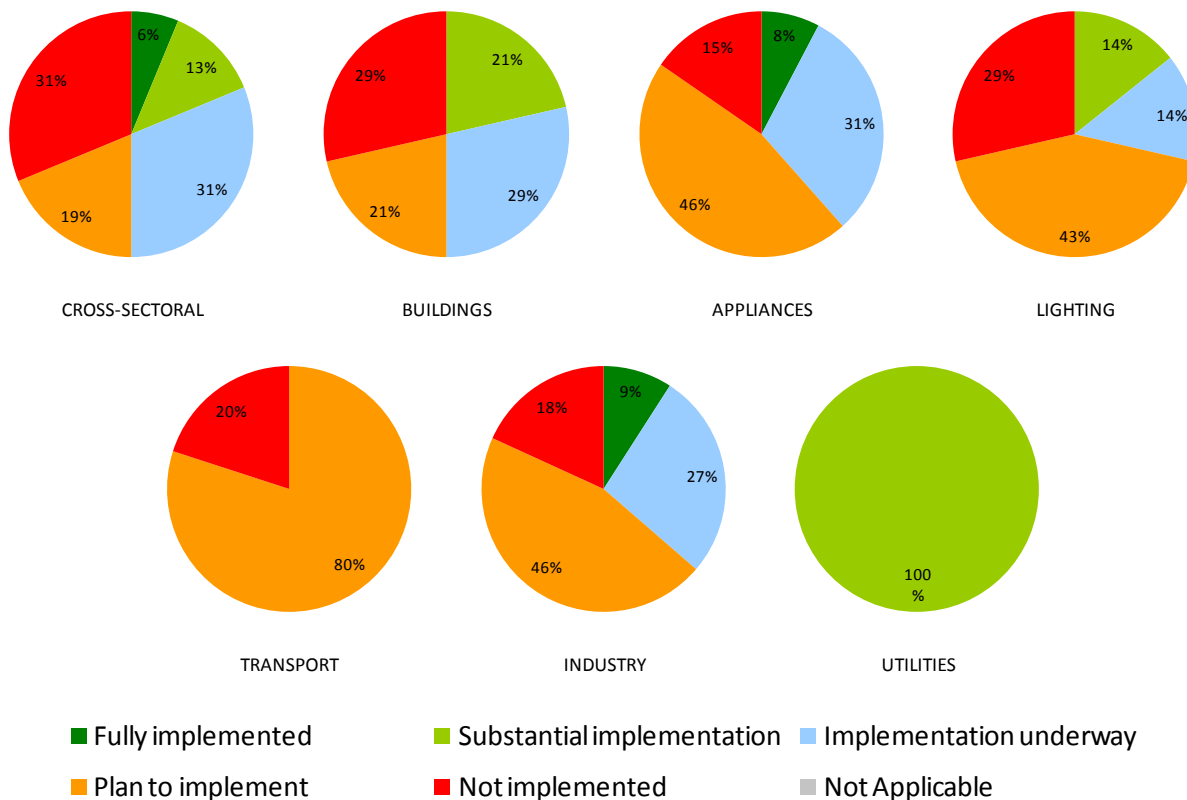
There is significant potential to substantially strengthen the energy efficiency of Italy's building stock. Italy urgently needs to transpose the Energy Performance of Buildings Directive (EPBD), ensure this is fully implemented in all regions and substantially strengthen energy efficiency requirements for both new and existing buildings. Italy also needs to establish policies to support the construction of passive, zero or other ultra low energy consuming buildings. In the area of lighting, there is scope to add specific lighting provisions within building codes.

In the industrial sector, Italy's NEEAP fails to provide a clear road map as to how much of the savings can be achieved in the absence of explicit measures. Nor does the NEEAP contain clear messages on necessary actions relating to energy collections and auditing for industry, which could help to realise some of the country's energy savings potential in this sector.

More generally, implementing measures under the revised EU Labelling and Eco-Design Directives will represent a considerable expansion of mandatory requirements for appliances in Europe. Italy

needs to ensure that it has comprehensive legal and physical capacity to enforce these policy measures adequately and maximise their effectiveness.

### Italy's progress with implementing G8/IEA energy efficiency recommendations



## Energy Efficiency Progress Report – Japan

### Context

Japan has improved energy efficiency by around 30% in the last 30 years as a result of action undertaken by the public and private sectors. Japanese primary energy consumption per GDP is one of the lowest in the world owing to vigorous energy conservation measures taken for various sectors. However, since the mid-1980s, this improvement has levelled off somewhat, with an average annual decline in energy intensity of 0.61% between 1990 and 2007. In Figure 31, Japan's reduction in energy consumption per GDP during this period was due to a decrease in the ratio of demand for energy services to GDP, whereas end-use intensities accounted for a very small portion of intensity reduction during this period (see Figure 33 above). As a result, Japanese energy intensity advantage over other countries has steadily eroded. The Japanese government is now aiming for an improvement of at least another 30% in terms of final energy consumption per unit of GDP by 2030 compared with 2003.

Energy conservation measures in the industrial sector, which accounts for the largest portion of the energy consumption in Japan, the civil (commercial/residential) sector and transport have been enhanced in a broad range of fields through regulation and government support programmes.

### Strengths and innovations

Japan has strong energy efficiency policies for many sectors, particularly the industrial sector. The Act on Rational Use of Energy provides a mandatory energy management system, designation of qualified energy managers and a reporting and monitoring scheme for industrial energy consumption, as well as periodic reporting on energy saving plans. The act has been amended and is estimated to cover about 90% of industrial energy consumption and 50% of commercial energy consumption. Also, by this recent amendment of the Act, sectoral benchmarking has been introduced as a measure to assess companies' efforts and level of energy efficiency. Sectoral indicators and targets have been set for each of the sub-sectors in energy intensive industries. This amendment also has strengthened the regulations for housing and building sectors; it has introduced a system of penalties against failure to meet reporting obligations and expanded the application of the reporting obligation to even small and medium-sized houses and buildings.

Japan has an innovative policy to promote energy efficiency in appliances and equipment. Through the Top Runner programme, Japan encourages competition among private companies to improve energy consumption efficiency. Japan will expand the scope of the target equipment and appliances of this programme, which currently covers 21 categories of equipment and appliances, to include commercial-use equipment and will review the energy efficiency standards of the appliances upon the arrival of the target year. The programme covers about 70% of energy consumption in the residential sector.

Japan has comprehensive energy demand and supply data in the General Energy Statistics database and a robust system for tracking energy consumption in the industrial sector – especially after the improvement of the statistical methodology underlying the system in 2002.

The government has been supporting private-sector business operators investing in energy conservation measures through the introduction of energy-efficient equipment and the



development of energy conservation technologies (budgets, tax schemes and policy-based finance). In the METI (Ministry of Economy, Trade and Industry) alone, annual budgets related to energy efficiency, excluding the recent stimulus package, amount to JPY 100 billion.

In the transport sector, Japan is the only country in the world with fuel standards for heavy-duty vehicles. These Top Runner standards were established in March 2006 and require vehicle makers to improve fuel economy so as to ensure the average fuel economy for each weight category of each vehicle type exceeds the standard value by the 2015 target year.

Japan has addressed access to finance, a key barrier to energy efficiency, for instance through its Flat 35 energy efficiency programme for the housing sector. In 1996, the Japanese government introduced energy efficiency criteria to the Flat 35 scheme for building renovation loans. To receive the loan, applicants need to demonstrate that their building renovation meets at least the 1980 thermal regulation for buildings. The Flat 35 scheme serves a triple purpose by offering preferential loans to the customer, reinforcement and certification of the thermal regulation, and security to the commercial financial institution offering the loan to customers.

### *Challenges and areas for improvement*

Despite being an international leader in energy efficiency policy, Japan can make improvements to energy efficiency in several areas. Mandatory building requirements for energy efficiency should be further strengthened to include all types of residential, commercial and public-use buildings regardless of the size of the buildings. Further action should be taken to promote ultra low energy and zero energy buildings.

In the transport area, the Japanese government launched a debate on the adoption of an internationally compatible method of testing tyre rolling resistance and labeling low-resistant tyres. It is also considering ways to properly manage tyre pressure, including mandatory installation of tyre-pressure monitoring systems and consciousness raising. Japan should move quickly on these issues.

Although the Act on the Rational Use of Energy addresses lighting in residential buildings, Japan could do well to expand policies to manage lighting and illumination of unoccupied spaces and ensure the planned implementation of policies to promote efficient lighting in non-residential buildings. Japan could also adopt measures to phase out mercury vapor street lighting.

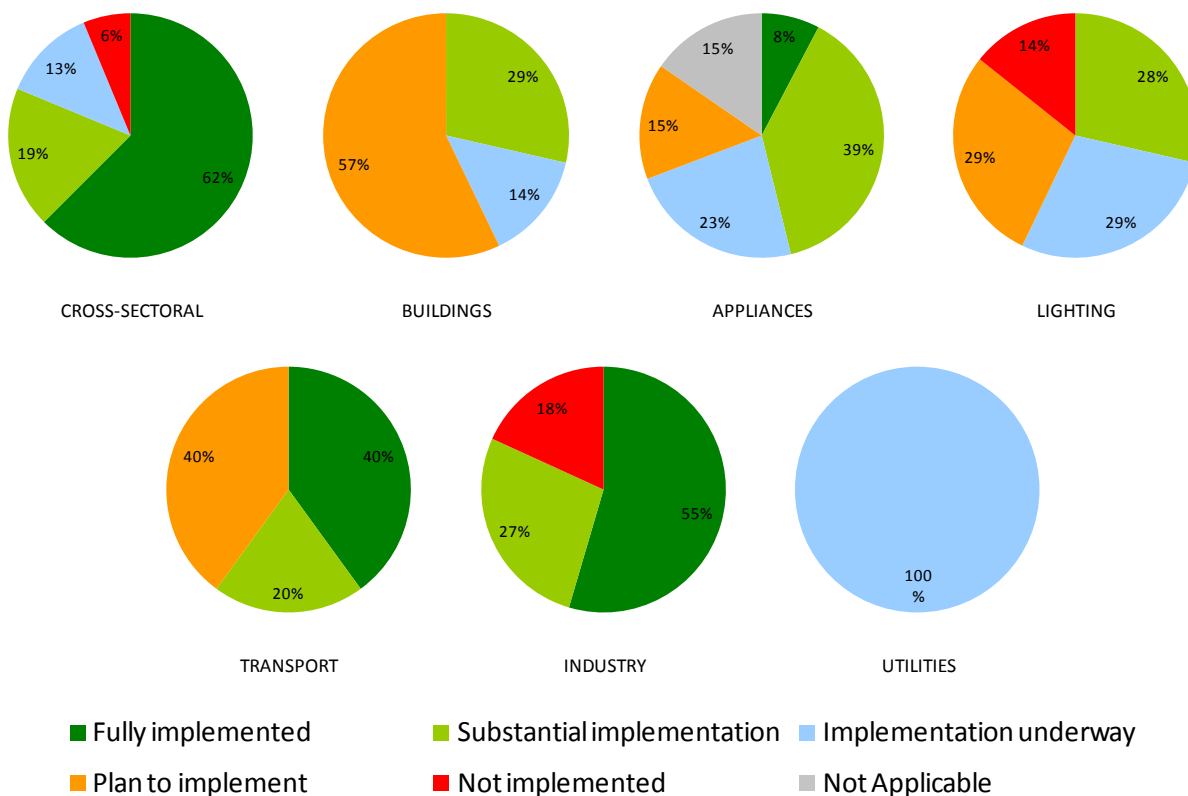
With respect to appliances and equipment, verification and enforcement processes form a vital component of national standards and labelling programmes. They ensure the credibility of the scheme for consumers, and safeguarding investments made by manufacturers in more efficient products. A high degree of transparency and visibility in these processes therefore not only acts to deter non-compliance, but provides confidence to participants. The system used in Japan, which is based on self-declaration by manufacturers of both performance and sales data, contains many elements of a good verification and enforcement regime. However, it would benefit from greater transparency, such as the regular publication of testing results, data on non-compliance and the results of enforcement action, and increased verification of sales data.

Performance targets for products under the Top Runner programme have tended to be set according to market and engineering analysis. An alternative approach used in some countries is to aim for performance levels that reflect least life-cycle cost and may yield more ambitious targets and improve the impact of this programme.





## Japan's progress with implementing G8/IEA energy efficiency recommendations



## Energy Efficiency Progress Report – Russia

### Context

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Energy efficiency is a key part of Russia's energy strategy. This is appropriate given that energy intensity in Russia is one of the highest in the world – due to several natural factors including climate, territorial size and importance of energy-intensive industry for the Russian economy.

Russia's energy intensity has reduced dramatically in the past decade. Russia leads G8 countries in energy intensity decline from 1990 to 2007 with an average improvement of 2.5% per year. From 2000 to 2007, Russian energy intensity experienced an even higher rate of decrease with an average annual decrease of 5.3%. Data is not available to decompose changes in Russia's energy intensity. However, given the recent increase in international hydrocarbon prices and the subsequent growth in Russia's GDP, 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.

Significant untapped energy efficiency potential remains in Russia. It is estimated that consumption per unit of output can be reduced an additional 40-50% from 2000 levels. Moreover, energy efficiency improvements in Russia's district heating sector could save up to 80 billion cubic meters a year. Optimization of its natural gas sector transmission and distribution systems as well as reductions in gas flaring by its oil industry could save a up to a further 30 billion cubic metres of gas per year.

### Strengths and innovations

Russia has made significant steps in improving its energy efficiency policy framework over the past few years. Recently, Russia announced a target to reduce energy intensity (energy use per unit of GDP) by 40% by 2020. A Presidential decree on "Certain Measures for Improving the Energy and Ecological Efficiency of the Russian Economy" in June 2008 outlined ambitious measures for achieving this goal.

Pursuant to this decree, the Russian Ministry of Energy formulated a comprehensive action plan (Plan) for the implementation of improvements in energy efficiency across the Russian economy. The Plan sets targets and outlines measures for energy efficiency improvements in different sectors of the economy. It includes the development of a modern legal and regulatory framework and the establishment of institutional structures. The use of codes and energy efficiency passports are useful tools to ensure effective implementation and monitoring of progress. The Plan also envisages the need for state support and the creation of a favourable investment climate to encourage energy efficiency investments. Key also is interaction with the business community and financial institutions on the basis of a public-private partnerships and informational and educational support for measures at the international, federal, regional and municipal levels.

Much of the IEA's assessment in this report is based on the Plan, a key focus of the Russian submission to this process. It is encouraging to see statements by the highest political figures in Russia reflecting the political will to make changes and raise the profile and awareness of Russia's large energy efficiency potential. The key to meeting these important targets will be effective implementation.



In addition to the Plan, Russia has built the basis for robust energy efficiency improvements in the buildings sector. Its national building code for energy efficiency includes relatively strong requirements for new buildings.

Russia also has a plan to phase out incandescent lighting. Effective implementation in this area will be a major step forward. The restructuring of Russia's electricity sector should also provide an opportunity for energy efficiency investments.

### *Challenges and areas for improvement*

There remains significant room for improvement of Russia's energy efficiency policy framework. In particular, Russia needs to urgently improve its collection of energy efficiency indicator related data. In this regard, the IEA, with the support of the UK government, is working with Russia and its State Statistics Service on establishing energy efficiency indicators. These indicators will assist Russian energy policy makers with setting priorities and monitoring progress with implementation of energy efficiency policies and initiatives.

In order to realise savings in the appliance sector comparable to those of other countries, Russia should implement, without delay, a standards and labelling programme. This would be especially effective in Russia given the massive turnover in appliance stock which is currently taking place.

In the building sector, there is room for improvement. Existing Russian buildings use as much as 50–100% more energy than buildings in OECD countries in similar climates. Policies should be developed to ensure that existing buildings are upgraded when they undergo improvements and refurbishments. A policy package in the buildings sector could include incentives, information and certification schemes. In addition, it is important that Russia ensures that the national model code is implemented as mandatory requirements for new buildings (Building Codes) in all regions, and that enforcement systems are developed. Over time, the codes should be based on minimising costs over a 30 year lifetime. Codes should also move towards passive energy or zero energy building requirements.

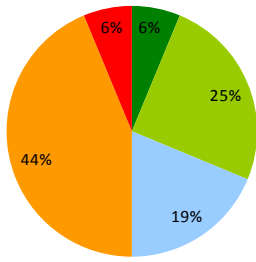
Large energy savings can also be made in Russia by implementing policies to address the efficiency of energy-related products. That is, those products that don't necessarily use energy, but nonetheless affect energy efficiency such as windows and glazed areas. The EU's new EcoDesign Directive now includes such products. Russia would benefit greatly from extending their policies to cover energy-related products.

More active Russian government policy making and implementation is encouraged in the transport sector. A holistic energy efficiency transport policy is needed if Russia is to take advantage of the massive energy savings potential in this sector.

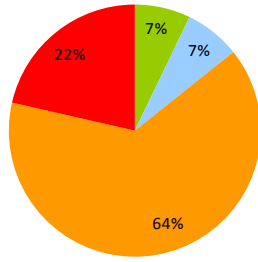
Regarding industrial energy efficiency, further improvements are needed in two areas. First, Russia should examine barriers to the optimisation of energy efficiency in electric motor-driven systems and design and implement comprehensive policy portfolios aimed at overcoming such barriers. The IEA also encourages the Russian government to provide effective assistance in the development of energy management capabilities and encourage the appointment of full-time energy managers within industry to focus on streamlining and cutting energy use and costs. Russia has a highly qualified pool of engineers and physicists who could be called upon to assist Russia meet its major efficiency targets, while enhancing the competitiveness of Russia's industrial sector.

## Russia' progress with implementing G8/IEA energy efficiency recommendations

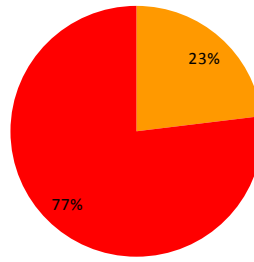
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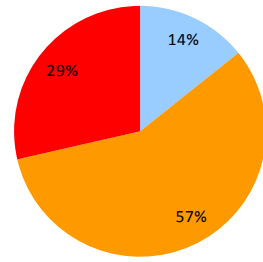
CROSS-SECTORAL



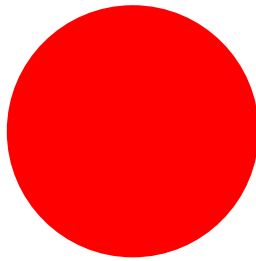
BUILDINGS



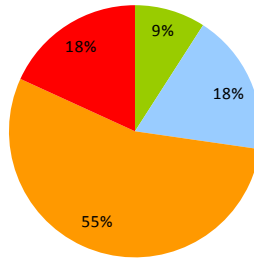
APPLIANCES



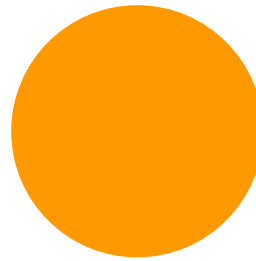
LIGHTING



TRANSPORT



INDUSTRY



UTILITIES

■ Fully implemented     
 ■ Substantial implementation     
 ■ Implementation underway  
■ Plan to implement     
 ■ Not implemented     
 ■ Not Applicable

## Energy Efficiency Progress Report – United Kingdom

### Context

The UK pursues energy efficiency as a central component of its energy policy and seeks to achieve an 18% reduction in energy consumption between 2007 and 2016 across all sectors.

Total final energy consumption in the UK rose considerably less than in OECD countries as a whole between 1973 and 2004. The role of energy efficiency in climate change mitigation policies has been emphasised particularly since 2003, when the government set the goal of aiming for 50% of the UK expected GHG emission reductions to 2020 to come from energy efficiency improvements. Between 1990-2007, the UK achieved 2.34% in annual energy intensity improvement (see Figure 31), second only to Russia in the G8, and in 2005, the UK overtook Italy as the G8 country with the lowest energy intensity (PPP adjusted). During this period, the decrease in energy intensity was largely due to reduced demand for energy services per unit of GDP, with end-use efficiency improvements levelling off at around 0.5% per year (see Figure 33 above).

### Strengths and innovations

The UK energy efficiency policy portfolio has many strengths. The UK has made good progress across the buildings sector – implementing measures to strengthen building codes based on a zero carbon approach, setting objectives for passive energy houses, constructing a package of initiatives to address market barriers and making information available to all actors in the building sector. Furthermore, the UK has building codes that specify installed lighting energy limits that are related to the recommended light levels. And as of October 2008, all buildings whenever sold, built or rented will need an Energy Performance Certificate. The UK minimum energy performance standards for buildings will be increased by steps in 2010 and 2013 so that by 2016, all new-build dwellings will be zero carbon. There are plans for these requirements to extend to non-residential buildings by 2019.

In the area of appliances and equipment, a major component of UK policy entails transposition and implementation of the Eco-Design Directive. Implementation will improve the energy efficiency of all new products outside of the transport sector.

Indirectly, further efficiencies will also be achieved in heavy industry and the heat and power sector as a result of the implementation of the European Union Emissions Trading Scheme. The UK has made other advances in the industrial sector. The UK Carbon Trust encourages implementation of comprehensive energy management procedures and practices and provides a comprehensive package of energy and carbon management advice and information for business and the public sector.

### Challenges and areas for improvement

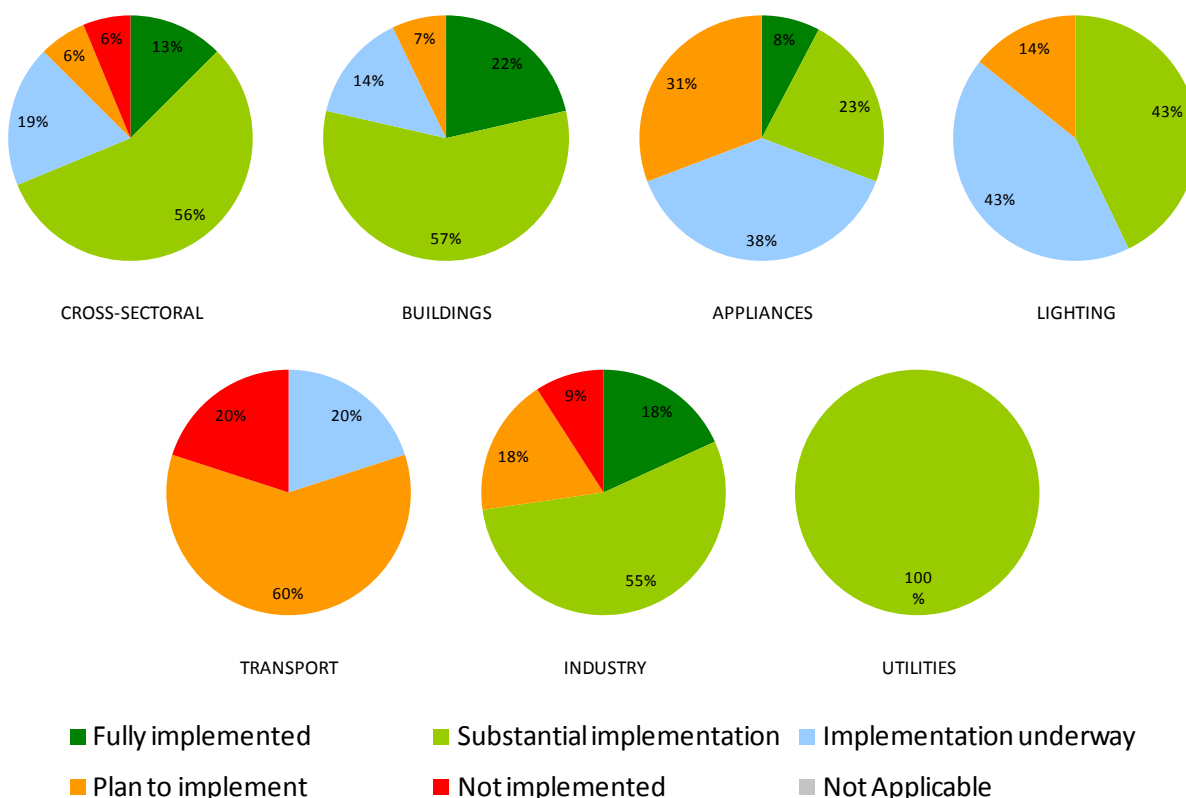
There remains room for improvement of the UK energy efficiency policy. EU-wide measures for fuel efficiency tyre standards should be implemented without delay. The UK should also encourage the EU to develop mandatory fuel efficiency standards for heavy-duty vehicles.

In the utility sector, the UK has promoted innovative policies including its successful Reduction Target (CERT). The UK government should consider complementing the CERT with policies that decouple utility revenue and profits from energy sales in order to allow energy savings to compete on equal terms with energy sales. The UK government should also consider establishing policies that would allow energy efficiency measures to be bid into energy pools on an equal basis with energy supply options.

There is also room for improvement with respect to policies promoting the financing of energy efficiency – particularly from the private sector. The Warm Front Programme and other fuel poverty programmes are limited in scope as they target only the low-income segment of the population. Although the UK can be praised for the extension of the Landlord’s Energy Saving Allowance to cavity wall and loft insulation, the country still needs to conduct an overview of the entire fiscal regime as well as promote the implementation of a national measurement and verification protocol for energy efficiency.

Finally, enforcement of domestic laws and policies that transpose the EU energy efficiency directives is the responsibility of member states. Enforcement is important for maximising energy savings and for ensuring the credibility of the schemes. The United Kingdom needs to ensure that it has comprehensive legal and physical capacity so as to adequately enforce these policy measures and optimise their effectiveness.

### UK’s progress with implementing G8/IEA energy efficiency recommendations



## Energy Efficiency Progress Report – United States

### Context

Energy efficiency has been a feature of US energy policy since the 1970s. Viewed originally as a way to reduce dependence on foreign oil, energy efficiency measures have led to significant improvements in US energy intensity and are now seen to be the most cost-effective way to mitigate GHG emissions. Between 1990 and 2007, energy intensity improved at an average of 1.63% per year (see Figure 31). Over 1% per year of this improvement was due to reductions in end-use energy intensity (see Figure 33 above).

While the United States made energy efficiency gains in new appliances, equipment, lighting and vehicles in 2008, most analysts agree that substantial further gains are economically justified.

The significant economic downturn in the United States and the inauguration of a new President in January 2009 led to important changes in energy efficiency policy. The 2009 economic stimulus package includes new energy efficiency-related initiatives and substantial additional funding for existing programmes. The direct and indirect funding for these programmes totals more than USD 30 billion and will be spent over two years. This funding for energy efficiency programmes and incentives is more than five times greater than the 2008 levels. The new Administration has also indicated that among its top priorities will be actions to increase the scope and stringency of vehicle fuel economy and appliance and equipment efficiency standards.

### Strengths and innovations

The US government has shown broad support for energy efficiency in the 2009 stimulus act, the Fiscal Year 2009 appropriations bill and in other recent energy policy proposals. Existing energy efficiency programmes and investments across sector lines and at federal, state and local levels will be strengthened by increased funding, as will new programmes outlined in the stimulus package.

One new funding initiative included in the 2009 stimulus is the “Energy Efficiency and Conservation Block Grants” programme. USD 3.2 billion will go to local governments for efficiency-related initiatives. Some grants will be awarded through a competitive process, and others will be available by application.

Relating to the transportation sector, the United States is ahead of other G8 countries in requiring all light-duty vehicles manufactured after September 2007 to contain tyre pressure monitoring systems. There have also been extensive public and private information campaigns promoting proper inflation of tyres. Recent stimulus funding increased the plug-in hybrid electric vehicles tax credit and provided significant funding to various battery, alternative fuel and high efficiency vehicle programmes.

In terms of energy management, the United States is a leader in supporting industrial energy efficiency programmes at the state level that encourage industries to improve energy management activities and adopt more energy efficient end-use technologies and practices. Related to utilities, the stimulus allocated USD 4.5 billion for investment in transmission, distribution and end-use metering systems for smart grids. The United States is also a leader in utility-based demand-side management programmes, with most states having implemented regulation or other measures encouraging utilities to deliver end-use efficiency improvements.

USD 300 million of stimulus money will go to efficient appliance rebates and Energy Star programmes that provide consumers with the opportunity to select the most efficient models on the market. The Energy Star efficiency label covers 50 different categories of products and has been successful in putting efficient appliances on the market, resulting in energy and cost savings. In response to the growing energy consumption of appliances and the penetration of new technologies, the Energy Star label now applies to all types of televisions, and to energy used in all modes of operation (*i.e.* including standby, etc.). In the lead-in to the switch to digital TV in 2009, Energy Star has also developed a labelling programme for set-top boxes and TV Service Providers, enabling householders to choose the most energy efficient services.

Another successful US residential programme, the Weatherisation Assistance Programme (WAP), has received an additional USD 5 billion in stimulus money. Running since 1976, the WAP targets low-income households and improves the energy efficiency of homes to reduce energy costs. Careful programme evaluations have demonstrated that the improvements have been cost-effective, and the programme has resulted in significant energy savings. Expanding funding for the programme and thus the number of homes that can be targeted is a welcome move.

In the area of lighting, the USA has gradually expanded the scope of its standards and labelling programme to cover an increased number of lighting products and adopted regulations to phase-out inefficient incandescent lamps.

### *Challenges and areas for improvement*

The recent growth in energy efficiency policy activity comes with its challenges. The United States must effectively manage the rapid growth of its energy efficiency programme activity and investment to improve energy efficiency policy in several sectors. Given the short time frame for spending the increased budget allocation to energy efficiency, this will not be easy.

In the buildings sector, two improvements are needed in the energy efficiency components of building codes. The model codes developed with support from the federal government should be strengthened by basing them on a 30 year life time optimum. Second, there are significant variations in the quality of energy efficiency requirements in building codes across the states. The federal government needs to encourage the implementation and enforcement, in all states, of energy efficiency requirements and should encourage every state to adopt mandatory building codes. An important step toward this objective was taken recently when all states receiving energy-related stimulus funds were required to commit to full implementation of current model energy codes.

In the area of appliances and equipment, the verification and enforcement processes form a vital component of national standards and labelling programmes, ensuring the credibility of the scheme for consumers, and safeguarding investments made by manufacturers in more efficient products. A high degree of transparency and visibility in these processes therefore not only acts to deter non-compliance, but provides confidence to participants. The system used by the US Department of Energy (DOE), which is based on self-declaration and the mutual oversight of competing manufacturers, has ensured nearly universal compliance with US energy efficiency standards and labelling requirements. However, the system would benefit from greater transparency, such as the regular publication of testing results and the periodic conduct of independent tests. The capacity of DOE to undertake these tasks on a regular basis has not kept pace with the expanding scope and activity of the programme. Therefore, further increases in capacity together with the development of new oversight and enforcement procedures are warranted.

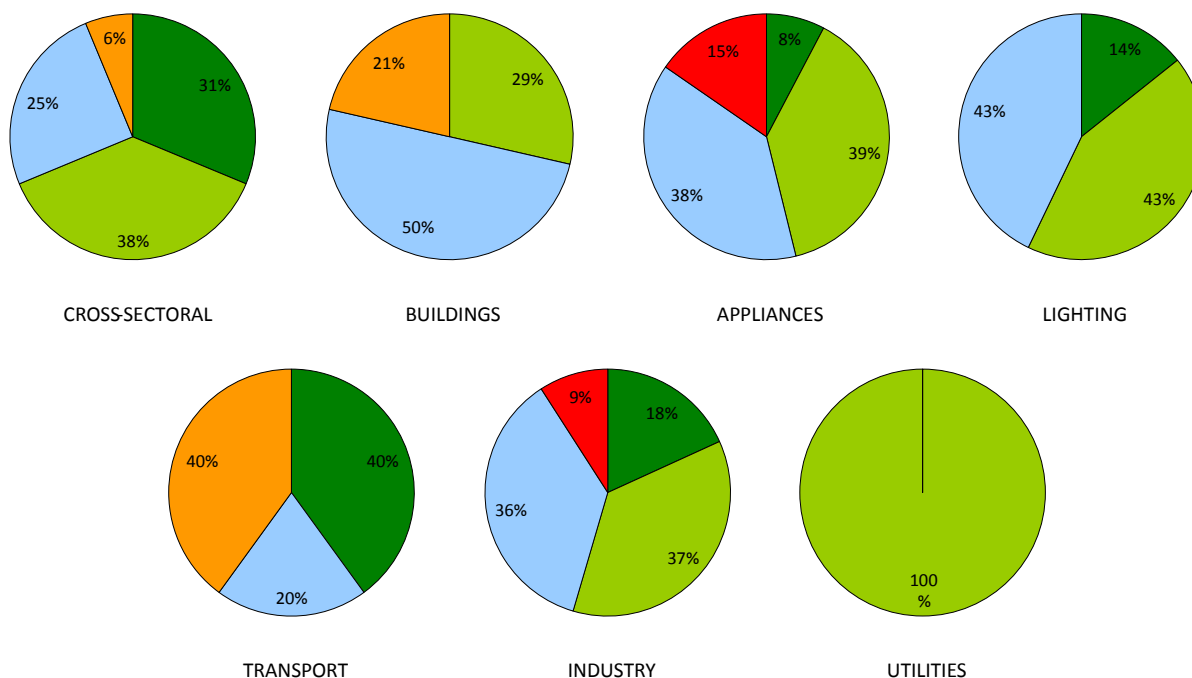




The United States has recognised that improvements to fuel-efficiency standards are needed. The US Department of Transportation (DOT) has recently established more stringent fuel economy standards for all light-duty vehicles. DOT has also been required by the US federal government to establish procedures for rating the rolling resistance of tyres and disseminating these ratings to consumers by the end of 2009. In conjunction with these efforts, the United States should consider establishing labelling, and possibly maximum rolling resistance limits, where appropriate, for road-vehicle tyres.

To assist financing energy efficiency, the USA is the only country with an existing protocol (the IPMVP) for measuring energy efficiency savings. The IPMVP is an important element for promoting finance for energy efficiency. However, it has not been adopted nationally and could benefit from further promotion by the federal government.

### US' progress with implementing G8/IEA energy efficiency recommendations



- Fully implemented
- Substantial implementation
- Implementation underway
- Plan to implement
- Not implemented
- Not Applicable

## Call to action

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Leaders at G8 Summits, and other high-level energy and environment events, have declared an intention to take more active measures regarding energy efficiency. At the G8 Summit in 2008, leaders committed to “*maximise implementation of the IEA 25 recommendations on energy efficiency*”.

Many countries have begun the process of implementing energy efficiency policies. Indeed, action in some countries and sectors has been impressive. For example, this analysis has highlighted the beginnings of a comprehensive energy efficiency policy framework in Russia, innovative financial instruments in Germany, France, and Japan, the widespread adoption of standby power policies and policies to phase out inefficient lighting, measures to promote proper inflation of tyres in the USA and Canada, and innovative policies to create incentives for utilities to promote energy efficiency in the UK, France, Italy and the USA.

However, more action is urgently needed. No country has captured the full potential available from the G8/IEA recommendations or similar measures. Furthermore, preliminary analysis indicates that this action gap is not unique to G8 countries.

What is the cause of this action gap? And why is it that G8 countries have not yet captured the full cost-effective potential available in these recommendations their leaders have endorsed? Energy efficiency continues to face pervasive barriers including lack of access to capital for energy efficiency investments, insufficient information, principal-agent problems and externality costs that are not reflected in energy prices. G8 leaders’ commitment to maximising implementation of energy efficiency policies may also have been challenged by the current economic crisis. Energy efficiency programmes must compete for funding with other priorities such as employment, health and social security. When making decisions about how to allocate limited resources, governments should keep in mind that the benefits of implementing energy efficiency extend beyond energy security and climate change mitigation. Experience shows that energy-efficient investments can deliver significant co-benefits – including job creation and health improvements. Several G8 countries have recognised these co-benefits and allocated substantial stimulus funds to energy efficiency efforts. The IEA supports this increase in funding for energy efficiency and urges other governments to also enhance the resources allocated to energy efficiency. Allocating resources to energy efficiency can kill many birds with one stone.

To address the action gap the IEA concludes that energy efficiency policy action is needed across two dimensions: action in G8 countries, and broader leadership of global energy efficiency action beyond the G8.

## Energy efficiency action in G8 countries

This report has demonstrated that if G8 countries are to achieve their energy, environment and economic development goals, urgent targeted action is needed across all sectors. These actions are outlined in Table 4 below.



INTERNATIONAL ENERGY AGENCY



**Table 4:** Summary of actions needed in G8 countries

		G8/IEA recommendation number <sup>26</sup>
Cross sectoral	All G8 countries need to:	
	• Further improve their national energy efficiency strategies and action plans.	1.2 a)
	• Give greater attention to enforcement, compliance and evaluation.	1.3
	• Expand efforts in financing, particularly with development of savings verification and measurement protocols, establishing public-private partnerships, and implementing findings of subsidy reviews.	1.1
Buildings	All G8 countries except Germany need to:	
	• Establish stronger energy efficiency requirements for buildings.	2.1a) and 2.1b)
	• Strengthen support for passive energy houses and zero energy buildings.	2.2
	All G8 countries need to:	
	• Increase efforts to promote energy-efficient windows and glazing.	2.5
Appliances	All G8 countries need to:	
	• Establish policies to address the growing television-related energy demand. • Develop measures needed to address home digital networks.	3.3 3.2c)
Transport	All G8 countries need to:	
	• Ensure the implementation of the transport energy efficiency policies that are planned.	5
	All G8 countries except Japan need to:	
	• Establish fuel-efficiency standards for heavy duty vehicles.	5.3
	Russia needs to develop and implement policies to promote transport energy efficiency as soon as possible.	
Industry	All G8 countries need to:	
	• Develop or strengthen energy efficiency standards for electric motors.	6.2
	• Develop further policies to assist small and medium-sized enterprises.	6.4
	• Russia, France and Germany need to give further attention to energy management policies.	6.3
Utilities	All G8 countries need to continue to consider how to incentivise utilities to promote energy efficiency.	7

## Extension activities – assisting energy efficiency action beyond the G8

The G8 also play an important role in providing leadership and encouraging energy efficiency implementation in other countries. One area that the G8 could show greater leadership is in assistance programmes to support international efforts to adopt high-efficiency alternatives to fuel based lighting. Also, through the work of the IEA it has become clear that many countries require technical assistance to understand the details of what is required to implement energy efficiency policies in general, and the G8/IEA 25 recommendations in particular. This need for capacity building on energy efficiency policy implementation applies to IEA members as well as emerging and developing countries. An initiative to assist countries with their implementation of energy efficiency policy is urgently needed if the pressing energy, environmental and economic development goals are to be achieved.

<sup>26</sup> See Annex 1

## Global Energy Efficiency Action Initiative (GEEA Initiative)

The IEA proposes that a key output from the G8 Summit in 2009 could be the Global Energy Efficiency Action Initiative (GEEA Initiative). This initiative would:

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- Conduct a series of regional information-dissemination seminars (covering Africa, Asia, North America, South America, Europe, Middle East and Oceania) for high-level decision makers and politicians. The seminars would aim to build the case for energy efficiency implementation among key decision makers across the broad spectrum of sector interests. The aim of this seminar would be to communicate the need to implement energy efficiency policy, the cost-effectiveness of such policy and the range of options available for achieving significant energy efficiency improvements.
- Conduct a series of regional and thematic technical capacity-building seminars (covering Africa, Asia, North America, South America, Europe, Middle East and Oceania) over the period of the Initiative. These seminars would target officials and relevant private sector stakeholders involved in the technical details of energy efficiency policy development, implementation and evaluation. The aim would be to train these officials and stakeholders in the technical aspects of energy efficiency policy implementation.
- Establish a technical assistance centre [hotline] based at the IEA to provide real-time advice and assistance on energy efficiency policy development to officials from all countries.
- Report back to the 2011 G8 Summit in France regarding progress in achieving GEEA Initiative goals as well as global energy efficiency policy implementation and energy efficiency improvement.

## Concluding remark

This report identifies a full range of energy efficiency activities in G8 countries. However, more action is needed to meet pressing energy-related challenges. The G8 can play a critical role in promoting “**Worldwide Implementation Now**” of energy efficiency. What will it be? W.I.N or lose the opportunity?



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# Annex 1: Consolidated list of 25 G8/IEA energy efficiency recommendations

## 1. Cross-sectoral Policies to Support Energy Efficiency

### 1.1 Increased Investment in Energy Efficiency

a) Governments should facilitate the private sector's involvement in energy efficiency investments by:

- i) Adopting, and publicising to the private sector, a common energy efficiency savings verification and measurement protocol, to reduce existing uncertainties in quantifying the benefits of energy efficiency investments and stimulate increased private sector involvement;
- ii) Encouraging financial institutions to train their staff and develop evaluation criteria and financial tools for energy efficiency projects;
- iii) Reviewing their current subsidies and fiscal incentive programmes to create more favourable grounds for private energy efficiency investments;
- iv) Collaborating with the private financial sector to establish public-private tools to facilitate energy efficiency financing;
- v) Promoting risk mitigation instruments, such as securitisation or public-private partnerships; and
- vi) Putting in place institutional frameworks to ensure regular co-operation and exchanges on energy efficiency issues between the public sector and financial institutions.

### 1.2 National Energy Efficiency Strategies and Energy Efficiency Goals

a) Governments should set goals and formulate action plans for improving energy efficiency in each sector of their domestic economies, utilising on-going IEA works for developing sectoral energy efficiency benchmarks and compiling best practices;

- i) Best practice action plans should:
  - I. Assess energy consumption by end-use in all sectors;
  - II. Identify the economy's energy savings potentials; and
  - III. Establish objectives and adequate methods for evaluating the success of the plan.

b) Energy efficiency policy agencies should be adequately resourced.

### 1.3 Compliance Monitoring, Enforcement and Evaluation

a) Governments should ensure that both voluntary and mandatory energy efficiency policies are adequately monitored, enforced and evaluated so as to ensure maximum compliance. At a minimum, this should include:

- i) Considering and planning for optimal compliance, monitoring and evaluation procedures at the time new policies and measures are formulated;

- ii) Establishing legal and institutional infrastructure for ensuring compliance with energy efficiency requirements;
- iii) Ensuring transparent and fair procedures for assessing compliance; including specification of the methods, frequency and scope of monitoring activities;
- iv) Ensuring regular and public reporting of monitoring activities, including instances of non-compliance;
- v) Establishing and implementing a suite of enforcement actions commensurate with the scale of non-compliance and the value of lost energy savings; and
- vi) Establishing and implementing a robust system for evaluating policy and programme success during and after implementation.

#### 1.4 Indicators

- a) Governments should ensure that their energy efficiency policies are supported by adequate end-use information by substantially increasing their efforts to collect energy end-use data across all sectors and relating to all energy-types.
  - i) This will require governments to increase the resources allocated to energy end-use data collection.
  - ii) At a minimum, governments should ensure that they are able to complete and submit the annual energy efficiency data template developed by the IEA in co-operation with other organisations.

#### 1.5 Monitoring and Reporting Progress with IEA Energy Efficiency Recommendations

- a) Governments should agree to track progress in implementing each of the concrete recommendations and to provide the IEA with regular updates.

### 2. Energy-efficient Buildings

#### 2.1 Building Codes for New Buildings

- a)
  - i) Governments that do not currently have mandatory energy efficiency standards for new buildings in building codes should urgently set, enforce and regularly update such standards.
  - ii) Those governments that currently have mandatory energy efficiency standards for new buildings should significantly strengthen those standards.
- b) Energy efficiency standards for new buildings should be set by national or state governments and should aim to minimise total costs over a 30-year lifetime.

#### 2.2 Passive Energy Houses and Zero Energy Buildings

- a) Governments should support and encourage the construction of buildings with very low or no net energy consumption (Passive Energy Houses and Zero Energy Buildings) and ensure that these buildings are commonly available in the market.
- b) Governments should set objectives for PEH and ZEB market share of all new construction by 2020.
- c) Passive Energy Houses or Zero Energy Buildings should be used as benchmark for energy efficiency standards in future updates of building regulations.

## 2.3 Existing Buildings

- a) Governments should systematically collect information on energy efficiency in existing buildings and on barriers to energy efficiency.
- b) Standardised indicators should also be calculated for energy efficiency in buildings for international comparison, monitoring and selection of best practices.
- c) Based on this information, governments should construct a package of initiatives to address the most important barriers to energy efficiency in buildings.
  - i) This package should set standards to ensure that energy efficiency improvements are achieved during the refurbishment of all buildings; and
  - ii) Also, the package should increase awareness of efficiency in the building sector and raise the market profile of a building's energy performance.

## 2.4 Building Certification

- a) Governments should take actions to make building energy efficiency more visible and to provide information on major energy saving opportunities. This should include:
  - i) Mandatory energy certification schemes that ensure that buyers and renters of buildings get information on the energy efficiency of buildings and major opportunities for energy savings; and
  - ii) Structures that ensure that energy efficiency information is available to all actors in the building sector at all times.

## 2.5 Windows and other Glazed Areas

- a) Governments should set up a policy package to improve energy efficiency in windows and other glazed areas. This policy package should include:
  - i) Minimum energy efficiency standards for windows and other glazing that are based on least lifetime costs;
  - ii) A requirement for window and glazed-product manufacturers to provide energy efficiency labelling for their products; and
  - iii) Governments establishing demonstration projects for efficient windows and implementing energy-efficient window procurement policies.

## 3. Energy-efficient Appliances

### 3.1 Mandatory Energy Performance Requirements or Labels

- a) Governments should adopt mandatory energy performance requirements and, where appropriate, comparative energy labels across the spectrum of appliances and equipment at a level consistent with international best practices.
- b) Adequate resources should be allocated to ensure that stringency is maintained and that the requirements are effectively enforced.

### 3.2 Low-power Modes for Electronic Equipment

- a) Governments should adopt the same "horizontal" 1-Watt limit and apply it to all products covered by an International Electrotechnical Commission definition of standby power with limited exceptions.



b) Governments should adopt policies which require electronic devices to enter low-power modes automatically after a reasonable period when not being used.

c) Governments should ensure that network-connected electronic devices minimise energy consumption, with a priority placed on the establishment of industry-wide protocols for power management.

i) In order to enhance energy efficiency across electronic networks, governments should:

I. Instruct relevant public and private standards authorities to ensure that industry-wide protocols are developed to support power management in appliances and equipment, including networked devices; and

II. Ensure such protocols are developed and implemented.

### 3.3 Televisions, Television “set-top” Boxes and Digital Television Adaptors (DTAs)

a) The IEA concludes that international best practice with respect to energy-efficient set-top boxes are policies that establish a minimum efficiency standard for Digital Television Adaptors. These regulations should:

i) Specify the maximum power levels while “on” and “off”; and

ii) Ensure that the consumer can easily switch the unit to the lower power level.

b) A second aspect of best-practice is to ensure that government-subsidised units meet higher efficiency requirements.

c) Governments should implement energy efficiency policy measures for TVs and set-top boxes designed to:

i) Promote the best performing current TV products and technologies;

ii) Stimulate the market entry of new television technologies which aim to halve TV energy consumption compared to current performance levels; and

iii) Minimise the energy used by TVSP customers in receiving TV services by ensuring that such requirements are included in relevant franchise or licensing agreements that allow TVSPs to operate.

### 3.4 Test Standards and Measurement Protocols

a) Governments should:

i) Review energy measurement standards currently used, to determine whether they are consistent with national policy requirements; and

ii) Support the development and use of international measurement standards, where appropriate, in order to assist performance comparison and benchmarking for traded products while also reducing compliance costs.

## 4. Best Practice in Energy-efficient Lighting

### 4.1 Best Practice and Incandescent Phase-out

a) The IEA recommends that governments endorse the objective of across-the-board best practice in lighting.

b) Governments should move to phase out the most inefficient incandescent bulbs as soon as commercially and economically viable.

i) In aiming for this objective, there is a need both for appropriate time scales and performance targets to be established; and

ii) Also government and industry actions must be coordinated internationally to ensure a sufficient supply of good quality higher efficiency alternative lamps.

#### 4.2 Non-residential Buildings and Phase-out of Inefficient Fuel-based Lighting

a) Governments should put in place a portfolio of measures to ensure energy-efficient least-cost lighting is attained in non-residential buildings. The portfolio of measures should include the following:

i) The inclusion of energy performance requirements for lighting systems within building codes and ordinances applicable to the installation of lighting in the commercial, public, industrial, outdoor and residential sectors. These requirements should:

I. Include targeted measures to stimulate better control of lighting and the avoidance of illumination of unoccupied spaces;

II. Specify that general service lighting systems in new non-residential buildings, or substantial retrofits of existing non-residential buildings, should draw no more than 10W of power per square metre of internal floor area when averaged over the whole building;

III. Be based upon a review of recommended lighting levels, including a full peer review comparing local recommendations with those applied internationally to ensure that there are no excessive lighting levels recommended in national guidelines; and

IV. Hasten the phase-out of inefficient street lighting technologies such as mercury vapour lamps.

b) Governments should support international efforts to stimulate the adoption of higher efficiency alternatives to fuel-based lighting in off-grid communities *e.g.* via supporting the diffusion of solar powered solid state lighting devices.

### 5. Energy-efficient Transport

#### 5.1 Fuel-efficient Tyres

a) Governments should:

i) Adopt new international test procedures for measuring the rolling resistance of tyres, with a view to establishing labelling, and possibly maximum rolling resistance limits where appropriate, for road-vehicle tyres; and

ii) Adopt measures to promote proper inflation levels of tyres.

I. This should include governments, acting in cooperation with international organisations including UNECE, making the fitting of tyre-pressure monitoring systems on new road vehicles mandatory.

## 5.2 Mandatory Fuel Efficiency Standards for Light-duty Vehicles

### a) Governments should:

- i) Introduce new mandatory fuel efficiency standards for light-duty vehicles if they do not already exist, or, where they do exist, make those standards more stringent;
- ii) Announce the more stringent content of the proposed standards as soon as possible; and
- iii) Harmonise, where appropriate, as many aspects of the future standards as possible.

## 5.3 Mandatory Fuel Efficiency Standards for Heavy-duty Vehicles

### a) For heavy duty vehicles, governments should introduce:

- i) Fuel efficiency standards; and
- ii) Related policies including labelling and financial incentives based on the vehicle's fuel efficiency.

## 5.4 Eco-driving

### a) Governments should ensure that eco-driving is a central component of government initiatives to improve energy efficiency and reduce CO<sub>2</sub> emissions.

- i) Governments support for eco-driving should include promotion of driver training and deployment of in-car feedback instruments.

## 6. Energy efficient Industry

### 6.1 High-quality Energy Efficiency Data for Industry

#### a) Governments should support the IEA energy efficiency indicator work that underpins critical policy analysis by ensuring that accurate energy intensity time series data for industrial sectors is reported regularly to the IEA.

### 6.2 Minimum Energy Performance Standards for Motors

#### a) Governments should consider adopting mandatory minimum energy performance standards for electric motors in line with international best practice.

#### b) Governments should examine barriers to the optimisation of energy efficiency in electric motor-driven systems and design and implement comprehensive policy portfolios aimed at overcoming such barriers.

### 6.3 Energy Management

#### a) Governments should consider providing effective assistance in the development of energy management (EM) capability through the development and maintenance of EM tools, training, certification and quality assurance.

#### b) In addition, governments should encourage or require major industrial energy users to implement comprehensive energy management procedures and practices that could include:

- i) The development and adoption of a formal energy management policy:
  - I. Progress with implementation of this policy should be reported to and overseen at company board level and reported in the company report.

II. Within this policy companies would need to demonstrate that effective organisational structures have been put in place to ensure that decisions regarding the procurement of energy-using equipment are taken with full knowledge of the equipment's expected life-cycle costs and that procurement managers have an effective incentive to minimise the life-cycle costs of their acquisitions.

- ii) The appointment of full-time qualified energy managers at both the enterprise and plant-specific level as appropriate; and
- iii) The establishment of a scheme to monitor, evaluate and report industrial energy consumption and efficiency at the individual company, sector and national level.

I. As a part of this effort, appropriate energy performance benchmarks should be developed, monitored and reported at levels deemed suitable in each sector.

#### 6.4 Small and Medium-sized Enterprises

a) Governments should consider developing and implementing a package of policies and measures to promote energy efficiency in small and medium-sized enterprises (SMEs). This package should include:

- i) A system for ensuring that energy audits, carried out by qualified engineers, are widely promoted and easily accessible for all SMEs;
- ii) The provision of high quality and relevant information on energy efficiency best practice;
- iii) The provision of energy performance benchmarking information which ideally would be structured to allow international and within economy comparisons; and
- iv) Appropriate incentives to adopt least-life cycle cost capital acquisition and procurement procedures.

### 7. Energy Utilities and Energy Efficiency

a) Governments and utility regulators should consider implementing mechanisms that strengthen the incentives for utilities to deliver cost-effective energy savings to end-users such as:

- i) Establishing regulation which decouples utility revenue and profits from energy sales and allows energy savings delivery to compete on equal terms with energy sales; or
- ii) Placing energy efficiency obligations on energy utilities, the stringency of which is periodically raised based on continuing cost effectiveness in delivering energy services, and where:
  - I. Such obligations may be tradable and structured such that utility costs are recoverable through the rates;
  - II. The obligations are designed to be consistent with any corresponding mandatory or voluntary CO2 emission target imposed on utilities; or
- iii) Allowing energy efficiency measures to be bid into energy pools, on an equal basis to energy supply options; or
- iv) Other appropriate policy measures that encourage utilities to play an active part in funding and/or delivering end-use efficiency improvements among their customer base.