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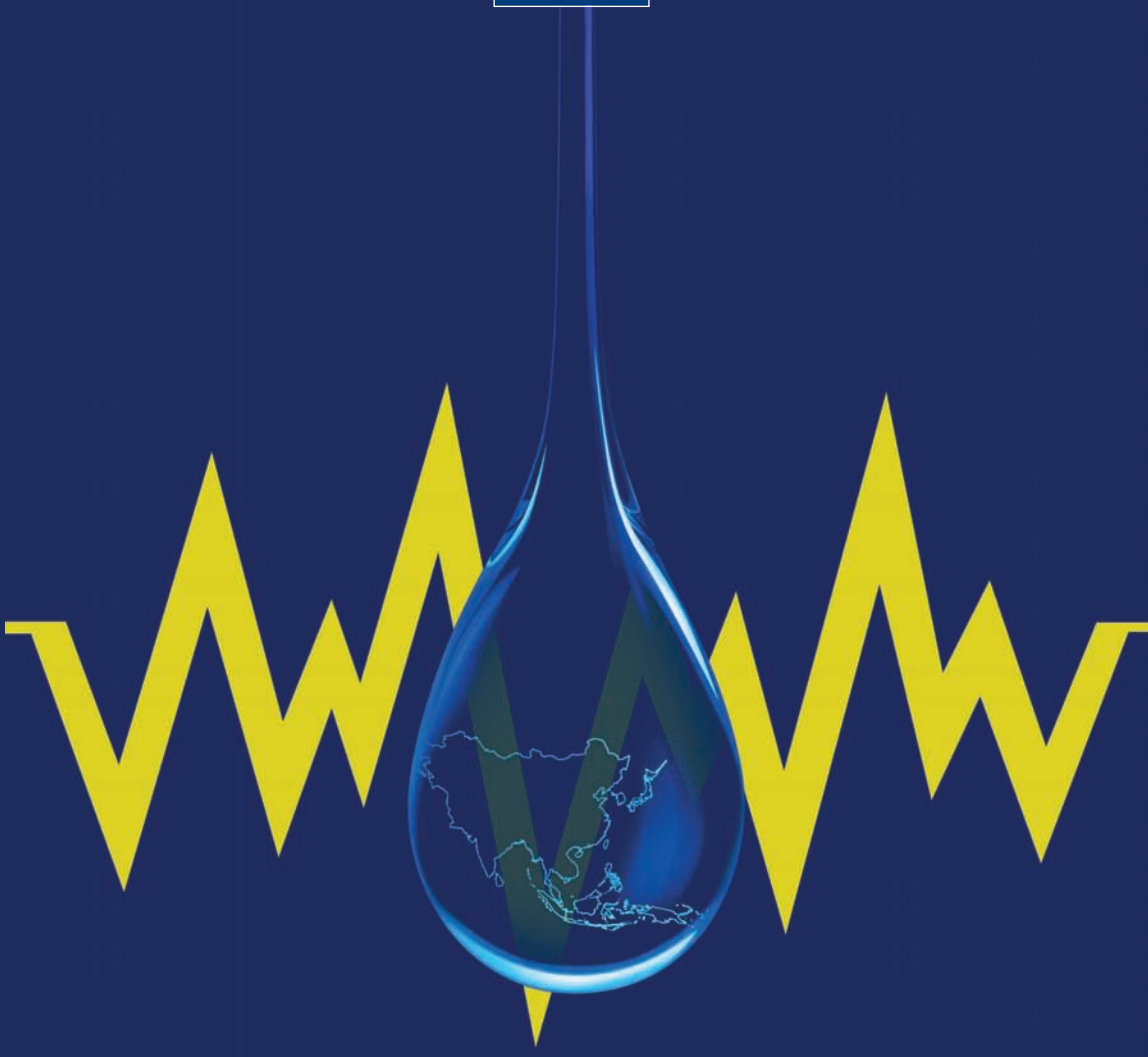

ATTAINING ACCESS FOR ALL

Pro-Poor Policy and Regulation for Water and Energy Services

Asian Development Bank

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Printed in the Philippines.

ISBN 978-92-9092-139-4
Publication Stock No. TIM102037

Cataloging-In-Publication Data

Asian Development Bank.
Attaining access for all: pro-poor policy and regulation for water and energy services.
Mandaluyong City, Philippines: Asian Development Bank, 2010.
1. Water services. 2. Energy services. 3. Access to services. 4. Regulation.
I. Asian Development Bank.

Note:
In this report, "$" refers to US dollars, unless otherwise stated.

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Foreword

This publication on *Attaining Access for All: Pro-Poor Policy and Regulation for Water and Energy Services* is the first in the Asian Development Bank (ADB) Infrastructure Regulation and Reform Series. The series will collect ADB's knowledge on infrastructure regulation and reform and present it in a way that is interesting, accessible, and easily referenced for operations staff. It was prepared under the Law and Policy Reform program of the Office of the General Counsel in response to the demand from operational departments and ADB's developing member countries for additional knowledge support for infrastructure regulation.

The ADB Energy for All and Water for All programs form an important part of ADB's work on infrastructure and the provision of utility services. During the preparation of the Infrastructure Regulation and Reform series, it became clear that there was a need to collect ADB's knowledge on targeted pro-poor policies and regulations and to gather the best concrete examples from around the region for operations staff to incorporate into their projects. This guide seeks to respond to that need by presenting concrete policy and regulatory measures and approaches for ADB staff to build into projects and programs to implement the Energy for All and Water for All programs. It also seeks to serve as a useful reference for policy makers and regulators.

Jeremy H. Hovland
General Counsel

Acknowledgments

Several departments and individuals made contributions and gave support in preparing this *Attaining Access for All: Pro-Poor Policy and Regulation for Water and Energy Services Guide*. Members of the Energy Community of Practice and the Water Community of Practice provided peer review comments. Thanks to Amy S. Leung of the East Asia Regional Department (EARD); Samuel Tumiwa of the Regional and Sustainable Development Department (RSDD); Alexander Ablaza (RSDD consultant), for excellent ongoing support and contributions on energy efficiency and water conservation; Armin Bauer (RSDD); Anand Chiplunkar (RSDD); Sohail Hasnie of the Southeast Asia Department (SERD); Robert Hood (RSDD consultant); Shaanti Kapila (RSDD consultant); Joanna Masic (EARD); Priyantha Wijayatunga of the South Asia Department; and Yongping Zhai (SERD).

Chin-Choon Fong of the Office of the General Counsel (OGC) provided much support, facilitation, and encouragement. Mark Alain Villocero gave many hours of administrative and logistical assistance.

Wayne Shirley, David Moskovitz, and Jim Lazar of the Regulatory Assistance Project (RAP) prepared a draft handbook on energy regulation for ADB, which provided the basis for RAP to contribute to Chapters 5, 7, and 8. RAP also gave extensive research assistance and comments, particularly on Chapter 7. RAP has provided significant ongoing advice on environmentally sustainable and pro-poor infrastructure regulation. Smita Nakhooda and Davida Wood of the World Resources Institute, and Shantanu Dixit of Prayas Institute have provided ongoing advice and helpful comments. Similarly, Arthur McIntosh provided helpful comments on water services and the poor.

Robert Hugh Davis, Miguel Paulino, Ma. Priscila del Rosario, Cynthia Hidalgo, Vicente Angeles, Anthony Victoria, Portia Andres, Edith Creus, Joseph Manglicmot, Principe Nicdao, and Rodel Bautista of the Department of External Relations provided tireless assistance on editorial, creative, composition, and pre-press services.

Eveline Fischer, as then deputy general counsel; Hamid Sharif, as then assistant general counsel; and Philip Daltrop, as deputy general counsel, encouraged OGC's infrastructure regulatory work in their leadership roles for the OGC Law and Policy Reform program.

Kala Mulqueeny, senior counsel (OGC), with OGC legal specialists Camille Bautista and Angelique Badelles, prepared this guide.

Abbreviations

ADB	–	Asian Development Bank
CFL	–	compact fluorescent lamp
DMC	–	developing member country
DSM	–	demand-side management
kW	–	kilowatt
kWh	–	kilowatt-hour
MDG	–	Millennium Development Goals
NGO	–	nongovernment organization
OBA	–	output-based aid
PIP	–	percentage-of-income plan
PSP	–	private service provider
UN	–	United Nations
US	–	United States
USF	–	universal service fund
WFP	–	Water Financing Program

Executive Summary

Asia and the Pacific is home to about 1.8 billion people who survive on less than $2.00 a day and 903 million people living below the poverty line of less than $1.25 a day. More than 403 million people in rural areas and 93 million people in urban areas lack access to adequate water, while more than 1.9 billion people in the region are living without basic sanitation facilities. About 1 billion people in in the region do not have access to electricity.

One of the United Nations (UN) Millennium Development Goals (MDGs) is to halve the proportion of the population without sustainable access to safe drinking water and basic sanitation. The International Covenant on Economic, Social and Cultural Rights implicitly entitles everyone to a right to sufficient, safe, acceptable, physically accessible, and affordable water for personal and domestic uses. At a time when many programs have been introduced to reform water and energy infrastructure and utility service industries by restructuring, introducing competition, facilitating private sector participation, and introducing different types of regulatory reform, it is crucial to ensure that the poorest of the poor actually gain increased access to affordable utility services.

Although universal access to safe, reliable energy is not itself an MDG, it is a necessary condition for providing the poor with safe water and sanitation, for maintaining adequate standards of living, and for achieving any of the other MDGs. The Asian Development Bank (ADB) recognizes the importance of electricity and water access to the poor and has committed to providing such access by establishing the Energy for All and Water for All initiatives.

However, while broad efforts aimed at regulatory reform and increasing energy and water access may be helpful, specifically targeted interventions, measures, and approaches are often needed to ensure that the poor benefit from these efforts. This publication, *Attaining Access for All: Pro-Poor Policy and Regulation for Water and Energy Services* (*Pro-Poor Guide*), is designed to identify specific infrastructure and utility service reform measures that can be taken to advance the interests of the poor.

The *Pro-Poor Guide* consists of three components:

Overview. ADB considers the poor to be those deprived of essential assets and opportunities to which every human is entitled, and distinguishes

three categories of poverty—human, income, and absolute—that form the conceptual backdrop of its efforts. The *Pro-Poor Guide* defines pro-poor approaches and measures as "specifically targeted initiatives or interventions that seek to promote benefits for the poor, or mitigate the effects of activities on the poor or a group or subset thereof." Pro-poor approaches go beyond macro-level efforts at poverty reduction to target particular activities and populations in relation to energy and water supply.

To implement pro-poor regulation, reformers need to identify the poor, which is not as easy as it may first appear. Five broad methods can be used to identify groups of poor people: self-identification, geography, income, household demographics, and neighborhood demographics. Whatever method is used, once the poor are identified, reformers must answer critical questions about them, including how they currently obtain services, what they want, what they can afford, and how they are organized.

Reformers usually establish regulations for large water and energy network utility service providers. Some limited regulation may also be needed for alternative service providers, but it will be different from that needed for network service providers. Regulation of network service provision involves access, price, and quality regulation; requires a targeted pro-poor system; and may also need a consumer or pro-poor advocate. Alternative service providers most often operate in unregulated markets, meaning that reformers should be more concerned with minimum environmental, health, and safety standards and maximum pricing levels. In either case, pro-poor regulation has five fundamental objectives: access, affordability, quality, efficiency, and sustainability.

However, the development of pro-poor regulation faces several distinct challenges: high costs in providing utility services from the main network, disincentives to expand access, high costs in improving service quality standards, inadequate rate design and misdirected subsidies, constrained pro-poor capacity, and ineffective regulatory reform.

ADB's water and energy policies explicitly embody its goal of achieving poverty reduction. The Water for All and Energy for All initiatives embrace the need to adopt pro-poor approaches and measures.

Designing Policy and Regulation to Be Pro-Poor. The regulation of water or electricity utilities seeks to balance the interests of investors (a reasonable rate of return on their capital investment), consumers (an adequate, safe,

and affordable supply of utilities), and the public (including such interests as avoiding irreversible damage to the environment, expanding access for the poor, and ensuring that taxpayer dollars are spent wisely). These commodities are traditionally supplied by publicly owned companies operating large distribution networks, though over the past 30 years there have been increasing attempts to introduce different types of competition. Economic regulation of these entities—by government, autonomous public agencies, or contract—seeks to regulate the supply of water and energy along network infrastructure, encourage more competitive delivery of infrastructure services, and ensure that goods of adequate quality are made available to the market at affordable prices. Thus, regulatory designers need to conduct a baseline assessment of the effects of existing regulation on the poor before any major new designs or redesigns to the policy, statutory, or regulatory regime are concluded. Once that is done, they should adopt explicit pro-poor objectives (such as universal service; affordable pricing for essential utility service; and reasonable connection, disconnection, and reconnection policies) and assess the impact of the proposed reforms in terms of expanded coverage, efficacy of tariff levels and structure, appropriate quality standards, and the resulting role of alternative service providers. Once implemented, the regulations must be monitored and reviewed to ensure that they are working to benefit the poor.

Utility services regulatory reform encompasses any change to policy, law, or regulation to (i) separate the functions of sector policy, utility operation and management, and regulation; (ii) introduce competition; (iii) separate vertically integrated industries; (iv) introduce private sector participation; or (v) introduce and then promote the functioning of independent regulators. It also includes efforts to bring alternative service providers within the ambit of regulation. The effectiveness of regulatory reform is country- and context-dependent and the evidence is mixed. But whichever side one takes, regulatory reform and restructuring can be more beneficial to the poor if their needs are specifically considered than if their needs are not. Pro-poor regulation must start with a clear picture of current water or electricity supply services for the urban poor.

One important pro-poor measure is demand management through increased resource efficiency and conservation. Energy efficiency services help the poor directly because they reduce demand for energy services. They can also help the poor indirectly, because their efficiency gains can be reinvested

to expand network access to unconnected poor areas, or be transferred to consumers to make energy services more affordable. Demand-side energy efficiency measures include promoting the use of efficient lighting and appliances, building or retrofitting efficient and insulated housing, establishing appropriate tariff rates, and establishing fuel conversion programs. Supply-side measures include installation of load limiters and certain tariff designs, such as inverted block rates, revenue-cap pricing that decouples the link between increases in sales and increases in revenue, and tariffs that vary with the time of day (and consequent demand). Pro-poor water efficiency measures include (i) demand-side management by appropriate pricing of water supply sources; (ii) mechanisms, such as low-pressure pipes, sprinkler systems, and drip systems for irrigation; (iii) types of water recycling; (iv) improved water canal lining materials to reduce seepage; (v) consumer education regarding plumbing leaks and household demand-side management; and (vi) seasonal variations in the water tariff. Supply-side management measures include rainwater harvesting, efficient pumping, leak management, system automation, and metering and monitoring.

The Substance of Pro-Poor Regulation. The *Pro-Poor Guide* emphasizes concrete ways to include the poor in regulatory design and includes chapters on expanding access, offering different levels of service quality, and making prices affordable. Increasing access to water and electricity is one of the most significant pro-poor objectives of regulatory reform. Reformers need an understanding of the wide variety of ways to increase access so they can deploy the right technique for their specific country- and context-bound situation. While context matters, in most cases, direct support to the poor to pay an electricity or water service connection fee would be the most effective way of increasing pro-poor access. The *Pro-Poor Guide* explains nine available techniques for making service expansion affordable—direct government subsidies, output-based aid, connection fees and connection kits, local renewable resources, grants from other parties, low-interest loans, utility-provided subsidies, volunteer and cooperative implementation, and low-cost options. It gives examples of situations in which each is appropriate.

Ultimately, the poor should gain increased access to affordable water or electricity network services. Levels of service that fall short of this objective (for example, service that sees neighbors sharing water standpipe supplies) should ultimately be phased out. However, offering service quality levels that

fall short of this main objective may still improve conditions for the poor in some places and would be a good interim measure. On diversifying service quality, the *Pro-Poor Guide* explains that reformers must consider that not all consumers need or want the same services. A system that offers various levels of service quality serves the poor best because—given minimum levels of environment, health, and safety protection—different service offerings can satisfy the needs of the poor at reduced cost. Reformers should consider which of a wide range of ways to vary service quality are appropriate. Examples include flexible consumer service arrangements (such as multiple payment and service options), use of low-cost technologies (such as rental of solar-charged lanterns), cooperative arrangements with alternative providers, and block grid connections (under which the community manages payment for a block of users and, if one bill is late, the whole block is disconnected).

No matter what level of utility service quality is offered to the poor, reformers must ensure that it is affordable. Tariffs, discounts, and subsidies can be used to ensure affordability. The high cost of utility services for the poor can be addressed by pricing the service at a level that low-income users can pay, or by finding funding to support low-income consumers. Tariff systems should be designed or redesigned to reflect the full costs of the service, while discount and subsidy systems should be designed to directly target the poor's needs. A system that combines tariffs, discounts, and subsidies should determine the basis and continuing validity of the tariff design, the financing sources of the utility, and how to distribute the discount or subsidy so as to accomplish its specific purpose. Stakeholders should be involved at all stages.

Pro-poor pricing mechanisms other than discounts and subsidies can be considered. Examples that have had success include inverted rates (rising price per unit), zero basic charge setups (no charge for operating and maintaining a connection), "lifeline" rates for qualifying low-income consumers, and a flat percentage of income charge. There are also many non-pricing elements of utility charges that bear on the affordability of services to the poor, including deposit requirements, the use of prepayment meters, termination and reconnection policies, moratoria on winter disconnections, the use of universal service and "good neighbor" funds, and the use of load limiters to control a household's usage.

The relevant regulator can then play a significant part in making utility services available to low-income households. Regulators can review and

approve a utility line extension tariff (the terms under which the utility will extend service to new communities and new consumers) as well as other tariffs, such as hookup fees. Regulators can also establish internal institutional structures to respond to the needs of the poor, such as a low-income advisory body, a consumer representative committee, and an adjudicative body.

Introduction

A. What Is *Attaining Access for All: Pro-Poor Policy and Regulation for Water and Energy Services*?

Attaining Access for All: Pro-Poor Policy and Regulation for Water and Energy Services (*Pro-Poor Guide*) is an elementary guide to assist Asian Development Bank (ADB) staff in thinking about ways to ensure that water and energy services policy and regulation and their reform are designed and implemented to serve the poor. It is intended principally to aid in the design and implementation of ADB technical assistance, projects, and policy interventions in water and energy supply services but is also intended to assist government officials. It is designed for engineers, lawyers, social and environmental specialists, other policy makers, and regulators.

B. Why Prepare this *Pro-Poor Guide*?

Policy makers and development professionals have long tended to assume that broad efforts at regulatory reform and increasing energy and water access would help the poor. ADB has prepared the *Pro-Poor Guide* because some of the evidence has shown that the poor often need specifically targeted interventions, measures, and approaches to ensure that they benefit from investments in water and energy supply services.[1] Pro-poor policy and regulation are consistent with international standards and principles of good governance, and can be consistent with various models of policy and regulatory reform, be they public or private sector models.

The connection between providing water and energy access and achieving sustainable human development, economic growth, and higher quality of life is quite clear. Nevertheless, the challenge of improving the poor's access to both water and energy remains significant. Asia and the Pacific is home to about 1.8 billion people who survive on less than $2.00 a day and 903 million people living below the poverty line of less than $1.25 a day.[2] More than 406 million people in rural areas[3] and 93 million people in urban areas[4] lack access to adequate water, while more than 1.9 billion people in the region are living without basic sanitation facilities.[5] Worldwide, about 3 billion people rely on traditional biomass for cooking and heating.[6] About 1 billion people in Asia and the Pacific do not have access to electricity.[7]

While large-scale efforts to provide access to energy and water services will continue to remain essential, evidence suggests that such efforts must be buttressed by targeted measures and reform initiatives designed to ensure the poor specifically benefit.[8]

C. What Are the Goals of the International Community for Promoting Water and Energy Services?

The UN Millennium Development Goals (MDGs)—a series of 8 development goals, 18 targets, and 48 indicators for the international community to achieve by 2015—includes a target to halve the proportion of the population without sustainable access to safe drinking water and basic sanitation.[9] Other MDGs for poverty reduction, health, and environmental sustainability are also intimately related to water and sanitation.[10]

The UN considers the right to water to be an essential human right implicit in the International Covenant on Economic, Social and Cultural Rights (ICESCR)[11] Next to air, water is the most essential condition for life, health, and adequate living.[12] Thus, while the right is not expressed, the UN considers it implicit because the ICESCR contains a right to life,[13] a right to health,[14] and a right to an adequate standard of living.[15] The UN has explained that the ICESCR entitles everyone to sufficient, safe, acceptable, physically accessible, and affordable water for personal and domestic uses.[16] Further, the obligation to provide water rests with the state. States can determine whether water and sanitation services should be provided through the public or private sector, although they are required to regulate and monitor private water and sanitation providers.[17] The UN also considers states to be obliged to provide a clear and efficient regulatory framework that can maintain sustainable access to safe, sufficient, physically accessible, and affordable water and sanitation.[18]

Access to energy has not been specifically identified as an MDG. However, MDG targets cannot be met without access to modern energy services.[19] In June 2009, the International Energy Conference proposed the formulation of a robust international understanding and framework that clearly advocates an international goal of universal energy access by 2030.[20] Further, in 2010, the United Nations (UN) Advisory Group on Climate Change released an exhaustive report stating the challenges faced by the lack of energy access and calling for universal access to modern energy services.[21]

To support these international goals in Asia and the Pacific, ADB has committed to providing access for the poor by establishing the Energy for All and Water for All initiatives.[22]

D. Why Is Pro-Poor Policy and Regulatory Reform in the Water and Energy Sectors Relevant to ADB?

ADB's overarching mission is to help its developing member countries (DMCs) reduce poverty and improve the quality of life of the people of Asia.[23] Pro-poor policy and regulatory reform is essential to reduce poverty and achieve the MDGs. In its poverty reduction strategy, ADB recognizes the importance of the poor's access to electricity and water, which affects their ability to meet basic human needs including health, nutrition, education, and livelihood.[24] The poverty reduction strategy is inextricably linked with ADB water and energy policies[25] and the Water for All and Energy for All initiatives. [26]

Thus, pro-poor water and energy policy and regulatory reform is relevant to ADB because it is relevant to its DMCs. Over the past 30 years, infrastructure and utility services throughout the world have undergone significant changes. All over the world, many programs have been introduced to reform water and energy service provision by restructuring these industries and introducing competition, private sector participation, and different forms of regulation. While these reforms have generally proceeded upon the assumption that everyone will benefit, this has not always been the case: not all reforms have ensured that the poor obtain increased access to affordable water or energy services at minimum quality levels. By recognizing that broad water or energy service reforms can but will not necessarily benefit all the poor, policy reformers and project designers can take more explicit steps to address the poor's interests.

E. How Do I Use the *Pro-Poor Guide*?

This *Pro-Poor Guide* assists policy reformers and project designers by providing explicit steps to identify specific measures to advance the interests of the poor. It can be read from cover to cover as a general introduction. It can also be used as a general reference and operational guide on specific topics. It has

self-contained modules that can be read separately and the main points are highlighted in the text. Ensuring each chapter is self-contained means same concepts are discussed in several chapters. Key points from the chapters are highlighted in boxes. Operational checklists are also included. The appendix on covenants would be relevant for a team formulating a project and considering appropriate pro-poor covenants.

CHAPTER 1
The Poor and Water and Energy Service Providers

A. Overview

This chapter provides a brief review of the concepts of the poor and poverty and pro-poor approaches and measures. It considers who provides water and energy services to the poor and how they help or hinder service provision. It also sets out the general objectives of pro-poor utility services regulation: increasing access to the electricity, water, or sanitation service; ensuring affordable service; and ensuring an acceptable service quality. This chapter also considers the challenges to developing pro-poor regulation.

B. The Poor and Energy and Water Service Providers

1. Who Are the Poor? What Is Poverty?

Reformers need to identify who are the poor. In doing so, they need to have a clear definition of "poverty," which means different things to different individuals and organizations.[27] ADB considers the poor to be those deprived of essential assets and opportunities to which every human is entitled,[28] including access to basic education, health care, nutrition, and water and sanitation, as well as income, employment, and wages.[29] Poverty is measured in terms of adequate access to these essentials. ADB views poverty as comprising three broad categories:[30]

- human poverty—the absence of essential human capabilities such as literacy;
- income poverty—insufficient income to meet minimum consumption needs, due to lack of employment or wages; and

- absolute poverty—the poverty level below a threshold (often described as the "poverty line") that sets the minimum basic needs for survival.[31] These basic needs will include food, water, and shelter; this bare minimum is often described as "less than $1 a day."[32]

A family of four living in eastern Asia without access to electricity or water supply

Human poverty is caused by a diverse range of mutually reinforcing factors,[33] including geographic location, age, health, living environment, occupation,[34] and membership in vulnerable groups (such as certain castes, ethnic minorities, women, the elderly, orphans, or the disabled).[35] Poverty may also arise or persist because vested interests or entrenched power structures seek to maintain the status quo.[36]

Poverty may continue, or be worsened, because the poor may not have the knowledge to obtain essential assets or their rightful legal entitlements: they may not have been informed of those rights and/or legal entitlements and they may not have any means of knowing about them. Moreover, government policies, legal and regulatory frameworks, and programs, may not encourage empowerment of the poor in a way that would allow them to overcome these knowledge gaps.[37]

Policy makers and donors often have general discussions about "the poor;" however, it can be difficult to identify any specific group of poor people. The poor often lack formal addresses or property rights, and there is insufficient data about where they live, how much they earn,[38] what they spend, how they behave, and so on.

2. How Can We Identify the Poor?

There are many different approaches and methodologies to identifying the poor but five broad methods are commonly applied: self-identification, geography, income, household demographics, and neighborhood demographics.

- **Self-identification.** Poor consumers are those that self-identify through their choice of the quantity or type of service that they consume.[39] For instance, poor consumers can self-select into a service-level subsidy scheme by choosing a particular level of water, sanitation, or electricity service[40] that provides lower quality, less reliable, or less convenient services to which a subsidy is applied.[41] Only poor consumers are expected to choose the subsidized service because cost and access are more important to them than quality or convenience.[42]

- **Geography.** A "poor community" is one in which poor people are known to live. The principal advantage of using geography

to define who is poor is its simplicity. For example, in Jakarta, an indicator of urban poverty is the number of people who live in squatter, slum, or "uncontrolled" settlements.[43] Although not everyone who lives in such settlements is poor, the poor tend to congregate in these congested, poorly serviced areas.[44] Another example is a poor community defined by people living in a remote or rural area. The principal risk of using geography to define communities as poor is that it discounts the existence of wealthy residents within those rural or remote areas, and may not include the urban poor.[45]

- Income. The poor are those earning less than a set income threshold. It uses the inability of people to meet the price of a basket of goods that would supply at least 2,000 calories per person per day.[46] For example, this method is used in the Philippines, but is criticized because of its failure to incorporate qualitative factors. Many people whose income is above the poverty line may be living in substandard conditions or may lack access to proper utility resources.[47]

- Household socioeconomic demographics. The poor are those living in households sharing particular socioeconomic demographics such as size and composition, occupation and education of the head of the family, assets and income, and the characteristics of the dwelling. This method requires household interviews and is an effective way of identifying the poor, but will often be costly. It will also be inaccurate if respondents know that their answers could affect the price they pay for certain services.[48]

- Neighborhood socioeconomic demographics. The poor are those living in neighborhoods considered poor because they have specific characteristics derived from census or household survey data rather than interviews.[49] This method will usually be less data-intensive than determining individual household demographics.[50] However, it becomes less precise when used in between censuses (especially when they take place infrequently) and in rapidly growing cities.[51]

3. Who Provides Utility Services to the Poor?

The poor receive utility services from two general categories of providers:

- **Main network utility service providers.** The poor may receive electricity or gas through a household connection to an electricity or gas network, water supply or sanitation services through a household connection to a piped water supply network, and sanitation services through a piped sanitation network. If the poor have an individual connection, their relevant issues are affordability and quality, not access. The poor may also be connected to a water supply or electricity network through a common connection, in which case network access remains an issue, making it desirable to provide individual connections. Individual and common household connections are, not infrequently, made illegally.

A geothermal power plant (S. Hasnie)

- **Alternative service providers.** Alternative service providers, who are often small scale, deliver utility services to poor or inaccessible end users who are generally underserved or not served at all by the electricity or water network provider.[52] Some examples are

    - small independent power producers that generate electricity from solar panels or diesel generators;
    - alternative providers that operate "mini-electricity grids" from a mini-hydropower source or mini-generators;
    - water suppliers that deliver water containers to a tank or common community source through water trucks or low-cost piping;
    - small companies providing small-bore, reticulated sewerage systems with off-site treatment; and
    - small private utility providers that offer more flexible payment conditions for the provision of water or power.

A boy fills plastic containers with water from a metered connection for community members who do not want to pay connection fees to join the water supply network

4. How Do Water and Energy Network Suppliers Help or Hinder Service to the Poor?

a. Water and Energy Services Supplied by the State

Water and electricity services have traditionally been supplied by the state. Under the traditional model, the state has formulated policy, often owned the main network utility provider, and set standards for them. This model has been criticized for providing inefficient and poor quality service that does not cover the costs of supply, requires large government subsidies for continued service (which governments cannot afford), and inhibits the expansion of utility service networks to unserved communities because there is insufficient revenue for investment.[53] Moreover, the ministries that administer policy and set or "regulate" standards have conflicts of interest with the state-owned or operated monopoly utility. Dominant state monopolies have few incentives to invest in the expansion of networks, and their ability to operate efficiently is compromised.[54] While tariffs are often kept artificially low under this model, it is often the wealthy and middle class that benefit from low tariffs, leaving large segments of the poor population without access.

b. Restructuring and Regulatory Reform

As a proposed remedy, many programs have been introduced all over the world to reform water and energy service industries by market-based regulatory reform. Regulatory reform includes industry restructuring (such as unbundling and privatizing previously state-owned entities) and introducing competition, private sector participation, and different types of regulation. Hence, under this approach, adopting these forms of regulatory reform should rectify the problems of the traditional model, lead to increases in investment, and expand access.[55] In short, under this approach, restructuring and regulatory reform are considered to improve the economic vitality of the network industry. All consumers, including the poor, would share in the benefits through improved services, often at lower cost. To the extent that this general approach directly considers the effects of regulatory reform on the poor, it assumes that competitive, efficient, and well-capitalized utility service providers will be willing and able to take the risks necessary to invest in expanded access for the poor. [56]

However, while these reforms have generally proceeded upon the assumption that everyone will benefit, this has not always been the case. Not all reforms ensure that the poor actually gain increased access to affordable energy and water services at minimum quality levels. Expanding access to poor communities is often unprofitable. Many newly corporatized or private sector entities view poor areas as having low profit margins and complex problems because many of the poor exist in slums and uncontrolled settlements, which raises complicated issues of land tenure and illegality.

In both the electricity and water sectors, those concerned with the problems relating to main service providers, including the private sector, may fail to serve the poor for the following reasons:

- connection fees are often set at high levels, and require lump-sum up-front payments that the poor cannot afford;
- tariffs and low water and electricity consumption in low-income communities may make it unattractive to expand network access to these areas, where the minimum cost of extending service is relatively high;
- people occupying land in slum dwellings or informal settlements are often ineligible for public utility services;
- main providers lack know-how to serve the poor because service levels are based on quality standards that the wealthy and middle class require;
- payment systems are not adapted to the conditions and constraints of the poor; and
- their employees do not always communicate well with the poor.[57]

Empirical evidence on the effects of restructuring and regulatory reform on the poor supports claims that it helps them obtain access to affordable, safe, and quality services—and also supports claims that it hinders their access.[58] On the one hand, regulatory reform has led to a viable macroeconomic means of expanding access to utility services for the poor.[59] On the other hand, there are well documented cases where regulatory reforms did not increase access for the poor, or did so only marginally.[60] Whether a particular regulatory reform will improve the performance of an electricity or water utility will ultimately depend on a host of variables.

A woman proudly exhibits her improvised kerosene lamps that provide light at night

c. Private Service Provision

The effect of private service providers (PSPs) is one aspect of the broader issue of how restructuring and regulatory reform affects the poor. Governments around the world have experimented with inviting the private sector to deliver better quality services at lower prices.[61] Some authors have argued that privatization will benefit the poor because more investment in and improved management of infrastructure will help expand access and make it affordable,[62] and contracts will encourage autonomy of operations.[63] Moreover, where utility services were heavily rationed before privatization, it may result in increased coverage for the poor even if prices increase.[64]

However, there is evidence that the introduction of private sector provision has not been entirely beneficial.[65] A World Bank report prepared in 2009 showed that private sector participation generally delivers on operational performance and labor efficiency, but there was no evidence that private sector participation resulted in greater investments, increased coverage, or

any substantial changes in tariffs.[66] Further, where the poor already have extensive formal access, PSPs may cause price increases that make the service unaffordable, leading to a reduction in coverage even though the total area available for connections increases.[67] Similarly, if PSPs cut off informal or illegal connections to the network as a cost recovery measure, the poor's access to utility services will be reduced.[68] Box 1.1 provides some examples of measures to ensure that efforts to introduce the private sector to provide service delivery benefit the poor.

Box 1.1: Pro-Poor Private Sector Provision

To achieve pro-poor objectives, governments should always consider pro-poor structural issues when planning to introduce private participation. The following are some examples of privatization efforts to introduce the private sector to provide service delivery with measures suggested to ensure benefits to the poor:

- **Divestiture**—Accompany divesture of state-owned operations with pro-poor reforms that include terms and conditions for network access and a subsidy scheme that is robust enough to support the degree of entry and competition envisioned.
- **Concession agreements**—Include terms and conditions on access coverage targets, minimum quality service criteria, and price caps or floors.
- **Management contracts**—Include terms and conditions on access coverage targets and prices.

Source: Adapted from D. Ehrhardt. 2000. Impact of Market Structure on Service Options for the Poor. In P. Brook and T. Irwin, eds. *Infrastructure for Poor People: Public Policy for Private Provision.* Washington, DC: World Bank.

5. How Do Alternative Water and Energy Service Providers Help or Hinder Service to the Poor?

Alternative service providers are an often unconsidered element of PSPs, but they have a large impact on utility service delivery for the poor. The removal of restrictions to market access and the introduction of liberal entry policies for water and energy providers generally result in increased access for areas currently unserved or underserved by the existing provider.[69] New alternative

service providers will either compete with the incumbent or serve market niches that were previously unserved or underserved. Competition from alternative service providers may also motivate network service providers to lower their prices and even improve service.[70]

In some cases, connections or services provided by alternative or small-scale providers may actually have lower total costs than conventional utility service. A single poor consumer who only needs electricity to charge a mobile phone or use some other low-wattage device is unlikely to find full utility service to be cost effective, but should not be discouraged from making an informal arrangement with another grid-connected consumer to obtain the electric service he or she requires. Some examples of alternative water and energy service providers are found in Box 1.2.

Box 1.2: Alternative Water and Energy Service Providers

Alternative Electricity Supply in Yemen

In Yemen, alternative electricity service providers supply rural towns and villages not served by the public utility.[a] These providers range from individual households that generate electricity for their own use and supply a few neighbors to larger operators that supply up to 200 households using diesel generators. The result is that electricity use in rural Yemen is high compared with that in other countries at a comparable income level.

Alternative Piped Water in Paraguay

In Paraguay, about 300 to 400 private individuals and firms called *aguaterias* supply high-quality piped water to areas not served by the public water company.[b] These alternative service providers range from small independent operators supplying their own neighborhoods to larger companies serving as many as 800 connections. Aguaterias have been operating successfully for a good 10 years and the quality of their service has increased with experience, competition, and consumer activism.

Water Vendors and Tankers in Metro Manila, Philippines

In Metro Manila, a study by ADB estimated that millions of people receive water from alternative service providers.[c] About 2 million receive water by resale from neighbors' connections or neighborhood kiosks, another 2 million from pushcart water vendors and tanker deliveries, and 1 million from direct connections or hoses.

continued on next page

Box. 1.2: continued

Water Distribution in Cebu City, Philippines

In Cebu City, a number of alternative service providers supply water to 30% of the population who are not served by the main utility provider.[c] Most alternative service providers have small distribution networks connected to privately owned and maintained wells that serve up to 500 households. The connection arrangements are simpler and less expensive than the main utility network but tariffs are higher.

[a] D. Ehrhardt and R. Burdon. 1999. Free Entry in Infrastructure. Washington, DC. World Bank, Private Sector Development Department. Quoted in D. Ehrhardt. 2000. Impact of Market Structure on Service Options for the Poor. In P. Brook and T. Irwin, eds. *Infrastructure for Poor People: Public Policy for Private Provision.* Washington, DC: World Bank.

[b] S. Snell. 1998. Water and Sanitation Services for the Urban Poor. Working paper. Water and Sanitation Program. Washington, DC: United Nations Development Programme and The World Bank. Quoted in D. Ehrhardt. 2000. Impact of Market Structure on Service Options for the Poor. In P. Brook and T. Irwin, eds. *Infrastructure for Poor People: Public Policy for Private Provision.* Washington, DC: World Bank.

[c] A. McIntosh. 2003. *Asian Water Supplies: Reaching the Urban Poor.* Manila: ADB.

6. What Are Pro-Poor Approaches and/or Measures? How Are They Distinct?

In this Guide, pro-poor approaches and measures are specifically targeted initiatives (including policy, regulatory, or institutional changes) that seek to provide the poor with reasonable access to water and energy utility services at an affordable price and of adequate quality, no matter where they are or who serves them.[71] They include activities that promote benefits for the poor, or mitigate the effects of activities on poor populations.

Policy and regulatory reforms will often need to specifically target the poor if benefits for the poor are to be ensured. While it is very easy to demonstrate the economic benefit of providing a poor family with a direct connection to water or electricity services supplied by a utility, not all increases in network connections will be directed toward poor areas or will be affordable for the poor. Hence, targeted pro-poor interventions are often required. This approach may require several departures from the way policy and regulatory reform has traditionally been carried out and implemented.[72]

Pro-poor policy and regulation for electricity and water network providers may require deliberate intervention in traditional fields of access, price, and quality regulation. It may also require a pro-poor system of review and a consumer or pro-poor advocate as explained further in Chapter 8. Pro-poor policy and regulation for alternative service providers will need to consider

that such providers are numerous, diverse, and often outside the formal, legal sector.[73] Alternative service providers usually operate in unregulated markets, whether they supply the water or power themselves or only distribute and sell it.[74] Regulatory reformers may therefore need to adopt minimum environmental, health, and safety standards and maximum pricing levels.[75] In any event, the presence and/or need for alternative service providers as a mode of pro-poor service provision must be specifically considered.

7. What Are the Objectives of Pro-Poor Utility Services Provision?

Pro-poor utility services provision has five primary objectives: efficiency, access, price, quality, and sustainability.

- **Efficiency.** Economic efficiency requires the following:
    - productive efficiency—providers must properly manage the relationship between inputs and outputs;
    - allocative efficiency—providers must ensure that resources are put to their best use by providing proper indicators for consumption and investment; and
    - dynamic efficiency—providers must encourage innovation and productivity gains.[76]

  Other measures can affect efficiency. For example, energy efficiency will promote environmental sustainability and also improve economic efficiency.

- **Access.** Pro-poor utility services provision is ultimately meant to ensure universal access to a direct connection to the potable water or electricity services necessary for life and livelihood.

- **Price.** Pro-poor pricing is meant to ensure that the poor have access to utility services at an affordable price. There are different ways of achieving this (discussed further in Chapter 7), most of which involve a tariff basis or a subsidy.

- **Quality.** Pro-poor quality service provision requires ensuring that the poor have access to utility services of a quality that is

appropriate for their price and access requirements and that achieves acceptable minimum environmental, health, and safety benchmarks. The poor may not seek to have gilt-edged service, but will demand access at an acceptable quality and at an affordable price.

- **Sustainability.** Pro-poor services provision must be financially, environmentally, and socially self-sustaining.

    - Financial sustainability—the reforms that implement pro-poor services provision should ensure that sufficient investments in network expansion, operation, and maintenance will be made and will benefit the communities being served on a long-term basis.
    - Environmental sustainability—environmental sustainability needs to be integrated into infrastructure and environmental assessment and planning processes to avoid the destruction of natural habitats and ecosystems, and to manage energy and water resources in an efficient and integrated way that takes account of the challenges of water scarcity and climate change.
    - Social sustainability—all classes of consumers, including the poor and vulnerable, need to be given a voice in decisions and actions over electricity and water policy and regulation if those decisions and actions are to be socially and politically sustainable over the long term. Decisions and actions need to be equitable and take account of the interests of the poor and vulnerable groups.

8. Why Are Pro-Poor Approaches and Measures Needed?

Pro-poor approaches to the provision of water and energy services are needed because the operation of the market and regulatory system sometimes works in ways that continue to deny or limit the poor's access to a utility service. The poor are often excluded from network infrastructure services, and the limited services to which they do have access are often of low quality.[77] However, the poor's demand for services is often still high

and the poor are typically willing to pay a much higher proportion of their income for these basic services than would a wealthy family connected to the network.[78] For example, many rural poor use biomass for cooking and heating often to their detriment. Box 1.3 discusses the pros and cons of using biomass for cooking and heating.

Box 1.3: The Need for Electricity—Biomass for Cooking and Heating

A large number of the rural poor still use traditional biomass sources—such as wood, charcoal, dung, and waste materials—for cooking and heating[a] because they are cheaper and more readily available.[b] However, they may have detrimental effects on users. Inhalation of fumes from traditional biomass fuels used indoors can cause health problems and eventually lead to higher health care costs. In addition, gathering biomass fuels takes up significant time and detracts from more productive activities.[c]

[a] ADB. 2008. *Energy for All Initiative.* Technical Assistance Project No. 40629. Manila.
[b] ADB. 2009. *Energy Policy.* Manila.
[c] T. Pulley and J. Acharya. Gender and Energy. Manila: ADB. Available: www.adb.org/Documents/Periodicals/GNN/gender-and-energy.asp (last accessed on 5 March 2010).

Women and children collect firewood to be used for heating and cooking

C. Challenges to Pro-Poor Utility Service Provision

1. What Are the Key Challenges?

The key challenges to pro-poor utility service provision include the familiar challenges of all utility service provision in developing countries, such as a weak or unstable government commitment to a reform process, the capture of the policy and regulatory process by political or private interests, corruption, weak regulatory institutions, and weak institutional capacity in terms of both the numbers of staff and their competence to address relevant issues. These familiar challenges are exacerbated by the following seven additional challenges.

a. Access—Disincentives for Network Expansion to the Poor

Consumers receive electricity through vast transmission and distribution networks, and water through extensive networks of pipes and pumps. To expand access, the main network provider must make new investments in the networks. However, service providers face significant disincentives to expanding network access to the poor. If the incumbent main network provider is a state-owned public utility whose tariffs are not high enough to cover the costs of providing the utility service, the utility will have insufficient revenues to direct to new investments in expanding access. It would need large subsidies before it could do so, and funds for these subsidies are often not available. Alternatively, the government could award PSPs the right to expand the network. However, as described in section B.4 above, some evidence suggests that PSPs have often not sought to expand access to the poor because it is often not profitable enough to do so.[79]

In urban areas, the poor often live in informal or illegal settlements. The main network provider may not be able to expand access into these informal or illegal slum settlements because

- the government would view the extension of service as legitimizing the illegal settlement;
- informal settlers or tenants lack the landlord's authority to avail themselves of utility services;[80]
- billing and collecting payment is difficult; and
- the risk of pilferage and illegal connections to the network is high.[81]

In rural areas, expanding access is often even more challenging. It requires significant financing to build extensive network infrastructure and engage additional personnel to support the expansion. Extending the network in some areas is not cost effective because it reduces the efficiency of transmitting electricity and leads to low voltage transmission.[82] Cost recovery is difficult because there are few consumers relative to the overall network area covered.

b. Access—Legal and Procedural Requirements

As well as network providers facing disincentives to extending the existing network to reach the poor, the poor themselves face legal and procedural obstacles to connecting to the existing network. The utility's requirements for connecting a person to the existing network usually include evidence of identity and residential address. The poor often lack formal identity documents, and those living in illegal urban slum settlements face additional obstacles.[83] Some poor people overcome these obstacles by securing indirect connections from landlords or neighbors. But they then leave themselves open to harassment or intimidation from those persons and utility staff.[84] This situation leaves open corruption and abuse of process.

c. Affordability—High Costs of Utility Services from the Main Network to the Poor

Getting utility services from the main network is expensive for the poor because of high upfront costs and high transaction costs. Although the cost per unit of water or electricity from a main network provider is usually lower than that from alternative service providers,[85] obtaining electricity or water from the main network requires the payment of added costs such as connection fees, meter fees, and annual charges. Therefore, the total cost to connect to the main network is often prohibitive for the poor and they rely on alternative service providers instead. Despite their high total costs, main network providers do not often give the poor flexible payment terms, such as buying water on credit, whereas alternative service providers often do. However, the poor often pay high prices for services because they are limited to using alternative service providers.[86] Examples of the high relative costs charged by alternative water and energy service providers are set out in Box 1.4.

Box 1.4: The Price of Water from Alternative Service Providers

Water Services in Jakarta, Indonesia

While vended water is 10 to 32 times more expensive than water from the main network provider, the poor still buy vended water because they cannot afford the additional fees charged by the network provider.[a] The fixed charge for a household that consumes 50 liters of water per person per day will be 5 to 10 times more than the volumetric consumption charge, making it unaffordable for the poorest households.

Alternative Water Service Provision in Dhaka, Bangladesh

One alternative service provider illegally serves 9,100 households through 100 individual connections.[b] It sources its water from the main utility network, without paying, through 15 standpipes, but charges consumers $0.86 per cubic meter for water, compared with the $0.12 charged by the main utility.

Buying from Water Vendors in Manila, Philippines

A poor family in Manila may have to pay 800 pesos (P) for vended water each month, whereas a family connected to the network may only pay P100 each month.[b] That is an extra P700 for not having access to the network—money that a poor family could spend more usefully on other items.[c]

[a] K. Bakker et al. 2006. Disconnected: Poverty, Water Supply and Development in Jakarta, Indonesia. *Human Development Report 2006.* Human Development Report Office Occasional Paper. New York: United Nations Development Programme.
[b] A. McIntosh. 2003. *Asian Water Supplies: Reaching the Urban Poor.* Manila: ADB.
[c] B. Baker and S. Tremolet. 2003. Regulation of the Quality of Infrastructure Services in Developing Countries. In P. Brook and T. Irwin, eds. *Infrastructure for Poor People: Public Policy for Private Provision.* Washington, DC: World Bank.

Both non-poor and poor consumers have to deal with transaction costs; however, the poor pay a higher transaction cost when connecting to the main network provider. The poor who work for daily or hourly wages lose more when they line up to pay bills, because time away from work results in a decrease in pay. The non-poor have other options, such as paying through the internet or using the phone to complain about meter misreading, that the poor do not. In contrast, by obtaining their electricity or water from alternative service providers, the poor can simplify their purchases and more conveniently deal with complaints about the quality of service.

Poor households who have been connected to the electricity grid and subsequently been disconnected due to their inability to pay may suffer

even further barriers to access because of their inability to pay arrears.[87] A failure to pay arrears may disentitle them from subsequently applying for a connection.[88]

d. Affordability—Inadequate Rate Design and Misdirected Subsidies

A main network provider's ability to serve poor consumers is impaired by the following common tariff and subsidy design flaws:

- tariffs are set too low, resulting in low service quality and limiting the main utility's ability to expand its network and services;
- tariffs are set too high, resulting in excessive charges to consumers who do not have other options; and
- subsidies are wrongly targeted because either poor consumers do not receive subsidies, or comparatively rich consumers do receive subsidies.[89]

Tariffs are often set too low for the costs of providing the services to be recovered, thus preventing the main network provider from earning the revenues needed to expand access to the poor. If the middle class and the rich are already connected to the main network, then providing service to those consumers at below-cost recovery levels ensures them a subsidy at the expense of the unconnected poor. Tariffs should generally be set to recover the costs of providing the service, including some contribution toward investments, without allowing the main network provider to earn excess profits.

Pro-poor tariff design is inextricably linked to subsidy design because when tariffs are correctly set at cost recovery levels, then subsidies are required to bridge the gap between the tariff and the amount that poor consumers can afford to pay for the service. Targeted subsidies to allow the poor to afford the utility service are generally preferred to cross-subsidies, which involve charging some users a higher price while reducing the price charged to other users. For example, lifeline tariffs, specifically targeted at identified poor households can help improve the affordability of water and energy services. However, there is also some recognition that cross-subsidies may be the only feasible way of providing subsidies given government's administrative and capacity constraints. For example in India, the Electricity Act of 2003 initially provided for the reduction of cross-subsidies but this provision was removed in a 2007

amendment that recognized that cross-subsidies could not be completely eliminated but continued to be needed to help the poor.[90]

Cross-subsidies are not generally sustainable in a competitive environment; thus, some commentators have argued that competition and privatization harm the poor because they make cross-subsidies unsustainable.[91] In contrast, others claim that cross-subsidies usually benefit the elite or vested interests rather than the poor anyway.[92]

e. Quality—High Costs of Improving Service Standards

Quality, measured in terms of the quality and quantity of supply, the continuity of service, and the quality of consumer service and response time, comes at a cost. The challenge is to offer services of a price and quality appropriate to the poor. Raising quality and service standards usually also raises costs, which may continue to serve as a barrier to the poor. Poor consumers may be willing to pay a higher price for higher-quality utility services, though not at the generally high level of main service providers.[93] The poor, like anyone else, require minimum standards of quality such as stable electrical current or safe water. Above those minimum levels, price and quality could be traded off on aspects such as water pressure, hours of electricity supply, and indoor plumbing.[94]

f. Quality—Continuity of Supply

Service quality involves the availability and continuity of service as key elements. During periods of very high electricity demand, such as mornings and evenings, electricity cuts may be introduced. These power cuts can significantly affect service to the poor because they tend to be introduced into rural areas and poor locations first.[95] Similarly, the poor often suffer interruptions to water supply and in areas where service occurs for less than 24 hours. It is usually the poor who are subject to shorter periods of service.

g. Capacity—Constrained Ability to Respond to the Poor's Needs

Many developing countries lack the proper administrative and regulatory systems to effectively implement any regulatory policies, and the need for skills, knowledge, and empathy to address the needs of the poor impose further constraints. The capacity deficits may exist in relation to both the numbers of

personnel available to consider pro-poor policy and regulatory issues as well as the knowledge, skill set, and interest in the issues. This is compounded by the difficulty in attracting and retaining qualified professionals (given salary restrictions), who are motivated to promote pro-poor regulation. For example, policy makers need to be able to appropriately target subsidies and regulators need to be able to prevent utilities from charging prohibitive connection fees or unreasonable disconnection policies.

In India, women were taught to check and repair leaks in the water distribution system

CHAPTER 2

The Poor and ADB Policies, Strategies, and Initiatives on Energy and Water

A. Overview

This chapter discusses ADB policies in the water and energy sectors and their implications for pro-poor approaches and measures. ADB staff should recall that ADB Board approved policies and strategies that provide mandatory directions to staff. Other strategies and initiatives support the implementation of these policies and strategies.

B. ADB Policies, Strategies, and Initiatives

1. What Explains ADB Support of Pro-Poor Approaches and Measures?

ADB's support for pro-poor approaches and measures derives from its mission. Since 1999, ADB's mission and overarching goal has been to reduce poverty.[96] It has been a long-standing important feature of ADB planning and operations.[97] While ADB recognizes that countries have the primary responsibility for reducing poverty, and their success will depend upon the united efforts of government and civil society, it also recognizes the need for strong and sustained support from the international community.[98] As described in Chapter 1, evidence suggests that targeted efforts to ensure that the poor benefit from measures to increase water and energy supply are often needed. Thus, ADB's overarching support for poverty reduction would also embrace the adoption of more specific pro-poor approaches and measures to ensure that the poor benefit, where necessary.[99]

ADB sees sustainable economic growth, social development, sound macroeconomic management, and good governance as key elements in any framework for reducing poverty and fostering socially inclusive development.[100] Under its Long-Term Strategic Framework (Strategy 2020), ADB intends to focus its support on three distinct but complementary development agendas: inclusive economic growth, environmentally sustainable growth, and regional integration.[101] To adopt a systematic approach to poverty reduction—by promoting policy reforms, assisting the development of physical and institutional capability, and designing projects and programs to better target poverty—specific and discrete pro-poor measures should be integrated into projects and programs to ensure actual benefits to the poor.

Access to electricity allows this farmer to irrigate his land with water pumps powered by electricity instead of diesel

2. How Are Pro-Poor Approaches and Measures Dealt With in ADB Policies and Initiatives?

a. Water Policy (2001)

ADB's water policy complements its poverty reduction strategy by defining an approach to water-related issues that affects poverty reduction.[102] Recognizing that the specific needs and vulnerabilities of the poor are important in formulating sound and equitable water strategies, the policy addresses the three key elements of the ADB poverty reduction strategy: pro-poor sustainable growth, social development, and good governance.[103]

Under the policy, ADB must properly identify and articulate a role for the poor in helping DMCs undertake comprehensive assessments and develop national policies and programs in the water sector.[104] A principal policy element is to promote a national focus on reform of legal, institutional, and administrative frameworks in the water sector that specifically takes the poor's needs into account.[105] Box 2.1 summarizes the key operational features of the ADB Water Policy underpinning pro-poor measures and approaches that ADB staff should know.

Box 2.1: Key Points to Know About the ADB Water Policy

ADB staff should know that the water policy is relevant to pro-poor water supply because it

- sets out an approach to issues that affect poverty reduction in the water sector;
- is geared to the critical effects of water scarcity, water pollution, and degradation of watersheds on the poor;
- embodies a river basin approach to integrated water resource management for pro-poor sustainable growth and requires implementation through national water sector reforms;
- assumes that communities need to be empowered, educated, and involved in the process of water management to allow for more equitable access to water;
- calls for stakeholder consultation and participation at all levels to increase and improve the poor's access to basic water services;
- recognizes the need for good governance and regulation and for subsidies that target the poor; and
- aims to identify a role for the poor in helping developing member countries undertake comprehensive assessments and develop national policies and programs in the water sector.

Source: ADB. 2001. *Water for All: The Water Policy of the Asian Development Bank*. Manila.

b. Water for All Initiative and Water Financing Program

ADB has formulated the Water for All initiative to help the poor protect and develop their assets, make the best use of limited land resources, and improve their overall health.[106] Under this program, ADB has also examined the issue of water connection charges, which often act as a major barrier to connecting the poor.[107] The cumulative benefits of these efforts to the poor will be significant.[108] ADB's water supply and sanitation targets are critical to achieving the MDGs.[109] For example, water is essential for agriculture; safe drinking water and basic sanitation are critical to environmental sustainability.[110]

The Water for All initiative is linked to the Water Financing Program (WFP), which ADB launched in response to international calls for increased financing for water. The WFP seeks to double water investments between 2006 and 2010. Setting a precedent among multilateral development banks, the WFP commits 25% of ADB's investment portfolio to water projects and has set out to ensure that

- 200 million people obtain sustainable access to safe drinking water and improved sanitation;
- 100 million people have a reduced risk of flooding;
- 40 million people have more productive and efficient irrigation and drainage services;
- 25 river basins apply integrated water resources management; and
- water governance is improved through national water reforms.[111]

Table 2.1 indicates ADB's total programmed and approved water investments as of 31 March 2010.

Table 2.1: Water Financing Program (WFP) Investments ($ billion)

WFP Investments	2006	2007	2008	2009	2010	Total
Target	>2	>2	>2	>2	>2	>10
Approved	2.7	1.0	3.3	1.9	0.004*	8.9

* Approved as of 31 March 2010.

Source: Water Committee/Regional and Sustainable Development Department.

The WFP is ultimately intended to bring about a significant increase in the number of people in Asia and the Pacific with access to reliable, affordable water services and effective, sustainable integrated management of water resources in river basins, resulting in sustained economic growth and environmental improvement.[112] A successor program is being developed to succeed the WFP after December 2010 that will continue to target specific results on the ground.

c. Energy Policy (2009)

ADB's energy policy (2009) seeks "to help DMCs provide reliable, adequate, and affordable energy for inclusive growth in a socially, economically, and environmentally sustainable way."[113] The policy has three key operational principles:

- promote energy efficiency and renewable energy,
- maximize access to energy for all, and
- promote energy reform, capability building, and governance.[114]

Promoting energy efficiency[115] is relevant for the poor because it directly helps them reduce their energy bills by lessening their demand for electricity or energy services.[116] It also has the potential to help the poor indirectly because it tends to make an energy system more efficient. If efficiency gains are invested back into the system, network access to unconnected poor areas can be expanded. If efficiency gains are transferred to consumers, electricity services can become more affordable. Further, promoting renewable energy is relevant to the poor because renewable energy can often be provided to remote or rural areas by developing small-scale or off-grid generation and directly linking it to distribution lines for the poor.

Maximizing access to energy is essential to reducing poverty. The policy recognizes that access to modern and reliable energy services is essential for sustainable human development, economic growth, higher quality of life, and better delivery of education and health services.[117] To maximize energy access, ADB will support DMCs' sustainable rural electrification efforts,[118] particularly for remote communities that are less likely to be connected to the electricity grid.[119] ADB will also develop small-scale demonstration projects that can be replicated in other remote locations, which will then be packaged

into projects of bankable size and added as a special component to main energy sector projects if feasible.[120]

The policy emphasizes the promotion of reforms, capability building, and governance to increase investment and efficient use of resources.[121] ADB's efforts under this pillar include supporting regulation of natural monopolies, the introduction of competition, the introduction of the private sector where appropriate, and reforms that improve the governance and efficiency of public energy enterprises.[122] Box 2.2 summarizes key points of the energy policy that ADB staff should know.

Box 2.2: Key Points to Know About the Energy Policy

ADB staff should know that the energy policy is relevant to pro-poor energy because it

- promotes energy efficiency and renewable energy;
- seeks to maximize energy access for all; and
- seeks to promote good governance and regulatory reform directed toward the needs of the poor.

Source: ADB. 2009. *Energy Policy*. Manila.

d. Energy for All Initiative

The ADB Energy for All initiative aims to "improve the economic, environmental, and health conditions of the poor by increasing their access to modern forms of energy."[123] The widespread lack of access to modern energy services for the poorest households is a severe impediment to progress in meeting most of the MDGs.[124] No MDG refers explicitly to energy, but studies show clear links between energy and all of the MDGs.[125] As an example, the MDG to eradicate extreme poverty and hunger would be inhibited without access to modern energy services because the poor will suffer from respiratory diseases, spend many hours collecting fuelwood from forests and water from streams, and be deprived of opportunities to engage in income-generating activities.[126] Unless affordable and sustainable energy services are made more widely available, not only will the MDGs not be achieved, but 1.4 billion people globally will still have no access to electricity in 2030.[127]

CHAPTER 3

Designing Policy and Regulation to Be Pro-Poor

A. Overview

This chapter discusses the process of designing pro-poor policy and regulation, when pro-poor policy and regulation should be considered, and the steps that designers must take to ensure that policy and regulation is pro-poor. It describes how analysts, regulators, and sector stakeholders can assess the needs of the poor and consider these needs in project design.

An overriding concern for all pro-poor policy and regulation is the country's institutional endowments and governance structures. Vested interests may not want the poor to access formal water or electricity supplies because they are obtaining significant benefits from the status quo. They may be obtaining revenues or bribes from operating large alternative service providers, or by illegally connecting the poor to the network. Thus, serving the poor will also require policy and regulatory designers to consider strong core and sector governance and specific anticorruption measures.

B. The Process of Designing Pro-Poor Policy and Regulation

1. When Should Pro-Poor Policy and Regulation Be Considered?

Designers and reformers should consider pro-poor policy and regulation at several obvious stages of the design and reform process. They rarely start with a blank slate. Up front, a baseline examination is needed to determine the effects of existing policy and regulation on the poor. Thereafter, an assessment is needed before selecting major new designs or proposing redesigns to the policy, statutory, or regulatory regime, including the way it is implemented.

a. New Infrastructure and Utility Service Laws Introduced

The legislative branch of government has the primary responsibility for establishing utility legislation, including how it treats low-income consumers. Such legislation typically leaves a great deal of discretion to the relevant ministry, agency, or regulator. It often encompasses issues relevant to the poor as a vulnerable group, including

- universal service obligations;
- energy efficiency and water conservation standards and programs;
- inverted rate and lifeline rate design; and
- connection, disconnection, and reconnection policies.

The government has an opportunity and an obligation to ensure that the poor are not disadvantaged by changes arising from any major revision to the legislative framework or the statute that established the relevant agency or regulatory body. It should also ensure that the poor can share equitably in any benefits obtained by other classes of citizens or consumers. The legislature should also provide statutory direction on how the needs of the poor are to be taken into consideration.

b. Any New Policy or Regulation

New regulation should only be established after a thorough notice and comment process, including giving the public the opportunity to comment on pro-poor utility service issues. This process should be open to all sector stakeholders, including representatives of the poor. Where the interests of the poor are not well represented by government agencies or nongovernment organizations (NGOs), regulators must take a proactive role in considering their interests.

c. Major Policy or Regulatory Review and Revisions

Sector policy makers and utility regulators undertaking a major policy or regulatory review with a view to implementing revisions to existing policy or reguation must consider the effect of existing and proposed new policies upon the poor directly. For example, if the regulator was considering the approval of a large new power plant, or changing from cost-plus to performance-

based methods to determine tariffs, it would need to assess the needs of the poor and how the proposals would affect those needs.

d. Tariff Changes

Any time that a policy maker or the regulator changes or modifies the tariff charged by utilities, that body needs to examine the impact of proposed changes on the poor.

e. Changes to Subsidies

Policy makers or regulators will need to examine the effects on the poor of the introduction or elimination of any subsidies.

2. What Steps Must Designers Take to Ensure that Policy and Regulation Is Pro-Poor?

Policy makers and regulators must understand the needs of the poor and take them into account when setting regulatory objectives; then they must carefully monitor implementation over time to ensure that the objectives are met and that unforeseen problems are addressed in a timely manner. The steps to ensure pro-poor policy and regulatory design are to (i) assess and understand the poor's needs, (ii) formulate pro-poor policy and regulatory objectives, (iii) assess the impact of policy and regulatory reform on the poor, (iv) design and formulate pro-poor policy and regulations, (v) monitor and review implementation, and (vi) encourage accountability and transparency.

a. Assess and Understand the Poor's Needs

Understanding the needs of the poor is challenging for policy makers and regulators who are not themselves poor and whose education and technical understanding may vastly exceed those of low-income consumers. The policy makers or regulators must establish a formal process to investigate the needs of the poor, involve their representatives early in that process, and regularly revisit the assumptions upon which utility service conditions and tariffs are based. Box 3.1 sets out a checklist of questions for understanding the needs of poor consumers and Box 3.2 provides a checklist for understanding the circumstances surrounding the way the poor access electricity and water services.

To establish the formal process, a new policy maker or regulator should convene an advisory body of pro-poor advocates before establishing an initial set of operating rules and tariffs. The advisory body should convene periodically to determine if the operating rules and tariffs are working as intended, and if there are new or unforeseen issues that need attention. The possible modes for obtaining such external inputs, including establishing advisory bodies, are discussed further in Chapter 8.

Box 3.1: Understanding Poor Consumers' Needs

Who Are The Poor?
Establish a formal, predictable, and transparent means of determining who counts as "poor." It is likely to be difficult to gather the necessary information due to the absence of formal addressing systems or property rights and the lack of statistical information about poor communities.

How Do The Poor Currently Obtain Services?
Determine whether the poor have access to the main network or rely on small, informal entities (alternative service providers). The poor often obtain services through alternative service providers, which may be resellers of utility services or shared outlets.

What Services Can The Poor Afford?
Establish a means of determining what the poor can pay. Affordability is a key issue, and subsidies may be required for equitable service provision. However, subsidies must be targeted to be efficient.

How Are The Poor Organized?
Consider how the poor are grouped, and how policy makers and regulators can use these groupings to listen to them and address their needs. Rural communities are more cohesive and more easily organized, which makes them easier to deal with. Peri-urban areas may be more disjointed, without an organized voice to express their needs.

What Do The Poor Want?
Determine what the poor in a particular location want. Their needs may be very different in different communities. While the poor are aware that there are trade-offs between price and quality, they may have difficulty expressing their preferences to policy making on regulatory bodies, especially if they are illiterate.

Source: Adapted from S. Tremolet. 2002. Pro-Poor Regulation: Challenges and Implications for Regulatory Design. Conference background paper for Infrastructure Development: Private Solutions for the Poor: The Asian Perspective, Manila, 28–30 October.

Box 3.2: Checklist for Understanding the Current Circumstances of the Poor

The Water Sector

- What is the population?
- What area does the water network cover?
- How many are directly connected to the water network (volume and cost)?
- How many are served by the standpipe (volume and cost)?
- How many are served by a neighbor's connection (volume and cost)?
- How many are served by a water vendor (volume and cost)?
- How many are served by small-scale water providers (volume and cost)?
- What is the estimate of the nonrevenue water (% of production)?
- What is the estimate of theft and pilferage?
- What proportion of the population enjoy 24/7 water from the utility?

The Energy Sector

- What is the population?
- What area does the electricity grid cover?
- How many are directly connected to the main electricity grid?
- What other forms of non-grid or off-grid energy (including heating and cooking) are available?
- How many poor households have access to these energy sources from alternative service providers?
- What is the estimate of transmission and distribution losses?
- What is the estimate of electricity theft or pilferage (percent of production)?
- What proportion of the population enjoy 24/7 electricity from the utility?

Source: Authors.

b. Formulate Pro-Poor Policy or Regulatory Objectives

The policy maker and/or regulator should adopt explicit pro-poor policy and regulatory objectives, which may include universal service; affordable pricing for essential utility service; and reasonable connection, disconnection, and reconnection policies. For instance, when undertaking energy sector reforms, assuring that new loads from system expansions are energy efficient may require programs to assist low-income consumers to purchase high-efficiency lighting and appliances. Such an effort will help prevent low-income consumers from using inefficient lighting and then demanding

higher subsidies for electricity. It is much more cost effective if the pro-poor objectives are considered and planned for in advance. Box 3.3 lists key principles for policy makers and regulators to consider when establishing pro-poor objectives.

Box 3.3: Principles to Consider in Establishing Pro-Poor Objectives

Policy makers and regulators should consider the following principles in establishing pro-poor objectives:

- improve the lives of the poor through access to affordable utility services of appropriate quality as the key objective;
- avoid assuming that the poor are high-risk, low-return consumers;
- address the poor living in informal and often illegal settlements in utility supply policies and related legislation and regulations;
- avoid assuming that the main network is the best utility service provider for the poor—alternative service providers may play an important role;
- seek novel ways to deal with the geographical and physical constraints on infrastructure and service provision in low-income areas;
- appreciate that efforts to provide subsidies to the poor through tariffs have not often worked; and
- actively seek innovations to overcome the financial, legal, and social constraints faced by the poor in utility service reform.

Source: Adapted from Public–Private Infrastructure Advisory Facility. 2002. *New Designs for Water and Sanitation Transactions. Water and Sanitation Program.* Washington, DC.

c. Assess the Impact of Policy and Regulatory Reform on the Poor

Designers and reformers should next assess the potential impact of policy, structural, and regulatory reforms on the poor. The first step is to determine the relevant government policies and regulations. These include

- policies and rules for expanding access coverage, including whether those existing policies and rules are sufficiently detailed and enforceable;
- tariff levels and structure, including whether they are the most efficient for the consumer base;

- quality standards, including whether they are set at a sufficient and appropriate level; and
- alternative service providers, including whether they are able to operate in the community.[128]

A regulatory impact assessment or review is needed to assess the effect of the regulatory reform at the outset of the process. This assessment seeks to determine whether the poor are likely to benefit or be burdened by proposed reforms and to maximize the benefit to the unconnected poor. For instance, reforms usually seek to raise tariffs to recover the full cost of providing the utility service and to ensure the financial capability to expand. This typically has one or both of two broad implications for the poor. The change from a government-provided below-cost service to a full-cost service may be burdensome for the poor who are already connected. However, the unconnected poor may benefit because, when the utility receives higher revenues, it is able to reinvest more money to expand the network and increase access for poor consumers. A checklist of questions designed to measure the impact of reforms is set out in Box 3.4.

A regulatory review may identify ways to overcome identified hurdles for the poor. For example, establishing proper legal frameworks could have a positive impact on the poor because they can reduce regulatory uncertainty for private investors and may contain provisions explicitly targeted toward improving services for the poor.[129] With reduced regulatory risks, overall costs should be lower, and tariffs could be lower.

d. Consider Alternative Service Providers

Policy makers and regulators often overlook alternative service providers on the assumption that the main network provider can provide services more efficiently.[130] Sometimes this approach is justified: some alternative service providers offer lower-quality services at higher per-unit costs, and some may even have poor safety standards.[131] However, main network providers may not be able to extend continuous access to utility services for long periods, and poor areas may find it too expensive or inappropriate to rely on them.[132] Thus, alternative service providers often provide a critical service.

Alternative service providers that are closer to low-income communities may have better insights about how best to serve these consumers. Designers

Box 3.4: Guide Questions to Measure the Impact of Pro-Poor Reforms

- What are the likely effects of the reform on low-income consumer bills?
- Will the reform lead more low-income consumers to be disconnected from service?
- Are there low-cost generation resources (such as government-owned hydro) that can be reserved for basic domestic needs, so that a lower cost-based rate can apply to lifeline service?
- Are sequenced, phased tariff increases needed for residential service?
- To what extent do regulators prioritize the poor's access to services?
- How do regulators improve access and prevent disconnections?
- Do tariff schedules prioritize income distribution goals over allocative efficiency?
- How is affordability addressed? How do regulators interact with other government departments concerned with the poor? Do different parts of government coordinate on poverty reduction?
- Are subsidies or cross-subsidies used to pay for connection costs or the charges for service, such as through lifeline tariffs?
- What administrative and regulatory capacity exists? How does the regulator's funding affect their ability to tackle pro-poor issues?
- Is the regulator subject to capture by politicians or the private sector? If so, to what extent does this capture regulatory policy bias against the poor? To what extent do regulators attempt to obtain information from the poor to ensure that they address their needs?

Source: Adapted from D. Parker, C. Kirkpatrick, and C. Figueira-Theodorakopoulou. 2008. Infrastructure Regulation and Poverty Reduction in Developing Countries: A Review of the Evidence and a Research Agenda. *Quarterly Review of Economics and Finance.* 48 (2008). Elsevier. pp. 177–188.

and reformers can avoid results that serve neither the consumer nor the utility system by including alternative service providers in the initial development of the utility regulatory framework. Thus, the removal of market barriers and legal recognition of the existence of alternative service providers may benefit the poor. For example, in the energy sector, usually only regulated utilities can lawfully resell electricity. Thus, resellers are required to register as an electrical utility and meet all the service standards of an electrical utility.[133] This registration may amount to overregulation for alternative electricity providers. Regulatory designers could probably determine a reasonable

level below which a reseller need not be registered, so that small alternative service providers could be exempted from strict registration or licensing requirements. However, regulators may have limited regulatory authority or mandate to deal with alternative service providers, which raises additional challenges.

To ensure the full potential of alternative service providers is realized, policy makers and regulatory designers should

- understand the alternative service providers' market;
- examine whether it makes sense to bring alternative service providers into the formal sector through laws or regulations at all;
- if it does, determine what aspects of alternative service providers' performance should be regulated (if any); and
- determine what institutional mechanisms can be relied upon to regulate alternative service providers (if any).[134]

Industry structure should facilitate, rather than discourage, new market entrants, including small and informal operators; this can be achieved through laws and regulations. To introduce alternative service providers into the formal market, policy or regulatory reformers would need to undertake the following reforms:[135]

- lift legal prohibitions on new entrants into the market;
- remove biases against alternative service providers in tariffs, quality standards, and other regulations;
- provide effective, simple rules that prevent alternative service providers from engaging in unsafe or environmentally harmful practices; and
- help alternative service providers provide lower-cost, higher-quality service by facilitating interconnection with the formal network operators where requested.

One way of regulating alternative service providers is a gradual tightening of minimum service standards, with some incentives placed on alternative service providers to enter the formal sector and upgrade their services over time.[136] For example, governments could provide financing facilities to alternative service providers that want to expand their activities, on the

condition that they would fulfill licensing or operating quality requirements by a certain date.[137]

e. Design, Formulate, Issue, and Implement Pro-Poor Policy and Regulations

After the preparatory steps discussed above, the appropriate parties will need to design, formulate, issue, and implement the policy and regulations. These substantive components of pro-poor policy and regulatory design are discussed in greater detail in Chapters 4–6.

f. Monitor and Review Implementation

To ensure that any resulting policy and/or regulations are working to benefit the poor, and to assess the overall effectiveness of any pro-poor designs, proper monitoring, review, and evaluation are needed.

Assuming pro-poor objectives have been set, regulators or an external party will need to periodically review the policy or regulations to determine whether they are operating to meet those objectives as intended, and whether new issues are emerging that require regulators' attention.

Ongoing consultation and stakeholder engagement are necessary to monitor the effectiveness of pro-poor policy and regulations.[138] In the early stages of their development, legal provisions can be included to require consultation with low-income consumers to allow them to express their preferences and priorities.

Consultation committees and stakeholder partnerships involving the poor may also be established for review and evaluation.[139] Stakeholder involvement can greatly increase public acceptance of new or changed policies and can expand the policy maker and/or regulators' understanding of the needs of the poor. This increased understanding and public acceptance can significantly improve the regulators' willingness to pursue new policies or regulations by expanding their knowledge of the political environment, which is often more tolerant of change than may be perceived.

g. Encourage Accountability and Transparency

Policy makers, administrators, and regulators must also be accountable for their actions and decisions to ensure that regulations are properly implemented.

Decisions should be subject to challenge when they are perceived as unfair or wrong, to reduce the risk that certain utility service providers are treated unfairly or unequally. Ensuring accountability to consumers may be more difficult and may require that other key players, such as the media and consumer groups, monitor the treatment of consumers.[140]

At the same time, effective monitoring will also require utility service providers to practice transparency in their operations. Utility service providers need to produce regular progress reports, use open book accounting for funds that support services to the poor, and adhere to international standards of accounting and reporting.[141]

CHAPTER 4

Energy and Water Efficiency and Pro-Poor Support

A. Overview

Increasing the efficiency of water and electricity supply and use has a direct effect on the lives of the poor because it reduces their need for the utility service. It also has an indirect effect on the poor because it leads to more reliable electricity and water supplies, more efficient use of those supplies, and more efficiently run utilities, all of which can lead, in turn, to lower prices for all consumers, or additional revenue to invest in expanding access. However, these measures may have a limited effect, if any, on the very poor who have no access to the electricity or water supply network.

Box 4.1: Water and Electricity Use

Water and Electricity in the Kathmandu Valley, Nepal

Poor communities in the Kathmandu Valley have very high electricity bills—up to 20 times the size of their water bills. This is unusual in South Asia, which has an average ratio of 4:1.[a] It was found that these communities needed extra electricity to pump and store water because local suppliers provided unreliable and intermittent service. Reduced demand and improved delivery of water would reduce electricity use and increase the disposable income of this poor community.

Water and Electricity in Andhra Pradesh, India

In 2004, the Government of Andhra Pradesh introduced a policy that provided free power supply to farmers who used water pumps for agricultural irrigation.[b] The policy required that the water pumps be made more efficient by changing the motor to a more efficient one, installing capacitors, using plastic pipes, and using frictionless foot valves for farmers to claim the free electricity.

[a] A. McIntosh. 2003. *Asian Water Supplies: Reaching the Urban Poor.* Manila: ADB.
[b] Prayas Energy Group. 2008. *Awareness and Action for Better Electricity Service: An Agenda for the Community.* Pune.

Energy utilities use enormous amounts of water. It is often one of their most significant cost items. Almost all conventional power plants use cooling cycles that require water.[142] Correspondingly, water utilities use enormous amounts of energy; it is one of their largest cost items, if not the largest. Thus, energy and water efficiency measures can reduce costs for both energy and water utilities and hence increase the available revenues for expanding access. Box 4.1 provides examples of the link between water and electricity use.

B. Energy Efficiency Services

1. What Are Energy Efficiency Services?

Energy efficiency involves all changes leading to lower energy use for a given energy service (such as home appliances, lighting, heating or cooling), or for a given level of activity.[143] It can result from technical changes, better organization and management, or improved sector economic efficiency.[144]

2. Why Are Energy Efficiency Services Important for the Pro-Poor?

Energy efficiency services help the poor directly because they reduce demand for energy.[145] They can also help the poor indirectly because efficiency gains can be reinvested to expand network access to unconnected poor areas, or be transferred to consumers, making energy services more affordable. Many different programs with different funding sources have been developed to assist in reducing energy consumption in low-income households.

Low-income consumers lack access to capital for investments in energy efficiency. Well-off consumers may be willing to invest in energy efficiency measures because they are cost effective over the full life of the energy-efficient appliance. However, often low-income consumers cannot even afford efficiency measures that would pay for themselves within a year. Thus, in most markets, the investment cost for energy efficiency technologies is a barrier that prevents low-income households from replacing their energy-inefficient equipment.

3. What are Energy Efficiency Standards?

Policy makers or regulators can establish energy efficiency standards to set a target for energy savings. It requires either a state, province, or utility to achieve

targeted levels of energy savings (which in some jurisdictions has been framed as a reduction in greenhouse gas emissions) and may be implemented in conjunction with a scheme that awards certificates that represent the amount of energy savings and allows trading of those certificates.

Energy savings are usually achieved by demand-side, end-use efficiency programs such as those described in section 4 below. For example, in the United States (US), 19 states have adopted an Energy Efficiency Resource Standard that requires achievement of specified energy savings targets by implementing energy efficiency programs.[146] These energy savings are tracked through a scheme certifying energy reductions as white certificates. In the United Kingdom, energy efficiency standards require electricity retailers to spend money on residential consumers for energy savings targets. In 2000, the program was extended to all electricity and gas suppliers for residential consumers. Similar targets have been imposed in New South Wales, Victoria, and South Australia.

4. How Can Energy Efficiency Programs Benefit Low-Income Consumers?

a. Demand-Side Measures

Energy efficiency programs can benefit low-income consumers with reduced costs through

- more efficient heating or cooling in new and retrofitted energy efficient buildings;
- more efficient lighting;
- more efficient appliances, thereby reducing electricity costs;
- establishing fuel conversion programs; and
- establishing appropriate tariff rates.

The first four types of programs are described below. The discussion on tariffs is contained in Chapter 7.

i. Efficiency in New and Retrofitted Buildings and Housing

Retrofitting buildings and housing with more energy-efficient structures, equipment, or appliances has been an important means of improving energy efficiency in developed countries as widespread state or national programs can drastically improve the efficiency of the energy network. It includes

investment in windows, insulation, caulking, weather stripping, and other building shell improvements. Many programs provide free assistance to low-income households in countries such as Ireland, New Zealand, South Africa, and the US[147] and they are also often designed to employ local workers in low-income communities. The most successful programs combine utility, government, and grant funds, with little or no contribution from the recipient low-income households. Box 4.2 sets out examples of energy efficiency and retrofitting programs directed toward low-income groups.

Box 4.2: Energy Efficiency and Retrofitting Programs

The New Zealand Energy Efficiency and Conservation Authority

New Zealand included the creation of the New Zealand Energy Efficiency and Conservation Authority within its electricity industry restructuring process as a concession to environmental advocates. Originally, it had no social focus; however, the interplay of political, economic, and social welfare issues linked to energy efficiency became clear within a few years. As a result, the authority now directs significant funding to low-income consumers, particularly for addressing energy efficiency and health concerns in rural areas.[a]

Australia's Programs for Low-Income Households

Green Start, a national program directed at low-income households, was announced on 25 November 2009.[b] The A$130 million Green Start initiative seeks to improve the energy and water efficiency of low-income and disadvantaged households. It covers owner-occupied, rental, public, and community housing in all geographic regions. Eligible households receive free home energy and water assessments; free supply and installation of energy and water efficiency products such as pipe insulation, efficient light bulbs, low-flow showerheads, draft-proofing, and seals for refrigerators, doors, and windows; and personalized help to access rebates and programs, and to deal with landlords and trades people in implementing the measures.

Similar state measures are also in place to provide low-income support for energy efficiency housing retrofits. The State of Victoria has had an Energy and Water Task Force in operation since 2003 to assist low-income residents.[c] The program offers free energy and water home improvements to low-income households in Victoria's most disadvantaged communities. Home improvements may include ceiling insulation, efficient lights, and fixing drafts and other sources of air leakage. In May 2009, in New South Wales, the Low-Income Household Refit pilot program began, with a full program planned for later rollout. The pilot offers free energy assessments and power saver kits, though the free measures available do not appear to include larger home efforts such as insulation.

continued on next page

Box. 4.2: continued

The United States Programs for Low- and Moderate-Income Families

Since 1976, the United States (US) Department of Energy has provided direct financial assistance to more than 6.2 million low-income households for installing energy saving measures under its Weatherization Assistance Program. This assistance is usually matched by support from utilities, allowing families to dramatically reduce their energy bills.[d] Additional funding to improve energy efficiency measures for moderate-income households is provided in the economic stimulus program approved by Congress in early 2009 under the US Recovery Act.[e]

[a] The Regulatory Assistance Project. 2002. *International Survey of Low-Income and Rural Development Programs for the Electricity Sector.* Jakarta and Washington, DC: United States Agency for International Development (USAID). p. 9; see also Energy Efficiency and Conservation Authority. Available: www.eeca.govt.nz/

[b] Australian Government Department of Environment, Water, Heritage, and the Arts. Green Start. Available: www.environment.gov.au/sustainability/greenstart/index.html

[c] Sustainability Victoria. Available: www.sustainability.vic.gov.au/www/html/1464-energy-task-force.asp

[d] US Department of Energy. Energy Efficiency and Renewable Energy. Weatherization Assistance Program. Available: http://apps1.eere.energy.gov/weatherization/

[e] US Recovery Act. Available: www.recovery.gov/Pages/home.aspx

In developing countries, too, improvements in housing efficiency could directly reduce the poor's demand for energy. Home and building retrofitting may be less important for the poor in developing Asia than in developed countries, but energy efficiency is critical in the retrofit of commercial and industrial facilities and the design of new housing for poor urban and rural households.

ii. Efficient Lighting

Lighting is one of the largest electricity uses for low-income households. Efficient lighting programs aim to help realize energy savings through improved efficiency of existing lighting systems and accelerate the deployment of new clean lighting technologies.[148] Regulators have increasingly mandated efficient lighting and some electric utilities have instituted demand-side management (DSM) activities including efficient lighting.[149] Box 4.3 sets out some recent examples of efficient lighting programs in developing countries. Two types of programs have had particular success:

- compact fluorescent lamps (CFLs)—the collection of incandescent light bulbs and their replacement with compact fluorescent lamps for little or no charge to the consumer; and

Box 4.3: Efficient Lighting Programs

Compact Fluorescent Lamps Program in Nepal

In Nepal, the Nepal Electricity Authority has adopted a compact fluorescent lamp (CFL) program that distributes 1 million energy efficient CFLs to residential consumers.[a] CFLs will be distributed at no charge to lifeline households and on a buy-one-get-one-free basis to non-lifeline households.

Pakistan's CFL Program

Through its CFL project, the Government of Pakistan will replace about 30 million incandescent bulbs from residential consumers with efficient, high-quality CFLs.[b] The distribution companies will deliver the CFLs to registered household consumers in their license areas.

The Philippines' CFL Program

In the Philippines, the Department of Energy, in accordance with its efforts to phase out incandescent bulbs by 2010, will purchase 13 million energy-efficient CFLs for free distribution to consumers in four major metropolitan areas.[c] Eligible consumers will replace their incandescent bulbs with CFLs at a designated distribution utility. In conjunction with this project, a pilot program that provides consumers in certain off-grid areas with light-emitting diode (LED) lights will also be undertaken to evaluate the use of LED lights in place of kerosene, candles, and other non-electric alternatives.

Solar–Wind Street Lighting in Nepal

The Energy Access and Efficiency Improvement Project promotes the use of solar-powered streetlights and wind–solar hybrid streetlights in urban areas of Nepal.[a] The Nepal Electricity Authority will execute the program and will replace incandescent bulbs, sodium vapor lamps, and mercury vapor lamps with compact fluorescent, low-pressure sodium, or LEDs powered by solar and wind energy; retrofit existing conventional street lighting systems with solar lights and wind–solar hybrid lights systems; and install turnkey solar-powered street lighting systems and wind–solar hybrid street lighting systems.

[a] ADB. 2009. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Administration of Grants Nepal: Energy Access and Efficiency Improvement Project.* Manila.

[b] ADB. 2009. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranche Financing Facility and Administration of Cofinancing Islamic Republic of Pakistan: Energy Efficiency Investment Program.* Manila.

[c] ADB. 2009. *Report and Recommendation of the President to the Board of Directors: Proposed Loan and Administration of Grant Republic of the Philippines: Philippine Energy Efficiency Project.* Manila.

Solar–wind-powered street lamps in Palawan, Philippines

- renewable street lighting—the installation of street lighting from wind and solar sources in lieu of standard electric street–lighting programs. Solar–wind-powered street lamps are also considered energy efficient because more efficient lighting technologies, such as LEDs, are needed to downsize the renewable power supply and storage batteries.

iii. Efficient Appliances

In hot climates, after lighting, ceiling fans and refrigerators consume the most electricity.[150] Ceiling fans, refrigerators, cooling equipment, and other appliances operate at different efficiency levels. The appliances available in developing Asia are frequently not as efficient as those available in developed countries because not all Asian governments have established energy efficiency standards and labeling services.

Whether or not the poor directly use such equipment, they are indirectly affected by the purchase and use of inefficient appliances by more wealthy people and companies within their society. Inefficient appliances require additional amounts of energy that ultimately require utilities to invest more in production, transmission, and distribution to satisfy a given level of demand. Energy efficiency minimizes electricity load, thus reducing a utility's need to make these investments and allows those savings to be directed to meet otherwise unmet needs. Efficient appliances typically have a high return on investment due to their energy savings from lower consumption of electricity.[151]

Thus, establishing energy efficiency standards for appliances can be among the most cost-effective options available to governments and utilities for controlling demand, satisfying energy demand projections,[152] and allowing a limited supply of electricity to better serve a larger portion of the population. Some programs have provided free refrigerator replacements to low-income households; these programs benefit the environment further by recycling the old appliances and capturing chlorofluorocarbons.[153]

iv. Fuel Conversion Programs

Fuel conversion programs benefit low-income households. Low-income households often burn kerosene and other petroleum products for cooking and lighting, and may also burn traditional biomass fuels indoors, leading to health and safety problems and ultimately higher health care costs. There are significant potential benefits from fuel conversion programs in improving the quality, safety, and reliability of service, and reducing economic costs, environmental impact, and dependence upon imported fuel. Box 4.4 sets out an example of a fuel conversion program in South Africa.

Box 4.4: Fuel Conversion Programs

Converting Kerosene to Electricity in South Africa

A program shifting energy use from kerosene to electricity (i) reduced the total energy requirement (because electric lighting and cooking is more energy efficient than kerosene); (ii) reduced cost (because electricity, generated from a mix of coal, nuclear energy, and hydropower, is cheaper than kerosene, which is produced from petroleum); (iii) reduced environmental impact (because kerosene is toxic to aquatic life and is a possible contaminant of groundwater); and (iv) increased safety (because kerosene-related burn injuries and cooking accidents are common).

v. Automating the Delivery of Electricity

Smart grids hold the potential for presenting a very effective way of efficiently delivering electricity to the consumer. A smart grid is an "intelligent electric delivery system" that may be able to predict peaks in the demand for electricity, perceive system overload, detect electricity pilferage, and correct these conditions.[154] Smart grids can increase capacity, improve energy efficiency, and lower greenhouse gas emissions by managing loads, reducing system loss, and allowing interaction between the utility and consumers.[155] Smart grids need smart meters to operate. Smart meters will measure electricity consumption and communicate with appliances and the electric utility through the smart grid.[156]

However, developed countries are in the early stages of utilizing smart grid technologies. Their use in developing countries will face many challenges and is probably not a short-term prospect, although it does hold future potential.

b. Supply-Side Measures

Energy efficiency is most commonly associated with managing demand, but it is also applicable to managing supply.[157] Tremendous amounts of energy are lost as heat when power is generated, transmitted, and distributed. Supply-side management seeks to limit and reduce energy loss in the process of producing electricity. Power utilities can do this through proper planning and adoption of efficient technology. Energy-generating companies obtain direct benefits—more efficient systems translate to reduced wholesale power costs, improved voltage levels, more system capacity, and potentially reduced investment in system improvements. The poor obtain indirect benefits, which include improved system reliability and lower retail prices. Several opportunities and options for supply-side management are described below.[158]

i. Resource Preparation and Use

Resource preparation and use measures involve using more efficient resources and managing them better by (i) improving non-efficient energy resource generation, for example by using clean coal technologies; (ii) substituting one fuel source for another; and (iii) using renewable energy. From these measures, power output per unit of resource is increased and environmental impact reduced.

ii. Electricity Generation and Energy Conversion

Enhancing energy efficiency in electricity generation and energy conversion involves (i) improving the operations of existing power plants to ensure that equipment and systems operate at the most energy efficient level, (ii) upgrading electricity generation units through the installation of equipment enhancements, and (iii) generating heat and electricity from a single source (cogeneration).

iii. Transmission and Distribution

The transmission and distribution of electricity from the power plant to utilities and end users may be made more efficient by (i) reducing technical losses with various measures such as increasing transmission voltage, installing higher efficiency transformers in electricity substations and replacing overloaded lines with larger-sized conductors; (ii) planning to relocate transformer and substation sites closer to consumers using large electricity loads; (iii) reducing non-technical losses with innovative metering (e.g. pre-paid metering) and load-monitoring schemes; (iv) instituting appropriate penalties for electricity

Electricity transmission utilities facilitate delivery of electricity to rural areas

theft and pilferage; (v) instituting a cap on the amount of system losses that transmission and distribution utilities can charge and pass through to consumers and requiring the amount to be further reduced over time; (vi) aggregating the energy load of several consumers (such as through local community electricity associations), which results in less administrative work for the utility (in billing and meter reading and protecting against theft and pilferage), and expanded access to electricity and lower electricity prices for consumers if the aggregated load is charged at commercial tariff rates; (vii) giving incentives or imposing penalties to improve system power factor;[159] (viii) shifting load patterns through demand-side management and demand-pricing schemes to even out the load on the electric system to avoid excessively high peaking periods;[160] and (ix) improving the monitoring of energy flow and sales across the system grid.

iv. Transport of Fossil Fuels

Efficient transport measures include using high-efficiency motors and ensuring that the pipelines used to transport fossil fuels are correctly sized. They also include simple measures to minimize fuel use such as checking the tire pressures of vehicles transporting the fuel and planning transport routes to ensure that the shortest possible route is taken.

5. What Other Ways Can Energy Efficiency Be Promoted to Benefit Low-Income Consumers?

Participation in energy efficiency programs can be encouraged by several measures that are not complete energy efficiency programs in themselves. They will limit the total cost (and probable subsidy) of energy efficiency programs associated with serving low-income households or establish the framework or incentive to do so. These measures include load limiters, revenue cap tariffs inverted rates, and time of use or seasonal tariffs.

a. Load Limiters

An electric service load limiter limits the level of current a consumer receives from a power line.[161] It is established at the consumer's location or remotely, with an automatic meter.[162] It works by interrupting the flow of current through the consumer's power circuit when the level exceeds a predetermined

maximum.[163] Load-limited consumers have a powerful incentive to choose high-efficiency lighting and appliances. Load limiters may be set at a specific load for a fixed monthly bill to poor consumers beyond which electricity service is not provided.[164] Load limited connections are an effective pro-poor measure as the poor mainly use electricity for lighting, which requires only limited load.[165]

b. Revenue Cap Tariff and Decoupling

Revenue-cap tariff structures set the price of service that a utility provider can charge by providing a limit on the amount of revenue that a utility can earn. Revenue caps are calculated by subtracting expected efficiency savings (X) from the rate of inflation measured by the consumer price index (CPI) or CPI – X. Revenue caps can be used in providing electricity or water where the demand is beyond the control of the utility provider, and where the cost incurred by the utility provider in meeting the demand is not affected by short-term variations in the quantity of supply demanded.

They promote energy efficiency because they break the link between a utility provider's incentives to increase sales from the profits it receives. Decoupling works by breaking the link between the amount of electricity a utility sells to consumers and the revenue it collects from consumers to cover its fixed costs.[166] Utilities typically seek to increase electricity sales by increasing demand to increase revenues. Decoupling removes this incentives and in doing so also eliminates a utility's disincentive to promote energy efficiency.[167]

c. Inverted Block Rate Tariffs

Inverted block rate tariffs split consumer consumption into blocks. The tariff increases for each block per unit of energy consumed. The consumer is invoiced for the sum of energy consumed over each of the blocks. Inverted block rate tariffs, with or without load limiters, provide a strong incentive for using high-efficiency lighting and appliances instead of energy-inefficient lighting and appliances.

d. Time of Use Tariffs

Time of use tariff structures set electricity rates depending on the time of day or the season.

Box 4.5: Time-of-Day Tariffs

People's Republic of China
Twenty provinces charge large consumers peak and off-peak tariffs, rendering more than 50% of the total electricity consumed subject to time-of-day tariffs.

Mongolia
Industrial and commercial entities and residential consumers under a time-of-day tariff are charged the same rate of 51 togrogs (MNT) per kilowatt-hour (kWh) for daytime consumption; the rate for night consumption is about MNT8 per kWh less. Industrial and commercial consumers are charged a higher rate of MNT102 per kWh for peak hours consumption.

Source: ADB. 2005. *Electricity Sectors in CAREC Countries: A Diagnostic Review of Regulatory Approaches and Challenges.* Manila.

- **Time-of-day tariffs.** Off-peak tariffs are lower than those for peak times. This type of tariff promotes efficiency because electricity costs more to supply at peak hours; it can improve the reliability of energy supply by shifting demand from peak to off-peak periods.[168] However, it requires that metering be installed and that the provider use billing software able to distinguish between the blocks. Box 4.5 presents examples of the use of time-of-day tariffs.

- **Seasonal tariffs.** Seasonal tariffs should be higher during particular high-use times of the year. However, in some cases they are applied to make prices lower than appropriate during low-use times of the year. For example, in Tajikistan, the tariff is based on the winter tariff rate, which is a season of high use. Discounts are provided in the summer. Thus, while a seasonal tariff applies, it does not work to constrain high winter use. The summer discount obviates the beneficial effect of the higher winter prices.[169]

C. Water Conservation and Efficiency Measures

1. What is Water Conservation and Efficiency?

Like for energy, water conservation and efficiency involves managing both consumer demand and supply to reduce the amount of water used, or wasted for a given water service.[170]

2. Why Are Water Conservation and Efficiency Important for the Poor?

Water supply and wastewater treatment systems are both infrastructure-intensive, requiring expensive pumping, treatment, and conveyance systems.[171] The most cost-effective and sustainable way to meet burgeoning clean water needs, especially for those who do not have access to the same, is to maximize the capacity of existing water supply service infrastructure by increasing efficiency rather than encouraging new construction. Making water supply systems more efficient can also help control costs, improve service delivery, and expand access without incurring prohibitive costs.

3. How Can Water Conservation and Efficiency Programs Benefit the Poor?

a. Demand-Side Management Measures in the Water Sector

Demand-side management (DSM) in the water sector refers to managing water consumers' end use rather than main water network supply requirements.[172] It needs the right combination of restrictions, pricing, and water efficiency policies for ensuring healthy, safe, and reliable water supplies in times of scarcity.[173]

DSM presupposes a scarcity of water resources or a high cost of water for consumers. It is therefore relevant to the poor who suffer from lack of access to water or have issues with high water supply costs. There are fewer incentives for DSM when water resources are available, well distributed, or heavily subsidized and available at low cost.[174] Temporary restrictions on water use may balance short- to medium-term supply and demand. Permanent water conservation measures manage long-term demand.[175] A useful strategy in developed and developing countries alike is consumer education regarding plumbing leaks and household DSM.

Good water DSM ultimately means appropriate pricing of all water supply sources—not only water obtained from the water network, but water from alternative service providers and groundwater. Developed countries have instituted a range of innovative water efficiency measures. For example, Box 4.6 summarizes the Australian National Water Initiative, which seeks to improve water use efficiency. However, in developing countries, the price of water rarely reflects the cost of service and hence is too low to promote efficient water use. Non-revenue water, which includes water lost or wasted through leaks and illegal connections, as well as water available for public services like water bubblers, is often significant. It sometimes even approaches as much as 40%–50%. In this context, additional measures to reduce the demand for water, such as those introduced in Australia, may not make sense.[176]

Other water DSM policies and water conservation technologies need more in-depth analysis in particular countries and contexts to determine whether they are more cost effective than supply-side options. Such policies and technologies include low-pressure pipes, sprinkler systems, and drip systems for irrigation; different types of water recycling; improved water canal lining materials to reduce seepage; automatic water-flow restrictors for

Box 4.6: The Australian National Water Initiative

The following actions were established to improve water use efficiency in Australia:

- implement a mandatory scheme for water efficiency labeling that includes minimum efficiency standards for a set of household appliances;
- develop a "Smart Water Mark" for household gardens, garden irrigation equipment, garden designs, and plants;
- review the effectiveness of temporary water restrictions and associated public education strategies, and assess extending low-level restrictions as a permanent measure; and
- implement cost-effective management responses to water supply and discharge system losses including leakage, excess pressure, overflows, and other maintenance needs.

Source: Australian Government, National Water Commission. Demand Management. Available: www.nwc.gov.au/www/html/211-demand-management.asp

domestic or industrial ablution; low-flush toilets; and seasonal variations in the water tariff.[177]

To establish the cost of one of these measures, assumptions about initial cost, product lifetime, operating costs, the price elasticity of demand for the product, the particular consumer group being targeted, and the likely adoption rate of the product without incentives would be needed.[178] Small-scale technology, like efficient toilets and low-flow showerheads, has not been widely employed in Asia outside of Singapore.

b. Supply-Side Management Measures in the Water Sector

Supply-side water management seeks to limit and reduce the amount of water lost and wasted in the supply of water. The five supply-side interventions for water and wastewater efficiency improvements with the most potential are rainwater harvesting, efficient pumping, leak management, system automation, and metering and monitoring.[179]

i. Rainwater Harvesting

Rainwater harvesting involves collecting water on the roof of a home or office and storing it for later use. It is efficient and has tremendous untapped potential, because in many places where there is significant rainfall, such as Jakarta, Manila, and parts of India, the poor still lack access to water. Box 4.7 sets out some examples of rainwater harvesting.

ii. Efficient Pumping

Efficient pumping involves optimizing the energy used by the water-pumping system. Every liter of water that passes through the water-pumping system represents a significant energy cost. That cost is magnified for every liter lost to leaks or other nonrevenue outlets, like fire hydrants or public fountains. For example, according to a study by the US Department of Energy,[180] matching pumps to system requirements so that no more pressure is used than needed results in energy savings of 10% to 30%, while the use of variable speed drives to adjust pump speeds results in average energy savings of about 111%.[181] Pump system optimization can readily result in energy savings of 20%, with savings of 30% to 40% often feasible.[182]

Pumping improvements range from lower-cost measures—such as motors with low startup electricity requirements ("soft starters"), smaller size pump rotors ("trimming impellers" used when pumps are oversized), and

Rainwater is collected and flows through this stone spout. The woman uses this water to clean and bathe in since the nearest source of piped water is hours away

repairing motors to their original efficiency ("rewinding motors")—to higher-cost measures such as replacing inefficient pumps and installing pump flow controls ("variable-speed drives").[183]

In addition to these efficiency measures, a water utility should also improve the routine operation and maintenance protocol of the pumping system.[184] Managers should create a facility layout map to show the location of all critical water pumps for maintenance technicians to troubleshoot, conduct preventive inspection, clean, and make minor adjustments.[185]

iii. Leak Management

"Leak management" generally covers two basic activities: detecting and repairing leaks in a water supply or wastewater treatment system, and reducing leaks by managing the water pressure in the pipes.[186] In Asia, leak management often involves a visual site inspection, which even without special detection equipment will reveal significant leaks that need repair. In many developed countries, however, sophisticated equipment is needed to identify underground leaks. Further, automated controls that reduce pressure in the network can drastically lower leakage rates, especially at night.[187] Pressure management will cost less than repairs to numerous leaks in buried

Box 4.7: Rainwater Harvesting

Rainwater Harvesting in Gansu Province, People's Republic of China

In the Gansu Province, rainwater provides an important sustainable and environmentally benign water source for supplementing other water supply options.[a] A rainwater-harvesting project assisted more than 200,000 families and provided water supply and irrigation to about 1 million people. The project provided each family with a clay-tiled roof catchments area, upgraded the traditional clay-lined water cellars by lining them with cement and attaching a small metal pump, and placed plastic sheeting over the rills in fields to concentrate runoff rainwater to crops. Project implementers used spare plastic sheeting to build greenhouses and dug a trench around the greenhouse to collect any rainwater.

Rainwater Harvesting in Brazil

In the northeast of Brazil, a rainwater-harvesting system collects rainfall from the roof of a house into a 16,000-liter semi-underground tank, providing potable water for 8 months, which is the average dry period in the region.[b]

Collecting Rainwater in India

Rainwater harvesting is also traditionally practiced by the people of the Thar Desert in Rajasthan, India.[c] One traditional means of collecting rainwater is by using small underground tanks (*tankas*) in houses or courtyards. These are built by digging small circular holes in the ground, lining them with polished lime, and decorating them with tiles to keep the water cool. The water collected is used only for drinking. *Tankas* are still used in residential areas, temples, *dharamshalas*, and hotels. There are nine other traditional methods of rainwater collection in the Thar Desert.[d]

[a] J. Gould. Rainwater Harvesting Project in Gansu Province, People's Republic of China. United Nations Environment Programme: Dams and Development Project. Available: http://hqweb.unep.org/dams/documents/ell.asp?story_id=14

[b] D. Nogueira. 2008. Brazil: Rainwater Harvesting in Semi-Arid Area Helps Women. Available: www.irc.nl/page/42973

[c] J. Cochran and I. Ray. 2009. Equity Reexamined: A Study of Community-Based Rainwater Harvesting in Rajasthan, India. *World Development.* 37(2). pp. 435–444.

[d] Rainwater Harvesting. Thar Desert. www.rainwaterharvesting.org/Rural/thar-desert_tradi.htm

pipes.[188] Effective management of leaks can save enormous quantities of water and energy.

iv. Water System Automation

Water system automation involves ways to computerize or automate some or all of the water supply system to handle operations in response

to changed situations and to promote efficiency. Stand-alone devices that act on information from a sensor to perform simple actions, such as an automatic shutoff valve responding to a water-level indicator, are the most basic and inexpensive form of automation.[189] Other forms include equipment to optimize water pressure in the supply network; automatic alarms to reflect leaks, breakages, or other water supply system emergencies; and automatic shutdown of the water pumps.[190] Water system automation saves water, energy, and operational costs; improves service; and lengthens equipment life.

v. Metering and Regular Monitoring and Evaluation

Water supply system components and operations must be monitored to evaluate performance against benchmarks and targets. Regular monitoring helps to ensure that water providers' equipment is functioning properly and efficiently. Monitoring is an operations and maintenance protocol that serves as a no-cost or low-cost efficiency enhancement within reach of all utility budgets.[191] The basic steps for putting a successful monitoring and metering system in place are the following: (i) create a water metering and monitoring system, or expand and upgrade existing systems; (ii) develop baselines and metrics for regular monitoring; (iii) create targets and measure these against set baselines and benchmarks; (iv) obtain the proper measurement instrumentation; and (v) conduct ongoing and periodic evaluation of the effectiveness of the system.[192]

CHAPTER 5

Expanding Access

A. Overview

This chapter discusses the significance of increasing access to electricity and water services. It considers why expanding access is a significant objective, and then proceeds to discuss what policy, regulatory, and financial measures help to expand access.

B. Increasing Access to Electricity and Water Services as a Pro-Poor Measure

1. Why Is Increasing Access a Significant Objective of Pro-Poor Reform?

Universal provision of water and electrification are common goals for nearly every society as both basic services improve the living standards and quality of life for people who have access. The United Nations has emphasized that a human right to water exists and access to water must be equitable between the poor and the rich, physically safe, and affordable.[193] The UN Millennium Development Goals (MDGs) include a target to halve the proportion of people without access to safe drinking water and basic sanitation by 2015; and other MDGs for poverty reduction, health, and environmental sustainability are interconnected. Countries face economic and physical challenges and cultural obstacles to achieving universal service but these differ from country to country and by location within individual countries. For example, in urban areas where diversion and theft of electricity and water are common, the primary challenge is to ensure that consumers use only the service they are authorized to use. In rural areas, where the population and dwelling units are more stable, the principal challenges are physical. These challenges were set out in Chapter 1.

2. What Policy and Regulatory Measures Help Expand Access?

While access to energy is not an MDG, many MDG targets require access to energy to be fulfilled. International bodies, including the UN Advisory

Group on Climate Change, have called for an international target on access to energy.

Policy makers can deploy programs to increase access by addressing the key challenges set out in Chapter 1.C. This will require establishing policy frameworks to

- remove the disincentives for utility providers to expand the network to the unconnected poor by facilitating connections to illegal settlements, and assisting in the prevention of pilferage and illegal connections through good governance and integrity programs;
- empower the poor to access formal legal identity documents that are required to obtain connections;*
- establish the financial incentives for the main network providers to connect the unconnected; and
- provide financial measures to the poor to facilitate payments for their access.

The regulator can also introduce measures to promote access. These measures include approving electric line extensions, waiving hook-up fees, setting rate designs, approving connection and disconnection policies, and requiring energy efficiency measures. Chapter 8 on The Role of the Regulator provides a more extensive discussion of the topic.

The rest of the chapter sets out financial measures that policy makers and/or regulators may include in policy and regulatory frameworks to facilitate access.

3. What Financial Measures Help Expand Access?

Several specific techniques can be used to promote access. These relate to one of the major challenges to the expansion of utility services—finding the financial resources to deliver services to consumers who will use relatively little, and often can afford even less. The following measures are available: (i) direct government subsidies, (ii) output-based aid, (iii) connection fees and connection kits, (iv) local renewable resources, (v) grants from other parties, (vi) low-interest loans, (vii) utility-provided subsidies, (viii) volunteer and cooperative implementation, and (ix) low-cost and low-use options.

* Sri Lanka

a. Direct Government Subsidies

Direct government subsidies are an important means of helping the poor obtain the financial assistance they need to access formal utility services. These are usually the preferred way to allocate subsidies to poor consumers because they tend to be better targeted.[194] However, the effectiveness of government-provided utility subsidies will vary from industry to industry.

The most effective subsidies will probably be output-based rather than input-based. Output-based subsidies are linked to the achievement of certain outputs such as the actual provision of electricity or water.[195] Thus, a water utility would invoice a poor consumer the full amount of its bill. The poor consumer would then pay a lifeline portion of this amount and the government would provide an output-based subsidy for the rest.

In deciding whether direct government subsidies are possible, the first task for regulatory designers is to determine if adequate funds are available from the government's general budget. General income subsidies financed by taxation are likely to be the most efficient, and have the least impact on market structure.[196] However, as a practical matter, it may be that such support is politically difficult to achieve, that funds are not available, or that it is more efficient to provide the economic support from within the affected sector. In such a case, regulators may generate the economic support from within the sector or from a single utility. Box 5.1 contains examples of direct government subsidies. A more detailed discussion of the design of subsidies is in Chapter 7.

b. Output-Based Aid

Output-based aid (OBA) promotes effective use of development funds to support the delivery of public services in developing countries through the use of targeted performance-related subsidies.[197] In the water sector, for example, utilities could get a grant from the government for every poor household they connect. Set out in Box 5.2 is an OBA example.

c. Connection Fees and Connection Kits

Subsidies for poor citizens to connect to the main network may increase access to the electricity or water supply network. Traditional utilities usually

Box 5.1: Direct Government Subsidies

Government Grants in Indonesia
Indonesia's state electricity company, PT Perusahaan Listrik Negara (PLN), used annual governmental appropriations to fund extensions of service to low-income households. This government-subsidized service was available only for the lowest level of service. PLN was responsible for installing a load limiter in the affected households, which permitted approximately 480 watts of service without requiring households to pay a line extension or connection charge. The electricity tariff was a steeply inverted block rate, which was designed to achieve universal service to all households while pricing additional consumption at higher cost.

Lifeline Tariffs and Price Subsidies in Nanjing, People's Republic of China
In ADB's Nanjing Qinhuai River Environmental Improvement Project, the Nanjing municipal government ensured that before implementing any tariff increase, it would review and conduct research to determine the number of poor persons who would be affected.[a] It also began to measure the impact of such tariff adjustments on the poor and to prepare a plan to ensure that the poor's livelihoods or standard of living was not impaired by the tariff increase. The plan contemplated measures such as price subsidies and lifeline tariffs, and the government monitored the recipients of such measures to determine the plan's effectiveness.

Rajiv Gandhi Grameen Vidyutikaran Yojana Program, India
India's Ministry of Power initiated this scheme to provide electrification in rural areas by 2010. The Rural Electrification Corporation manages the scheme while distribution companies and other agencies implement it. A capital subsidy is given for strengthening the distribution network, creating village infrastructure and electrification, and establishing decentralized distribution and supply. A 100% capital subsidy is provided to electrify households below the poverty line, while a 90% subsidy is given for others.

[a] ADB. 2007. *Project Agreement Schedule, Nanjing Qinhuai River Environmental Improvement Project.* Manila.

require up-front connection and reconnection fees before they grant a consumer access to the network.[198] High connection charges often pose a barrier to access for the poor, even when they could afford to maintain access. For example, getting connected to the electricity network might cost $100 in one lump sum, an amount a poor citizen can ill afford, although the monthly charge might be only an affordable $10. Thus, subsidizing access for

new consumers may be a more effective way of expanding access than direct government subsidies for consumption. Focusing subsidies on connection fees rather than usage fees will benefit poor unconnected households.[199] However, regulators designing connection tariffs will need to define clear criteria for identifying and allowing service to poor unconnected would-be consumers.[200] Box 5.3 provides examples of connection kits.

Box 5.2: Output-Based Aid in Cambodia

The national government piloted an output-based aid scheme using a design–build–operate contract, where the winning contractor would be paid an agreed amount for each connection made to a pre-identified poor household.[a] The bulk of the payment would be made after the connections were validated by an independent engineer. A list of poor households that were eligible for free connections would be disclosed to the bidders and made part of the contract. The contractor would be responsible for the operation and management of the water system but would not be required to pay a lease fee to the government.

[a] M. Navarro and L. Tavares. 2008. Output-Based Aid in Cambodia: Getting Private Operators and Local Communities to Help Deliver Water to the Poor—The Experience to Date. Global Partnership on Output-Based Aid. *OBA Working Paper Series* No. 9. Washington, DC: World Bank.

Box 5.3: Connection Kits

Electrification Kits in Afghanistan

The ADB Power Transmission and Distribution Project in Afghanistan presents a good example of the inclusion of connection kits in a project.[a] The social and poverty survey undertaken during project preparation noted that the average cost for a new household connection was $31. The survey showed that project beneficiaries were willing to pay for electricity, but that they might not be able to pay the one-time connection charge and the internal wiring costs for lighting and power points. To ensure that project beneficiaries could obtain connections, electrification kits were included for payment under the ADB grant. Kit users could have immediate access to electricity, with a flexible payment option.

[a] ADB. 2005. *Report and Recommendation of the President to the Board of Directors on a Proposed Loan and Asian Development Fund Grant and Technical Assistance to the Islamic Republic of Afghanistan for the Power Transmission and Distribution Project.* Manila. p. 8.

Solar panels harness the sun's heat to generate electricity

d. Local Renewable Energy Resources

Renewable resources may offer the most economic, efficient, and effective way to provide services to a local community, particularly rural communities, and should always be considered and compared to extending the service network.

The primary energy resources available at the local level may be hydropower, wind, or solar energy. It will often be cheaper to use local renewable resources than to extend the transmission and distribution network long distances from centralized power plants and transmission and distribution lines. Moreover, environmentally benign generation such as rooftop photovoltaic and small-scale wind-power sources have environmental and climate benefits and can often be constructed more quickly than extending the network.

The integrated or stand-alone use of renewable energy technologies based on locally available resources to generate electricity close to the point of consumption is often described as distributed generation.[201] "Distributed generation is the use of small-scale power generation technologies located close to the load being served, capable of lowering costs, improving reliability,

reducing emissions and expanding energy options."[202] A distributed generator may be connected to a distribution utility or a sub-transmission system. Where grid extension is impractical for techno-economic reasons, distributed generation plants may offer a cost-effective option. A distributed generation power system, therefore, could also be an "isolated renewable energy resources-based power supply" intended to provide a village with energy for various applications.[203] Renewable energy and distributed generation technologies can diversify energy supply, improve energy security, and reduce fuel risks, particularly in rural and off-grid areas.[204] They are ideal for serving small and middle-sized generation needs and "can also assist in alleviating poverty by improving access to energy services, as well as increasing job opportunities, and improving air quality and public health."[205]

Based on locally available resources, such systems induce a degree of self-reliance that is not possible with imported fuels or fuels transported from long distances.

However, if such distributed generation plants produce only intermittent power, they may not be able to satisfy demand. In many areas, fossil-fired distributed generation units provide local service, but they have long-term maintenance, environmental, and cost issues that renewable resources do not. Some forms of distributed generation, diesel generators in particular, can have significant adverse environmental impacts. As a result, policy makers and regulators should ensure that any policies or regulations to encourage distributed generation also come with associated restrictions against greater use of environmentally harmful options. In general, diesel generators are best suited for standby use, supporting a lower-impact and lower-cost renewable option. Box 5.4 sets out examples of distributed generation programs.

e. Grants

Grants to extend utility services to unserved areas can often be obtained from government agencies or the private sector. International development banks, individual country foreign aid programs, and private foundations have provided grants. Some grants take the form of equipment or technical assistance, while others are given in cash. Grants in any form can make a service expansion project more possible. Box 5.5 sets out examples of grant programs that extend utility services in unserved or remote areas.

Box 5.4: Distributed Generation

Solar Energy Program in Bangladesh

The Solar Energy Program installed 438,000 solar home systems in households in off-grid rural areas.[a] Initially the program sought to finance 50,000 solar home systems by June 2008.[b] This goal was achieved 3 years ahead of schedule and $2 million below the estimated cost. A new target set to install an additional 200,000 solar home system by the end of 2009 was met in May 2009. The continuing program seeks to install an additional 1 million solar home systems in remote households by the end of 2012.

Micro-Hydro in the Philippines

A 19-kilowatt run of the river micro-hydro system and distribution lines were built to deliver electricity to eight remote villages in Negros Oriental.[c] The project cost of $1.5 million was a grant from ADB and Japan's government to provide renewable energy and sustain livelihood in these remote communities. The project also established a revolving fund to be used as loans for household electricity connections and renewable energy based livelihood investments. The cost of electricity from the mini-hydro is only $0.12 per kilowatt-hour instead of $0.15 from the local distribution utility.

[a] Infrastructure Development Company Limited. Available: www.idcol.org/energyProject.php
[b] Ibid.
[c] ADB. 2009. *Powering the Poor: Projects to Increase Access to Clean Energy for All.* Manila.

f. Low-Interest Loans

Low-interest loans for making utility connections may be made available to poor citizens. Utility resources are capital-intensive, and low-interest loans can greatly reduce the ultimate costs borne by energy consumers. National government, local government, NGOs, and international sources may make low-interest financing available. This approach has been successful in many developed nations to extend service to rural areas, which tend to have a higher cost per consumer to provide access to the utility system. Box 5.6 sets out an example of microfinancing that allows poor citizens to connect to the grid.

g. Utility-Provided Subsidies

Utilities may provide subsidies directly to low-income potential consumers. A regional or national electric utility can increase the economic feasibility

Box 5.5: Grants Extending Utility Services

South Africa's National Electrification Fund

In South Africa, grants to extend service are provided from the National Electrification Fund, funded by the national government, implemented by the national utility, and overseen by the national and municipal governments.[a] In November 2000, the national government committed to giving all households a free basket of basic support services including electricity. The national utility, Eskom, is responsible for implementing the policy. The policy applies only to electric connections with 2.5 amperes service or less (approximately 500 watts at 220 volts) and gives 50 kilowatt-hours (kWh) of free power, with limited additional power provided at low cost using prepayment meters. Larger users are expected to pay the full cost of supply. South Africa's government is increasing access by awarding six consortia concessions, which require extension of service to all potential consumers as a condition of service to prime areas. It is anticipated that a rural electrification fund ultimately will provide for transparent subsidies overseen by an independent utility regulator. The funding need is estimated at 500 rands (R) per year per consumer ($60), serving 2.5 million consumers for a total estimated cost of $150 million per year.

Andhi Khola Hydro Electric and Rural Electrification Program in Nepal

In Nepal, the Andhi Khola Hydro Electric and Rural Electrification Program built a 5.1-megawatt hydroelectric dam using local labor, three Norwegian surplus Pelton turbines, and an associated 1-kilovolt (kV) three-phase distribution system.[b] The Norwegian Agency for Development Cooperation provided project funding of 21 million kroner (NOK) (about $3 million). The dam, known as the Andhi Khola Hydroelectric Centre, is owned by the Butwal Power Company. The objectives of the program are to generate power for the districts of Palpa and Syangja and introduce new methods and technologies for rural electrification such as (i) the use of 1 kV distribution lines for the distribution system; (ii) the use of simplified and prefabricated wiring for the home to lower cost; (iii) the use of low-wattage electric cookers; (iv) the use of non-metered house connections, using cut-out current limiting devices; and (v) the formation and implementation of a users' organization to contribute voluntary labor and materials for operation and maintenance of the rural electricity network. Rural electrification reduced the use of kerosene and dry-cell batteries and improved the level of education, health, and commercial and productive activities. The program also installed an irrigation system that will supply water to 300 hectares of agricultural land. Nepal is an extremely poor, mountainous country, where the electric grid is limited to the largest cities. It has large hydroelectric potential. This is just one example, out of many, of Nepal's hydro-system development in remote areas.

continued on next page

Box. 5.5: continued

Hydroelectricity for a Hospital in the Congo

The Kaziba Hydroelectric Project is a 125 kW hydroelectric power plant constructed to provide electric power to a hospital and local villagers in the remote rural village of Kaziba, which is 40 kilometers from the nearest village by power grid.[c] The project is overseen by the Communauté des Eglises Libres de Pentecôte en Afrique, the local body that manages the hospital. Construction of the project cost $1 million, provided by a construction grant from Norway (including a used turbine) and about $75,000 per year for maintenance, which is provided from the sale of electricity to the hospital and other local users. Local workers constructed and maintain the plant. The tariff for non-hospital use is based on the cost of using kerosene lamps, an equivalent of about $0.15 per kWh. This tariff is designed to provide widespread use of nighttime electricity to smooth out river flows. During daylight hours, most of the electricity is used by the hospital and only a limited amount goes to other local users.

Rural Electrification in the United States

The Rural Electrification Administration/Rural Utilities Services scheme has achieved its principal goal of extending electric service to rural areas, and electric service today reaches more than 98% of American homes.[d] In 1936, the United States' (US) government created the Rural Electrification Administration (REA) as a part of the US Department of Agriculture to support electrification in remote parts of the country. REA began by offering zero-interest financing for the development of rural electric systems. Its successor agency, the Rural Utilities Service (RUS), today offers low-interest financing to rural electric cooperatives for expanding electric systems and for developing renewable energy systems in off-grid locations.[e] Funded by federal taxes and loan repayments, RUS can guarantee loans at unsubsidized market rates, at "hardship" rates of 5%, or at special rates to eligible municipal agencies at 3%–5%. Recent loans at the 5% hardship rate have been made to several native American tribes to install renewable energy systems in areas where expansion of electric distribution facilities was not feasible. For example, the Navajo Tribal Utility Authority in Arizona and New Mexico is installing solar systems to serve 350 rural consumers. This concept has been copied in Brazil, New Zealand, and other countries.

[a] Eskom. Available: www.eskom.co.za; South African Revenue Protection Association. Available: www.sarpa.co.za; and Association of Municipal Electricity Undertakings. Available: www.ameu.co.za

[b] Norwegian Agency for Development Cooperation (NORAD). 2007. *Evaluation of Norwegian Power-related Assistance, Annex 3 Case Studies Nepal.* Oslo.

[c] The Regulatory Assistance Project. 2002. *International Survey of Low-Income and Rural Development Programs for the Energy Sector.* Jakarta and Washington, DC: United States Agency for International Development (USAID).

[d] US Department of Agriculture Rural Development. Electric Programs. Available: www.usda.gov/rus/electric/index.htm

[e] This program provides subsidized funding for the construction of the rural distribution system, but does not subsidize maintenance. Separate federal programs in many areas provide low-cost electric power from federal dams at below-market rates. As a result of the combination of subsidized distribution construction in the past, and subsidized electric supply currently, many rural systems continue to have relatively old equipment and high loss factors, due to the expansion of systems into areas where maintenance and upgrades are prohibitively expensive.

Box 5.6: Low-Interest Loans

Microfinance for Rural Electrification in Sri Lanka

In Sri Lanka, many poor households are on a power grid but cannot afford to connect to it.[a] ADB launched a pilot microfinance scheme enabling nearly 15,000 households to obtain small loans that allow them to connect to the grid, with affordable installment payments. ADB has also extended a loan from its special funds to Sri Lanka for a project for the improved management of water resources. This project aims to benefit nearly 2 million people, thousands of businesses, and hundreds of industries in Greater Colombo.[b] The loan is repayable in 32 years at 1.5% interest; during a grace period of 8 years the interest rate is 1%. The Government of Sri Lanka has committed to institutional reforms including the establishment of a national water resources authority to manage and address the country's worsening water supply situation. The project's objectives include strengthening the government's ability to manage water resources in a sustainable, participatory, and transparent manner, and constructing critically needed infrastructure to control and measure water resources.

[a] ADB. 2009. *Powering the Poor: Projects to Increase Access to Clean Energy for All.* Manila. Available: www.adb.org/Documents/Books/powering-the-poor/default.asp; Japan Fund for Poverty Reduction. 2004. *Power Fund for the Poor: Connecting Poor Households to the Power Grid in Sri Lanka*. Manila: ADB.

[b] ADB. 2000. Sri Lanka Strengthens Water Resources Management. Available: www.adb.org/Documents/News/2000/nr2000095.asp

of expanding its network by extending service and recouping the cost in electricity prices over a wider geographical area.

To illustrate, utilities usually find it prohibitively expensive to run their poles and wires to rural areas where there are fewer consumers per mile to pay for the service. To remedy this situation, some utility service territories use "postage stamp" pricing, under which all areas are priced the same; this results in reduced charges to consumers in low-density areas, supported by consumers in more heavily populated areas (a form of cross-subsidy). That is, some pay a small premium so that all can enjoy a single "postage stamp" rate. Box 5.7 sets out examples of utility-provided subsidies.

h. Volunteer and Cooperative Implementation

Materials, skills, or services that are sourced locally may reduce the up-front cash investment required to extend access to utility services, making expansion more likely. Local materials and skills can greatly reduce the cash investment

Box 5.7: Utility-Provided Subsidies

Cross-Subsidies in Indonesia

Operations of Indonesia's state-run power firm, PT Perusahaan Listrik Negara, is more sustainable in the major islands than on the smaller, more remote islands because of substantial cross-subsidies between the Java–Bali grid and systems outside Java.[a] Cross-subsidies also exist between small residential consumers, particularly in the rural areas, and medium-sized commercial and industrial consumers.

Cost Averaging in the Hawaiian Islands

In Hawaii, the Maui Electric Company Ltd. serves the islands of Maui, Molokai, and Lanai.[b] The largest electric system and wealthiest population is on Maui, which has combined cycle electricity generation and high-voltage transmission. In contrast, the electric systems on Lanai and Molokai require that the service on Maui absorb about half of the additional cost for the other two islands.

[a] ADB. 1999. Technical Assistance Completion Report: Electricity Tariff Rationalization Study in Indonesia. Manila.
[b] The Regulatory Assistance Project. 2002. *International Survey of Low-Income and Rural Development Programs for the Energy Sector*. Jakarta and Washington, DC: USAID.

required to develop generation sites or distribution facilities. Local support in the form of land for electricity-generating facilities, trees to provide poles for distribution systems, or labor to construct generating distribution facilities can improve the ability of the government or a utility to expand service to new areas. Examples of volunteer and cooperative contributions are set out in Box 5.8.

i. Low-Cost or Low-Use Options

The provision of low-cost or low-use service options to poor consumers is another measure that can increase access. Some examples include the use of prepayment meters and "ready boards" (electrical panels from which electricity is distributed that contain provisions for electrical outlets and lighting sockets) as alternatives to the standard meter and conventional wiring inside the home. Support measures and tariffs that promote prepayment meters are discussed in Chapter 6 and the regulator's role is discussed in Chapter 8. Box 5.9 sets out examples of low-cost or low-use options for poor users.

Box 5.8: Volunteer and Cooperative Contributions

Volunteer Contributions in the United States

In 1938, residents of West Salem, Oregon, organized Salem Electric Cooperative as an alternative to Portland General Electric, a private power company.[a] The cooperative was unable to borrow funds from the Rural Electrification Administration for construction of a distribution system, so to build the distribution system the cooperative's members contributed funds, donated trees for poles, and volunteered labor to erect the poles and install electrical equipment on the poles. Upon completion of the original distribution system, the cooperative purchased 100 kilowatt-hours (kWh) from the Bonneville Power Administration to serve its 17 residential and 5 commercial consumers. The electric service was more valuable to these consumers than the time and money they devoted to obtain it. This cooperative is unique in that it serves an urban, not rural, area. Because the cooperative provided lower electricity rates, its distribution area also expanded; today it serves West Salem, portions of downtown Salem, Keizer, Portland Road, and the Northgate area.

Volunteer Contributions in Guatemala

The Yuxquen Guatemala Wind Turbine Project is a renewable energy generation project located in Yuxquen, Guatemala—a remote rural area near the Mexican border.[b] The community served by the project is 14 kilometers (km) from the nearest electric distribution line. A 1.5 kW wind turbine was donated by the Swiss Embassy in 1987 but not activated for a decade. Other equipment was donated by rural electric cooperatives in the United States (US).

The result is a generation, battery storage, inversion, and distribution system that serves 24 families. The local community provided project oversight under the supervision of volunteers from the US National Rural Electric Cooperatives Association. It received funding of $17,500 from donations. The local community implements the project, with maintenance costs paid from power sales revenues. The use of underutilized equipment and volunteer labor makes it impossible to quantify the economics. However, a capital cost of $17,500 and a capacity of 1.5 kW suggest the cost would not be economical compared with most grid-generating options, but is far less than the cost of extending electric distribution lines 14 km to the community.

[a] Salem Electric. Your Cooperative. www.salemelectric.org/your_cooperative/index.html; and Salem History www.salemhistory.net/commerce/salem_electric.htm

[b] The Regulatory Assistance Project. 2002. *International Survey of Low-Income and Rural Development Programs for the Energy Sector.* Jakarta and Washington, DC: USAID.

Distributed generation like this micro hydropower plant increases access to the rural areas

Box 5.9: Low-Cost or Low-Use Options

Poverty Tariff Connections in Indonesia

Indonesia's state power company, PT Perusahaan Listrik Negara, has used government appropriations to extend rural service. Free connections have been available for "poverty tariff" connections of 450 volts, and the price for this tariff at 1 rupiah per volt has been at a low level commensurate with the low cost of limited public hydropower. Larger users must pay the full cost of connections with a tariff that reflects marginal resource costs.

Royalties Provide Finance for Lifeline Tariffs for the Rural Poor in Bhutan

The Dagachhu Hydro Power Corporation (DHPC) supplies electricity to most of the Kingdom of Bhutan while the excess capacity is exported to India. Under a power purchase agreement between DHPC and the Tata Power Trading Company Limited, DHPC has contracted to export power to Tata Power for 30 years. The power purchase agreement also provides that the sale of exported power is subject to a royalty to be paid to Bhutan, set at 12% for the first 12 years and 18% for the 18-year balance of the period.[a] Bhutan's tariff determination regulations provide that such royalty revenue may be used to subsidize electricity for rural domestic consumers in accordance with policy set by the minister of the electricity sector,[b] similar to a lifeline tariff.[c]

continued on next page

Box. 5.9: continued

South Africa's Electricity Service to Urban Slums

In 1994, Eskom, Electricité de France, and East Midlands Electricity of the United Kingdom started a pilot project that established a community-based distribution company, Phambali Nombane Energy (PN Energy), to provide low-cost electricity to the residents of the Khayelitsha township on the outskirts of Cape Town.[d] The project lowered the cost of connection by subsidizing connection fees, substituting the installation of standard household wiring with "ready boards" (electrical panels from which electricity is distributed that contain provisions for electrical outlets and lighting sockets), and introducing prepayment schemes that allowed households to control their electricity spending by paying for it in advance. The project also provided higher-quality, more convenient, and more reliable service; employed technology for reducing theft by locating service drops (electrical lines that run from an electricity pole to the consumer's house or other premises) high on utility poles that are easily seen from the road; and reduced nonpayment by introducing prepayment meters. The project is still in operation but PN Energy's activities have evolved from electrification to mainly distribution because many of the households now have access to electricity. Introduction of high standards for business operations has allowed PN Energy to break even, although it continues to encounter challenges to its sustainability such as funding and changes in regulation and sector structure.

South Africa's Electricity Basic Service Support Tariff

In 2003, the Government of South Africa began to offer the Electricity Basic Service Support Tariff, which provides 50 kilowatt-hours of free electricity to grid-connected (mostly urban) households each month.[e] The Electricity Basic Service Support Tariff is a limited amount of electricity supply deemed necessary to support basic energy services of a typical poor household.[f]

[a] ADB. 2009. *Technical Assistance Consultant's Report Bhutan: Preparing the Bhutan Power Development Project.* Manila. Available: www.adb.org/Documents/Reports/Consultant/37399-BHU/37399-01-BHU-TACR.pdf

[b] Bhutan Electricity Authority. 2006. Tariff Determination Regulations. Available: www.bea.gov.bt/download/TariffRegFINAL.pdf

[c] ADB. 2008. *Report and Recommendation to the President to the Board of Directors: Proposed Loans, Asian Development Fund Grant, Technical Assistance Grant, and Administration of Grant Bhutan: Green Power Development Project.* Manila.

[d] United States Agency for International Development (USAID). 2004. *Innovative Approaches to Slum Electrification.* Washington, DC: USAID. Available: http://pdf.usaid.gov/pdf_docs/PNADB219.pdf

[e] K. Manlove. 2009. *Energy Poverty 101.* Washington, DC: Center for American Progress. Available: www.americanprogress.org/issues/2009/05/energy_poverty101.html

[f] Electricity Basic Services Support Tariff (Free Basic Electricity) Policy for the Republic of South Africa. Available: www.dme.gov.za/pdfs/energy/electricity/fbe_policy.pdf

CHAPTER 6

Offering Different Levels of Service Quality

A. Overview

This chapter discusses the need to set appropriate quality standards to meet the requirements of the poor. It provides examples of various measures that offer different levels of water and energy utility services to make the services more available and affordable to the poor.

B. Levels of Service Quality Appropriate for the Poor

1. Why Is Offering Different Levels of Service Quality Important?

Individuals do not all expect the same quality of service. The wealthy and middle class may demand utility service quality at levels that the poor might not need or want. Service providers need to determine the poor's real expectations and need for service quality. By providing different service offerings that meet minimum levels of environment, health, and safety protection, they may satisfy the needs of the poor at reduced cost.

Regulation can maximize net benefits for utility service providers and consumers by determining appropriate minimum levels of service quality for environment, health, and safety protection that is affordable even to the poor.

2. What Measures Can Be Used to Vary Utility Service Quality to Help the Poor?

The following are examples of efforts to make service quality appropriate for poor consumers.[206]

a. More Flexible Consumer Service Arrangements

Low-income consumers could be given an option to choose the price and quality bundle that is most appropriate for them. It is often not possible or

too costly to allow individuals the complete freedom to choose from any possible combination of price and quality options. Thus, suppliers must consider successful experiences from other poor communities with similar profiles, deliberately vary the quality of service in a number of locations, and measure consumer satisfaction by conducting group and community consultations or commissioning surveys. When varying combinations of price and quality, suppliers must always ensure minimum health, environmental, and safety thresholds are met.

i. Flexible Payment Schemes

Flexible payment schemes give the poor more control over their cash outlay by allowing them to make regular small "average" payments or prepay for service.[207]

Box 6.1: Flexible Payment Schemes

Prepaid Cards for Electricity in the Pacific

Vanuatu and Samoa, in the Pacific, have introduced prepayment meters for electricity services. People purchase prepaid cards to cover their electricity costs. Households do not have to pay connection or rental charges. In the case of prepaid cards, service halts when the value on the card is exhausted. In this way, people who would not generally be able to afford electricity services can do so, and cap their expenditure. Continuity of service can suffer and the costs may be high, but prepaid cards allow consumers to control their expenses.[a]

Prepaid Electricity Metering in West Bengal, India

One proven way of providing flexible payments for electricity services is through prepaid metering. In India, the West Bengal Renewable Energy Development Agency has installed prepaid energy meters in numerous households on Sagardeep Island.[b] Consumers simply purchase and insert the prepaid energy meter cards into the prepayment meter to activate their electricity. When 75% of the prepaid amount is consumed, the energy meter alerts the consumer. Upon exhaustion of the full amount, the electricity stops until new payments are made on the card. This flexible prepayment system allows consumers to manage their energy budgets without severance fees or disputed bills, and with reduced losses to utilities.

Prepaid Electricity Metering in Khartoum, Sudan

In Sudan, Khartoum's utility service provider was $70 million in debt before it turned to a prepayment system.[c] The system allowed consumers to purchase tokens at retail outlets, utility stores, and on their cell phones,

continued on next page

Box. 6.1: continued

enabling them to manage their energy budgets without severance fees or disputed bills, and with reduced losses to utilities. As a result, Khartoum's utility service provider installed 1 million prepayment meters, and based on consumer demand, all new meters will be prepayment meters. The utility is no longer in debt.

Average Seasonal Billing

In locations where consumption significantly varies between seasons, bills will change correspondingly. Utilities can offer an average billing option whereby the consumer pays the same average bill all year long to avoid the burden of extremely high bills in the peak season (usually in the summer or winter months). In Texas, the Tri-Country Electric Cooperative gives its consumers an option to use average billing to manage their electricity payments.[d] The average bill is computed by adding the current actual bill to bills from the previous 6 to 12 months and dividing by 7 to 13, plus 8% of any prior balance; this makes each month's electricity bill approximately the same and ideal for those on a budget. Consumers who have paid their electricity bill for the prior 66 months with no more than one delinquent payment are eligible to apply for average billing. No additional fee is charged for consumers who avail themselves of the average billing option. Average billing does not reduce the electricity bill but makes it more predictable by leveling out payments over the winter or summer peak periods.

[a] B. Baker and S. Tremolet. 2003. Regulation of the Quality of Infrastructure Services in Developing Countries. In P. Brook and T. Irwin, eds. *Infrastructure for Poor People: Public Policy for Private Provision.* Washington, DC: World Bank; and D. Ehrhardt. 2000. Impact of Market Structure on Service Options for the Poor. In P. Brook and T. Irwin, eds. *Infrastructure for Poor People: Public Policy for Private Provision.* Washington, DC: World Bank.

[b] R. Moharil and P. Kulkarni. 2009. A case study of solar photovoltaic power system at Sagardeep Island, India. *Renewable and Sustainable Energy Reviews.* Volume 13, Issue 3. p. 673–678.

[c] A. Nowlan. 2009. *Reliable Access to Energy in Slums: There's Hope.* Next Billion.net. www.nextbillion.net/blog/2009/05/19/hope-for-reliable-slum-access-to-energy

[d] Tri-County Electric Cooperative, Inc. Average Billing. Available: www.tcectexas.com/averagebilling.htm

Flexible payment mechanisms include "smart cards" that allow prepayment for water or power, and prepaid telephone cards. Box 6.1 offers some examples of flexible payment schemes.

ii. Flexible Service Options

Poor consumers may agree to a reduced number of service hours for a discounted price. For example, consumers receiving intermittent water service should pay less than consumers receiving 24-hour service. The degree to which this flexibility has an impact on operating costs depends on the marginal cost of operations during the time consumption is curtailed versus

A water meter; consumers connected to the water distributor are billed monthly for the water they consume

the time when consumption is allowed.[208] Providing a flexible service option could also involve restricting the hours the service is supplied. For electricity supply, this restriction may be accomplished through low-technology load control.[209] Different tariff options for different seasons and time-of-day use are another method of varying service options. See Chapter 7 for a more detailed discussion of these types of tariff options.

b. Low-Cost Technologies

The use of low-cost technologies may be acceptable for low-income consumers who cannot pay for more expensive offerings. For example, alternative utility providers could build a network more cheaply by using inexpensive pipes of shorter lengths that are buried less deeply than conventional networks and installed and maintained with community labor.[210] Box 6.2 sets out some additional examples of low-cost technologies.

c. Cooperative Arrangements with Alternative Service Providers

Cooperative arrangements between the main service provider, alternative service providers, and local communities may be an effective way to offer different levels of service. Alternative service providers are usually in a better position to deliver low-cost services. Box 6.3 sets out some examples of cooperative arrangements.

d. Block Grid Connections

A block grid connection is another way of varying service offerings. The advantage of this setup is that it provides connections to poor communities while ensuring on-time payments. Box 6.4 contains examples of block grid connections. This form of connection encourages group monitoring of the payment responsibilities of individual households.

Box 6.2: Low-Cost Technologies

Lighting a Billion Lives through Solar Charging in India

In the Lighting a Billion Lives campaign run by the Energy and Research Institute in India, solar charging stations are set up in villages for recharging lanterns that are rented to households and enterprises on a daily basis. Households pay a small fee, no higher than what they might otherwise pay for kerosene, to rent the lanterns. In doing so, they avoid a major capital investment but obtain lighting.[a]

Low-Cost Sanitation Services and Volunteer Labor in Karachi, Pakistan

In the Orangi Pilot Project for sanitation services in Karachi, operators developed a technique for providing low-income households with cheap in-home sanitary latrines, household sewers, and connections to underground sewers in adjoining streets.[b] This innovative system, with a twin-pit pour-flush latrine, costs $100 per household instead of the $1,000 required to install a sewer connection in the traditional way. It was quickly extended to connect 600,000 people.

[a] The Energy and Resources Institute, North America. *Lighting a Billion Lives.* Available: www.terina.org/index.php?option=com_content&task=view&id=22

[b] B. Baker and S. Tremolet. 2003. Regulation of the Quality of Infrastructure Services in Developing Countries. In P. Brook and T. Irwin, eds. *Infrastructure for Poor People: Public Policy for Private Provision.* Washington, DC: World Bank.

Box 6.3: Cooperative Arrangements

Electricity Utility and Franchisees Cooperate in Assam, India

In India, the Assam State Electricity Board appointed franchisees to manage rural networks on its behalf.[a] The franchisees assumed responsibility for the operation and maintenance of distribution lines, as well as billing and revenue collection. In the village of Sualkuchi, where the model is working successfully, this collaboration has resulted in a significant reduction in commercial and system losses, increased billing efficiency, and revenue collections that have more than doubled.

Cooperation between Aguas Argentinas and Local Communities in Buenos Aires, Argentina

Aguas Argentinas, the concessionaire for water and sanitation services in Buenos Aires since 1993, had a partnership with a low-income community when taking over the system put in place by the Barrio San Jorge.[b] The community developed a double system of water provision, with one system connected to the existing network for potable water, and the other drawing on groundwater sources for water used for washing and bathing.

The sewerage system consisted of a combination of cesspits in each household and a small-bore sewer pipe network. Aguas Argentinas took over the operation, maintenance, and repair of the system, and the residents now pay the company a fixed rate for the services. Following this experience, this type of sewerage system and other low-cost systems have been introduced to other poor areas of the city. Aguas Argentinas takes over networks built by communities at lower cost than it could have done itself (but that still conform to minimum quality standards), and in turn offer consumers a discount.

[a] ADB. 2009. *Powering the Poor: Projects to Increase Access to Clean Energy for All.* Manila. Available: www.adb.org/Documents/Books/powering-the-poor/default.asp

[b] B. Baker and S. Tremolet. 2003. Regulation of the Quality of Infrastructure Services in Developing Countries. In P. Brook and T. Irwin, eds. *Infrastructure for Poor People: Public Policy for Private Provision.* Washington, DC: World Bank; and S. Snell. 1998. Water and Sanitation Services for the Urban Poor. *Working paper*. Water and Sanitation Program. Washington, DC: United Nations Development Programme and the World Bank. Quoted in D. Ehrhardt. 2000. Impact of Market Structure on Service Options for the Poor. In P. Brook and T. Irwin, eds. *Infrastructure for Poor People: Public Policy for Private Provision.* Washington, DC: World Bank.

Box 6.4: Block Grid Connections

Block Electricity Connections to the Grid in Casablanca, Morocco

Lyonnaise des Eaux de Casablanca, a joint project of GDF Suez and Electricite de France that is designed and managed by end users, connected 75% of slum residents in Casablanca legally to the electricity grid.[a] Community representatives manage metering and payment for a block of 20 people. If one bill is late, the whole block is disconnected; currently 98% of bills are paid on time. Moreover, connected slums enjoyed a 17% increase in commercial activity, at about the same price as an informal connection.

Manila Water Company's Water for the Community Program in Manila, Philippines

Block grid connections produced a different result in the Philippines. The Manila Water Company, a water utility provider, launched Water for the Community, a program that offered communal meters among 5–7 households on a shared bills basis.[b] The program sought to provide access to the urban poor by allowing several households to share a meter, making the connection fee more affordable. Drawbacks to this approach include nonpayment by some households of their share of the bill, considerable consumer management, and credit issues. Despite nonpayment by some individual households, the utility is reluctant to disconnect the whole community. Instead, the utility is proposing to connect these households on an individual basis.

[a] A. Nowlan. 2009. *Reliable Access to Energy in Slums: There's Hope.* Next Billion.net. Available: www.nextbillion.net/blog/2009/05/19/hope-for-reliable-slum-access-to-energy

[b] I. Menzies and M. Suardi. 2009. Output-Based Aid in the Philippines: Improved Access to Water Services for Poor Households in Metro Manila. *OBA Approaches.* Note No. 28. Washington, DC: The Global Partnership on Output Based Aid.Available: www.gpoba.org/gpoba/pub/12

Each household connected to the water utility is given a meter that measures water consumption. Households are billed monthly for water consumption

CHAPTER 7

Ensuring Affordability—Tariffs, Subsidies, and Other Financial Reforms

A. Overview

This chapter discusses tariffs, subsidies, and financial reforms as measures to ensure that the poor have affordable access to utility services. It discusses the steps for designing a tariff and subsidy system, as well as other ways of making utility services more affordable.

B. Ensuring the Affordability of Utility Services for the Poor

1. Why Are Tariffs and Subsidies Relevant to Pro-Poor Reform?

Tariffs and subsidies are relevant to pro-poor reform because subsidies are often necessary to ensure the expansion of initial access and/or to cover the total cost of utility services (including fixed charges such as meter fees or annual charges, prohibitive connection fees,[211] and maintenance and supply costs).

The high cost of utility services for the poor can be addressed by pricing the service at a level that low-income users can pay, or by finding funding to support these consumers. Policy makers and regulators may need to reexamine tariff and subsidy designs. Subsidies and properly designed tariffs may be necessary to bridge the gap between tariffs charged to consumers and cost recovery levels, at least during transitional periods. The manner in which tariffs and subsidies are set can have a very decisive impact on the ability of utility service providers to reach the poor. There is therefore increasing pressure to develop innovative ways of setting tariffs and delivering subsidies.[212]

2. How Should a Tariff and Subsidy System Be Designed or Redesigned?

Tariff systems should be designed or redesigned so as to reflect the full costs of the service. Subsidy systems should be designed so as to target the subsidy directly to the poor's needs. In most cases, the cleanest way to achieve effective pro-poor subsidy design, where increasing network access is the intended objective, is to subsidize the connection fee.

Historically, most utility tariffs were designed at a time when the real cost of providing the service was masked by other factors—for instance, when the government-owned and operated public utilities, government taxes benefited the utility, and donors granted materials and services to the utility. Thus, tariffs were often designed with both technical and political objectives. Redesigning tariffs to reflect a full-cost approach may involve very significant increases to some consumers, including low-income consumers.

However, if tariffs in aggregate do not recover the full cost of providing the service, the utility—whether public or private—will not have the funds to invest in network maintenance and expansion over the long term. Even if tariffs do reflect the cost of service, safeguards are needed to ensure that at least some of the revenues are spent on network maintenance and expansion. A network system that does not recover the cost of service is unlikely to be sustainable over the long term because it will require large government subsidies to keep it operating.

The main objective of any tariff policy is to protect consumers while providing for the financial viability of the utility service provider.[213]

There is no one "correct" way to set a tariff: there are hundreds of different methodologies. However, the principles set out in Box 7.1 should be considered.

A tariff and subsidy system should be designed in accordance with the principles above and follow these steps:

- Determine the basis for the current tariff design and whether its underlying principles and cost assumptions remain valid.

  This determination would include profiling consumers in terms of their household income and willingness to pay for the service, identifying the total cost of the provision of services including connection fees or charges, and examining the affordability for different consumer classes.[214] Households generally are expected to be able to afford a maximum of 5% of their income for

Box 7.1: Guiding Principles for Tariff Design

- Tariffs should be set by determining the appropriate levels that would permit cost recovery of service provision, including some contribution toward investments, without generating excessive profits.[a]
- Financing mechanisms should not distort consumption and investment decisions.[b]
- The cost of raising funds should be kept low and should not benefit one firm at the expense of others.[c]
- Conflicts among principles should be resolved by choosing the principle that maximizes access to the poor, subject to acceptable levels of consumption and investment distortions caused by provision of the subsidy.[d]
- Subsidies should be properly targeted to the poor in need of assistance.
- Stakeholders and civil society should be engaged and involved so that alternatives can be identified, analyzed, and considered.

[a] S. Tremolet and J. Halpern. 2006. Regulation of Water and Sanitation Services: Getting Better Services to Poor People. *OBA Working Paper Series.* No. 8.
[b] G. Clarke and S. Wallsten. 2003. Universal Service: Empirical Evidence on the Provision of Infrastructure. In P. Brook and T. Erwin, eds. *Infrastructure for Poor People: Public Policy for Private Provision.* Washington, DC: World Bank.
[c] Ibid.
[d] Ibid.

water and sanitation services.[215] Tariff designers must determine whether consumers can afford the tariffs set or adjust their consumption level to fit their income.[216] Even if the consumption tariffs themselves are affordable, other factors such as connection charges may prevent consumers from accessing services.[217]

- Determine the source of financing for a particular utility service, as this can affect the final tariff set.

  Utility services can be funded by cross-subsidies, universal service funds, or auctions. Cross-subsidies involve charging some users above cost to subsidize other users who are charged below cost. In universal service funds, utility service providers are required to contribute to a fund and are entitled to draw from it to provide service to low-income consumers. In auctions, utility service providers bid for the right to serve a particular location; the winning bidder is the one that requires the smallest subsidy to provide the service.

- Determine how to distribute the subsidy (if any) most effectively to those in need.[218]

  While subsidies are generally discouraged, they can be justified and are often needed if they have a specific pro-poor purpose.[219] For example, if subsidies are provided to increase connections to the poor, clear and specific selection criteria should be defined for identifying poor consumers and which of them are entitled to a subsidy. In all cases, subsidies must be transparent.[220] Every utility service provider should be able to meet its own operation and management costs from its own tariff; in the long term, all should be self-sustaining.[221] Correctly targeted subsidies need not lead to a revenue shortfall for the utility.

- **Target Subsidies**. Subsidies may be targeted by geographic location, by specific data collected to identify the poor, or by using a lifeline or block tariff, under which consumers are charged a low rate for the first units of consumption and progressively more for additional units.[222] A system can prevent higher-income consumers from benefiting from this arrangement by reducing the size of the first block, or through a volume-differentiated tariff, whereby consumers are charged the unit price for the last block of their consumption so that only those who consume smaller amounts receive the lower price for the first block(s) of consumption.[223]

- During each step, engage and involve all stakeholders early in the discussions and planning so that alternatives can be identified, analyzed, and considered.

  Regulators could create an advisory body to perform this task or create focus group discussions with relevant stakeholders. The regulator's role in engaging stakeholders is discussed further in Chapter 8.

3. How Can Utility Services Be Made Affordable Other Than by Subsidies?

Different forms of setting prices or tariffs can either help to keep rates affordable for poor consumers or make them unnecessarily high. Low-income consumers typically have relatively low utility service use. High consumption of energy by poor households is generally due to inefficient or wasteful use of

electricity, which may be addressed by setting energy efficiency standards or through education (discussed in Chapter 4).

Block tariffs tend to discourage high consumption because tariffs increase as the level of consumption increases. They also tend to promote efficient use of the utility because wasteful consumption is discouraged. However, in both the electricity and the water sectors, block tariffs have been known to unnecessarily burden some poor households when several households rely upon one connection to the supply network. In this case, all those households pay the price of a higher block tariff, even though their actual household consumption is far less.

Utilities typically provide affordable service to low-income consumers by providing limited service at an affordable price. The manner in which this is done varies significantly from country to country. Certain rate designs are important for the present discussion: inverted rates, the zero basic charge, the lifeline rate for low-income households, and the percentage-of-income plan.

a. Inverted Rate

Inverted rates provide for a rising price per unit as usage increases rather than a constant or flat rate for all consumption. India, Indonesia, and other countries have made such rates commonplace. Table 7.1 shows an example of a typical inverted rate design for electricity services per kilowatt-hour (kWh).

Table 7.1: Inverted Rate Design

Tariff Element	Price
Basic charge (no kWh)	$2.00
First 200 kWh	$0.03/kWh
Additional kWh	$0.10/kWh

kWh = kilowatt-hour.

Source: RAP.

Inverted rates help the poor because they start low and increase as consumption increases. They also discourage excessive and inefficient use.

b. Zero Basic Charge

Utilities often charge consumers a set monthly basic charge to cover the fixed costs of providing services. High basic service charges can present barriers

Table 7.2: Zero Basic Charge/Minimum Charge

Tariff Element	Price
Basic charge (no kWh)	$0.00
All kWh	$0.05/kWh
Minimum monthly usage charge	$5.00

kWh = kilowatt-hour.

Source: RAP.

to low-usage consumers, preventing them from having access to service. A zero basic charge is a rate design that provides the basic connection to the utility system at no charge. To provide the electricity utility with stable revenue (which would have otherwise been provided by the basic service charge), the zero basic charge is sometimes combined with a minimum usage charge or prepayment. Table 7.2 shows a typical zero basic charge rate structure.

In the example in Table 7.2, the consumer is effectively charged a minimum of 100 kWh. The minimum charge buys the consumer the first 500 kWh, so there is no change in the bill between 0 and 500 kWh usage. However, above 500 kWh, the price is $0.05.

This zero basic charge design is favorable to low-usage consumers because the costs that could be collected in the basic service charge are effectively spread over all usage. A zero basic charge design has a higher price per kWh than a basic service charge for no usage. Once the threshold is reached, however, the rate design is purely usage-based, thereby encouraging more frugal use of the utility service. Thus, zero basic charges help the poor because utility providers maintain the service for free, and the cost of using them increases as consumption increases beyond a threshold.

c. Lifeline Rate for Low-Income Households

A lifeline rate is typically defined as a special rate for low-income households. It is lower than the rate available to other households for the same level of service. Utilities usually require households to meet certain income qualifications to be eligible for this rate. The revenue foregone because of the lifeline rate is typically recouped from standard-rate consumers or governmental subsidies. In many cases, the lifeline discount is limited: for example, to the first block in an inverted rate design, or the first few hundred kWh.

Table 7.3 illustrates a lifeline rate that incorporates a discount to both the basic charge and the initial consumption block:

Lifeline rates help the poor by giving the poor a special low rate, which increases as consumption increases. Box 7.2 sets out an example of lifeline rate in the Philippines.

Table 7.3: Lifeline Electric Rate Design

Service Element	Standard Rate	Lifeline Rate for Qualified Low-Income Consumers
Basic charge (no kWh)	$5.00	$2.00
First 200 kWh	$0.05	$0.03
Additional kWh	$0.10	$0.10

kWh = kilowatt-hour.

Box 7.2: Lifeline Rate in the Philippines

The Electric Power Industry Reform Act of 2001 (EPIRA) provided for a lifeline rate for low-income captive market end users who cannot afford to pay at full cost.[a] The level of lifeline consumption and its corresponding discount rates are calculated for each specific service franchise area based on the cost in that area of two lighting facilities at 20 watts each and a 50-watt radio used for a reasonable number of hours. Therefore, there are different levels of lifeline rates in each franchise area. The lifeline rate based on consumption is generally 50 kilowatts and below. However, the Energy Regulatory Commission has some discretion in setting the maximum level of lifeline consumption. It may adjust the minimum level of consumption and/or the level of lifeline discount to maximize the benefit to low-income end users while keeping costs associated with the subsidy between a certain range (approximately P0.05 and P0.10 per kilowatt-hour).

[a] Republic Act 9136. The Electric Power Industry Reform Act of 2001.

d. Percentage-of-Income Plans

Percentage-of-income plans (PIPs) were developed to ensure that consumer utility bills would be affordable. They set a consumer's maximum utility bill at a percentage of income. Any usage in excess of this amount is borne

by the government, the utility, or a privately funded subsidy program. PIPs are sometimes called guarantee of service plans. Because the amount the consumer pays is limited, there is a strong incentive to couple PIPs with energy efficiency programs to minimize costs. A PIP can be coupled with any type of residential price design. Table 7.4 provides an example of a PIP structure.

Table 7.4: Percentage-of-Income Plan

Element	Amount
Monthly income	$100
Maximum percentage of income	9%
Maximum monthly payment	$9

PIPs help the poor because they peg the cost of consumption at a specific percentage of income—and hence ensure affordability.

PIPs have been criticized for having a relatively high administrative cost because the program administrator (utility, government agency, or NGO) must determine each consumer's income and eligibility and regularly update those figures to reflect changes in utility costs and income levels. Because one goal of providing universal access to water and electricity is to increase the poor's disposable income, if the PIP works, the resulting increases in the poor's disposable income will require the administrator to update the income and eligibility figures. Thus, the PIPs very success will make the updating process a continuing administrative burden.

4. Are There Non-Pricing Elements of Low-Income Utility Tariffs?

In addition to the basic price schedule set through the applicable residential rate, a poor consumer needs to consider many non-price costs of receiving utility services. Each of these is also important to the utility. Thus, policy makers and regulators need to consider the impacts of these costs and seek to design programs alleviating these financial constraints.

a. Deposit Requirements

Utilities typically require some sort of deposit or credit assurance from consumers to extend new service. The options range from establishment of credit to full prepayment for service. This deposit requirement is sometimes

difficult for poor consumers to satisfy. The poor may have difficulty meeting this additional upfront cost. Hence, pro-poor measures can take steps to cover the deposit requirement for the poor.

b. Disconnection Policies

Utilities will often discontinue a service following nonpayment, and law, regulations, or utility standards for disconnection should set out what termination of service involves. Consumers should have notice of a utility's standards for disconnection. For the water sector, in explaining the human right to water, the UN has said that access to safe drinking water and sanitation implies a need for procedural safeguards, which includes the requirement of proper notice prior to disconnections.[224]

Typically, a utility will post a written notice at the service address at least 48 hours before a disconnection although a 30-day notice period is usually considered appropriate. The consumer can pay the delinquent amount and avoid disconnection. This requirement is particularly important for renters, who may not even know that the property owner has not paid the utility bill. If the consumer pays the utility service person when service is about to be physically disconnected, a "field service charge" is sometimes applied.

In addition, appropriate disconnection policies would prohibit disconnections at night or on the weekend, and provide some safety net for the very poor.

c. Reconnection Policies

Reconnecting the utility service following disconnection usually involves a cost. A consumer who has been disconnected for nonpayment is typically required to reestablish credit or make a new deposit before service can be restored. In some cases, a current consumer who moves location cannot establish service at the new location without either paying the delinquent bill from the former location or paying a deposit for the new location. Chapter 8 explains the role of the regulator in establishing these policies.

d. Universal Service Fund

A universal service fund (USF) is a pool of funds dedicated to subsidizing rural or low-income service, usually for the extension of service and connection to the system (as opposed to ongoing support for consumption). A USF is

typically derived from direct charges on the utility's other consumers. Where a USF is in place, an explicit subsidy is applied to a rural utility system or to rural or low-income consumers within a larger utility system. The amount of the USF contribution is calculated either as a percentage levy or as a fixed amount per bill applied to standard-rate consumers.

e. Good Neighbor Fund

Good neighbor funds are funds operated by utilities to which consumers make small voluntary donations that become available for use in low-income bill assistance. Some consumers simply round up the bill, others donate a set amount, and others dedicate "abandoned" amounts, such as deposits and prepayments, to the fund. Typically a low-income assistance agency administers the fund, not the utility.

f. Moratorium on Winter Electricity Disconnections

Generally, failure of consumers to pay for utility services warrants disconnection by the utility service provider. A moratorium on winter disconnections in cold climates recognizes that the loss of electricity service may be life-threatening during winter. To qualify for a moratorium, a consumer must typically satisfy three conditions: meeting program income standards, accepting a payment plan developed with the utility, and participating in energy efficiency programs to reduce usage. Policy makers and regulators should consider whether other disconnection moratoriums are appropriate in their context.

g. Load-Limited Electricity Service

As described on Chapter 4, an electric service load limiter limits the level of current a consumer receives from a power line.[225] Load limiters are significant because they can be installed for some low-income consumers to constrain their usage (and therefore the amount of subsidy required to serve them). Thus, consumers have a more powerful incentive to choose high-efficiency lighting and appliances. Many utilities have installed load limiters in the households of low-income consumers, either as part of their line-extension policy or their rate design.

Load limiters have several advantages for utility service providers. First, they ensure that the capacity limits of a utility's transmission and distribution infrastructure are not exceeded. Second, they limit the maximum amount of utility services a consumer can use at one time. Third, they limit the amount a utility needs to reserve for low-income consumers, whether in the form of low-cost resources, below-cost rates, lifeline rates, or other financial assistance. Finally, energy load limiters provide consumers with an incentive to choose low-wattage lighting and appliances. Sometimes consumers who have been disconnected from the utility for nonpayment are allowed to reconnect upon partial payment of delinquent amounts, but with access only to load-limited service.

h. Prepayment Meters for Electricity

An increasing number of electricity providers are installing prepayment meters.[226] Worldwide, many electricity providers charge for the amount recorded by a meter at the end of a billing cycle. This mode of charging consumers is known as postpayment. Electricity utilities using prepayment meters require the consumer to buy a prepaid card for electricity and either plug it into the electric meter or enter a numerical PIN that records the value of prepayment on the card.

When the prepaid amount is exhausted, the electricity stops flowing until a new card is purchased. Low-income consumers typically resist a conversion from postpayment to prepayment. But where a utility service is newly available, and is competing with more primitive or basic sources (such as kerosene for lighting and cooking), utilities may be able to introduce the option up front. Box 7.3 offers examples of prepayment metering schemes.

Box 7.3: Prepayment Meters

Prepaid Electricity Service in the Philippines

In the Philippines, the energy regulator has issued guidelines on prepaid retail electric service and the electric utility provider, Manila Electric Company (Meralco), has conducted pilot testing of prepaid metering in certain areas of Manila.[a]

Pay-As-You-Use Metering Scheme in Singapore

In Singapore, the pay-as-you-use metering scheme has been available since May 2005 for residential consumers whose electricity supply has been disconnected due to arrears. The scheme enables consumers with significant arrears to manage their electricity consumption with their ability to pay and also pay off their arrears.

Prepaid Electricity Service in Vanuatu

The Union Electrique du Vanuatu (UNELCO), the electricity provider in Vanuatu, has requested the Utilities Regulatory Authority (URA) to allow the implementation of a prepayment meter trial for 100 households in the Port Villa concession area.[b] The trial was conducted from August to December 2009 but was extended through 2010 and URA is awaiting results of a report on the technical performance of the pre-paid meters.

In the islands of Tanna and Malekula, use of prepayment meters was introduced as part of the concession agreement. The introduction of these prepayment meters was generally considered to be a success and was well received by consumers, however, full implementation has been delayed due to technical issues and supplier problems.

[a] Energy Regulatory Commission. 2009. A Resolution Adopting the Rules for Prepaid Retail Electric Service Using a Prepaid Metering System. 13 July. Available: www.erc.gov.ph/pdf/Resolution%20No.%2015,%20Series%20of%202009%20Prepaid%20Metering%20Service.pdf; *Philippine Daily Inquirer*. 2009. Prepaid electricity metering guidelines out. 30 July. Available: http://newsinfo.inquirer.net/breakingnews/nation/view/20090730-217975/Prepaid-electricity-metering-guidelines-out

[b] Utilities Regulatory Authority. 2009. *Pre-Payment Meter Technology Trial Review: Issues Paper.* Vanuatu.

CHAPTER 8

The Role of the Regulator

A. Overview

The regulatory system for energy and water services can play a significant part in making utility services more available to low-income households. The system may or may not include a regulatory body established separately from the government under specific authorizing legislation. Other guides in this ADB series on infrastructure will discuss the establishment of a separate autonomous regulator in more detail, so the description below provides only a summary of the relevant issues.

For any regulation of the energy and water sectors to be effective, it needs to be guided by the minimum principles of effective regulatory governance (the manner in which regulation is carried out, or the "how" of regulation) in order to deliver effective regulatory substance (the actual substance of regulatory actions or decisions, or the "what" of regulation). The principles of effective regulatory governance are that regulation be autonomous, transparent, accountable, predictable, directed by clear and coherent objectives and roles, participatory, and that regulators have sufficient capacity and integrity for stakeholders to consider the regulatory process to be credible and legitimate. These principles are described further in Box 8.1.

Box 8.1: Principles of Effective Regulatory Governance

- Autonomy—the regulatory body is able to make its own decisions and take action without referring to another authority, and is able to carry out its regulatory functions independent from political interference.
- Clarity of roles and objectives—the regulatory body's roles, responsibilities, and objectives are clearly defined and do not overlap significantly with other departments. Sector objectives must be clearly defined in the authorizing legislation and transparent to all stakeholders.

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Box. 8.1: continued

- Capacity—the ability of people, organizations, and society as a whole to manage their affairs successfully. A regulatory body must be able to manage its financial and human resources to plan, implement, and monitor decisions and actions.
- Accountability—the regulatory body is answerable for the actions and decisions it makes and is subject to sanction for abuses of power.
- Transparency—the regulatory body is able to provide information on regulatory actions and decision making.
- Predictability—certainty and stability of the processes and procedures by which rules and decisions are rendered; certainty that regulatory objectives, sector composition, or regulatory substance will not be suddenly changed; and certainty that decision making is regular, consistent, and orderly in relation to a set of objectives and criteria.
- Participation—the opportunity for all parties (including government, the regulated industry, consumers, and unconnected citizens affected by the regulatory decision, action, or process) to influence the regulation or decision before regulators decide.
- Integrity—the personal integrity of individuals that belong to the regulatory body as well as the institutional characteristics of the system itself. Personal integrity requires adherence to principles of honesty and sound ethics, and to the objectives, values, and principles of the regulatory system. System integrity requires that the system as a whole is not undermined, impaired, or diminished by external factors.
- Credibility—the regulatory body honors its commitments, abides by agreements, observes due process, is bound by judicial processes and third party arbitration, and does not unduly seek to change the parameters of regulatory substance or interfere inappropriately with the spirit and intent agreed by the parties.
- Legitimacy—the perception by stakeholders that the regulatory body is governed by the principles of its mandate, is fair and equitable in the treatment of all stakeholders, seeks to protect and enhance the interests of the sector and all participants, demonstrates impartiality in the discharge of its duties, and acts effectively and professionally.

Source: K. Mulqueeny, Energy Regulatory Governance, March 2010. Unpublished.

The key parameters for considering regulatory substance include tariff structure and levels, quality of service, licensing, investment and equity, and environmental issues, among others.[227] These parameters are described in Box 8.2.

Box 8.2: The Components of Effective Regulatory Substance

- Access—regulatory decisions and actions including monitoring and enforcement actions that enable citizens to be connected to and maintain connection to electricity and water supply service networks, inhibit such connections, facilitate access to alternative non-grid forms of energy and water supply, and resolve disputes related to access.
- Service quality—regulatory decisions and actions that set service standards for the quality of water and electricity, including standards ensuring continuity of water or electricity supply, standards ensuring the quality of supply, and consumer service and service quality.
- Tariff and price decisions—regulatory decisions and actions that set the tariff levels, determine the tariff structure, and periodically review or adjust the tariff, and include establishing tariff objectives, structure, methodology, and review.
- Subsidies—requires considering subsidies for the electricity or water sector whether they are direct (the result of a regulatory decisions or action) or indirect (actions that may affect regulatory decisions or the sectors involved). They include direct financial transfer, preferential tax treatment, trade restrictions, and public funding of research related to energy and water, and can affect patterns of both supply and demand.
- Licensing—regulatory decisions and actions that cover permitting, licensing, and re-licensing of energy and water facilities, including the issued grounds for amending or suspending licenses, processes of dispute settlement or management for licenses, the information the regulatory decision or action requires for a license application, the ease of new entry into the market, and the types of obligations reflected in licenses.
- Accounting and reporting—regulatory decisions and actions setting standards for collecting, compiling, evaluating, and distributing documentation and information related to energy and water supply, and the enforcement of those standards.
- Efficiency—regulatory decisions and actions that require water and energy suppliers to deliver their services using the least energy, water, or cost necessary, involving measures to make the supply side of the energy and water sectors more efficient by improving the efficiency of supply, transmission, and distribution. It also involves measures to reduce demand by improving end-use efficiency.

continued on next page

Box. 8.2: continued

- Financial performance—regulatory decisions and actions that require water and electricity suppliers to comply with financial ratios, including rates of return and debt coverage.
- Investment and maintenance—regulatory decisions and actions that relate to expenditures needed to maintain existing infrastructure, the age of infrastructure stock, and the degradation of that infrastructure.
- Equity—regulatory decisions and actions that concern, identify, or target poor or low-income water and electricity users.
- Environmental and social sustainability—regulatory decisions and actions that relate to environmental and social sustainability, including whether regulators have a mandate that covers sustainability issues, including provisions to include externalities in energy or water prices, energy efficiency and water conservation, whether regulators have made any decisions, issued any regulation or taken any action on environmental and social sustainability, including renewable energy and energy efficiency, and whether regulators have set out requirements to minimize greenhouse gas emissions and respond to climate change.
- Market composition and competition—regulatory decisions and actions on the structure of the electricity and water sector, including whether it is a monopoly, partially restructured, or fully restructured, deregulated, or liberalized. It includes regulatory decisions and actions (i) restricting investment; (ii) unbundling the generation, transmission, and distribution components of the sector; (iii) establishing competitive wholesale or retail markets for electricity and water; and (iv) facilitating or inhibiting access and interconnections to the transmission and distribution grid.

Source: K. Mulqueeny, D. Jarvis, and B. Sovacool. Conceptual Framework for ADB Technical Assistance on Enhancing Effective Regulation of Water and Energy Infrastructure and Utility Services. Unpublished.

In many countries around the world, including in Asia, autonomous or so-called "independent" regulators have been established to increase the effectiveness of energy and water sector regulation. The rationale for doing so is that the sectors would operate more efficiently and effectively, and avoid inherent conflicts of interest by largely separating the functions of regulation from the functions of making policy for the sectors and operating the service providers. While the autonomous regulator model has had been successful in some cases, not all of its expectations have been met for a variety of reasons, including that it can become captured by politicians and the regulated body, and that it can become too technocratic and far removed from the

public.[228] In addition, some commentators have been concerned that while a regulator's role is usually to balance the consumer and public interests with those of the government and investors and operators, regulators often lack of a broader framework that guides them to focus on pro-poor concerns,[229] including access and affordability.[230] Thus, while there are many advantages to establishing an autonomous regulator, to avoid the risk of focusing on the issues of particular interest groups without sufficiently focusing on the poor, regulatory designers may need to focus on establishing a regulatory institution that targets the poor's needs, and/or regulators themselves may need to draw attention to these issues.[231]

B. What Regulatory Structures May Help the Poor?

A regulatory body must have the scope within its mandate to consider the needs of the poor. While a specific pro-poor mandate may not have been given to a regulator, most regulators have been established with a mandate to protect consumer interests, and poor and low-income households are one class of consumers—like many others.

Thus, the overwhelming majority of regulators would have a formal mandate that would allow them to consider the needs of the poor. However, if an explicit pro-poor mandate does not exist, the regulatory mandate could be clarified by making a pro-poor mandate explicit; the specific nature of poor consumers' needs makes it necessary to explore institutional solutions to ensuring that the poor's issues are adequately covered by regulators.[232] A separate regulatory agency could be established, or the existing regulator could incorporate an internal pro-poor policy or program, a low-income advisory body, a consumer representative committee, or an adjudicative body, as described below.

1. Dedicated Pro-Poor Regulatory Agency

One option for addressing the needs of the poor, occasionally proposed, is to establish a dedicated pro-poor regulatory agency. This proposal has the advantage of institutionalizing a system for explicitly considering the poor's needs and concern for utility services. However, the disadvantage of this proposal is that it could carve the poor's interests out of mainstream regulatory considerations and marginalize their concerns and issues, while duplicating the regulators' function of protecting consumer interests. It may, however, be appropriate in a particular country context and the advantages

of having a dedicated agency with the expertise to consider pro-poor interests should be assessed against this disadvantage.

2. Pro-Poor Internal Policy and Program

A regulatory body could refine their own broad mandate for considering consumer concerns by establishing an internal policy and program, supported by sufficient human and financial resources, that would focus on assessing and satisfying pro-poor needs in terms of access, affordability, and quality. This internal policy could incorporate many of the more detailed measures contained in this guide as a way to require institutional consideration of pro-poor needs within an existing regulatory body. It could also take the form of a pro-poor or consumer representative unit within the regulatory body, which could also hear consumer complaints to advance the needs of consumers or the poor from within.

3. Low-Income Advisory Body

Regulators could consider establishing an external low-income advisory body to provide advice and guidance on the entire range of low-income energy service issues. Such representation could take the form of a parallel and independent institution. An advisory body could consist of all relevant stakeholders including advocates for the poor, representative citizens, and government and NGO representatives involved in low-income, energy efficiency, and environmental justice issues, with technical participation from utility representatives. Regulators could meet with the advisory body periodically to review proposed policy changes and rate design options, and consult with it to develop new programs. The risk in establishing an external low-income advisory body is that it is not directly integrated into the main regulatory office, potentially marginalizing poor consumers' interests. However, if a regulator authorizing legislation requires it to disclose and make transparent all proposals and recommendations made by the advisory body, this risk could be largely mitigated.

4. Consumer Representative Committee or Consumer Advocate

Policy makers or regulators could constitute an external consumer representative committee to represent and advocate for the interests of the poor in specific pro-poor projects or policy or regulatory initiatives. They could also participate directly in regulatory processes and ongoing decision-making

processes such as tariff adjustments or reviews that may require feedback or inputs from them.

5. Consumer Appeals Body

A consumer complaints appeals body could be established to resolve consumer complaints, particularly from low-income households. Utilities usually have a division to deal with consumer complaints. Regulators often, but not always, set standards for consumer service, and have processes for assisting the resolution of consumer complaints. A consumer appeals body could play an important role in handling consumer complaints and appeals which remain unresolved by the utility, and after a regulators intervention. To ensure objective dispute resolution, it is desirable that the body be separate from and independent of the regulator. However, in small countries or small regulatory systems, an additional appeals body may not be feasible.

C. What Is the Role of the Utility Regulator in Pro-Poor Programs?

Regulators can conduct specific activities and take actions to promote pro-poor programs. Regulators should consider the objectives of pro-poor utility service provision: efficiency, access, price, quality, and financial, environmental, and social sustainability. Regulators will need to balance the cost-of-service concepts that drive one type of rate design with environmental and social costs and goals embodied in applicable laws. They must consider this full range of costs, which includes, but is not limited to, the cost of setting a fair electric rate design. Regulators usually deal primarily with utility service extension and pricing programs, but regulators have also taken lead roles in rural electrification and low-income energy and water efficiency programs.

Set out below are examples of pro-poor measures where the role of regulators would be important in achieving pro-poor access to utility service at an affordable price and reasonable quality.

1. Access

Regulators can take steps to generate the incentives for expanding access in several ways, including establishing regulatory obligations for expanding access and ensuring performance indicators (such as access coverage targets) are used as a basis for tariff increases. Regulators can establish regulations

facilitating some of the measures explained in Chapter 5 and/or may be involved in administering those measures.

2. Access—Tariff Review

Regulators must work with stakeholders and consumer advocacy groups to further pro-poor initiatives in tariff review or tariff setting. Consumer advocacy groups can provide feedback on specific pro-poor issues and participate in the decision-making process. Tariff setting may lead to expanded access for the poor by ensuring that funds intended for extending access are spent before the regulator approves additional tariff increases requested by the utility service provider.

3. Access—Concession Agreements

Regulators are often tasked with administering concession agreements, which have established investment obligations upon the utility for expanding access to unserved areas. Box 8.3 contains a discussion of the concession contract in Vanuatu, which the regulator monitors.

Box 8.3: The Utility Regulatory Authority and Union Electrique du Vanuatu

Concession Contract in Vanuatu

Vanuatu's Utility Regulatory Authority, established only in 2008, is currently responsible for monitoring and enforcing the Union Electrique du Vanuatu's (UNELCO) compliance with the concession, which would include its obligations to expand access beyond the existing concession. The agreement relating to the concession for the generation and public supply of electric power in Port Villa between the Government of Vanuatu and UNELCO requires UNELCO to prepare a yearly distribution network plan[a] and to expand access of electricity supply to new consumers where consumers or the government pays.[b] Extension of the distribution line to new consumers is subject to repayment of 90% of the cost for high voltage consumers and 70%–90% for low voltage consumers. UNELCO has been operating under the concession since 1986 and the newly established regulator is now reviewing its monitoring and enforcement role.

[a] Specifications Agreement Relating to the Concession for the Generation and Public Supply of Electric Power in Port Villa between the Government of Vanuatu and UNELCO. Section 3, para. 9. 15 Aug 1986.
[b] Specifications Agreement Relating to the Concession for the Generation and Public Supply of Electric Power in Port Villa between the Government of Vanuatu and UNELCO. Section 7, 15 Aug 1986.

4. Access—Rural Electrification

Rural electrification policies and programs may include a role for regulators. Sometimes separate agencies, institutions, or corporations are established to administer such programs. Box 8.4 provides an example of a rural electrification program in India that involves regulators.

Box 8.4: Rural Electrification under India's Electricity Framework

India's Electricity Act 2003 emphasizes rural electrification. The Rural Electrification Policy calls on the government to notify the regulatory commissions of rural electrification plans, while the act requires state commissions to ensure that all households have access and play a role in giving oversight to the state programs.

Source: Prayas Energy Group. 2008. *Awareness and Action for Better Electricity Service: An Agenda for the Community.* Pune.

Harnessing the power of the wind as a source of renewable energy

5. Access—Renewable Energy and Rainwater

Regulators play an important role in encouraging renewable energy and could play a greater role in promoting the use of rainwater. As discussed in Chapter 5, renewable energy is relevant to the poor because renewable energy generation can often be designed for remote or rural areas by developing small-scale or off-grid generation and directly linking it to distribution lines for the poor. Regulators can support renewable energy through incentives or regulations that favor the development of distributed generation and renewable energy resources. Such incentives would include the development and administration of feed-in tariff regulations. Regulations encouraging renewable energy should also come with restrictions against greater use of environmentally harmful options, such as diesel generators.

Similarly, in some jurisdictions, regulators have issued regulations requiring the installation of rooftop or underground rainwater collection systems. Such direct regulation, and incentive schemes promoting rainwater use could significantly expand availability and pro-poor access by making efficient use of raw water.

6. Access and Affordability—Connection and Disconnection

Regulators must usually approve the utility's consumer deposit amounts, connection, disconnection, and reconnection policies. They should protect the poor's interest in the following ways:

- **Deposit amounts** must be reasonably related to the amount that the utility expects would become subject to collection if the consumer were to default.
- **Disconnection and reconnection policies** must reflect the social goal of extending electric service to as many people as reasonably possible. Disconnection and reconnection policies should encourage payment. However, they must not unduly deprive consumers, particularly poor and low-income consumers, of access to the utility service at unreasonable times or without the opportunity to receive notice of disconnection and to have the opportunity to make payment. For example, some disconnection policies prevent disconnection during the night or on weekends.

- **Disconnection and reconnection charges** must not be so high that they effectively prevent consumers from regaining access to the network after being disconnected.
- **Interest charges** must be based upon the utility's cost of borrowing, and not be punitive. Chapter 7 explained the relevance of these policies to consumer affordability.

7. Access—Line Extension Tariff and Consumer Advances

A line extension is the extension of a primary electric distribution line to the consumer's property, subdivision, or commercial building. Regulators should review and approve a utility line extension tariff—the terms under which the utility will extend service to new communities and new consumers. A typical line extension tariff provides that the utility will bear only those costs that are justified by the revenues generated from the service expansion. However, this standard arrangement can be modified by several factors.

First, if there is an explicit governmental directive for the utility to subsidize rural service, the expense will be factored into the line extension tariff. Second, a line extension tariff should assume that more consumers will add service over time, and that existing consumers will increase usage as their income grows and as they acquire more electricity-consuming appliances. Third, a line extension tariff should provide a way for new consumers to pay for the cost of extending service over a long time—effectively using the utility's access to credit for the benefit of the public. Regulators should ensure that the line extension tariff is based on the full line-cycle revenues and costs of service expansion, not only on a short-run view of costs and revenues.

One common approach is to charge one consumer or community for the cost of extending a distribution line extension, but to recover a proportion of that cost from new consumers or communities who connect to the same distribution line at a later time, and to give a rebate to the initial consumer or community. For example, regulators might collect a portion of the cost of a line extension from the first consumer or consumers and then require "latecomer fees" from later consumers, which would then be repaid to the original consumer making the investment. This approach, called a "consumer advance," protects the utility from making an uneconomic investment while allowing the consumer who makes the initial investment some ability to cost-share with latecoming consumers. Regulators must normally approve the creation of such a consumer advance system along with the accounting policies for collecting latecomer fees.

8. Access and Affordability—Resource Planning

Integrated resource planning (IRP) seeks to consider both demand-side (energy efficiency) and supply-side (efficiency and new generation) options in satisfying the least-cost options for meeting new energy supply needs that address new technological developments and environmental constraints.[233] Thus, the IRP requires (i) energy efficiency measures to be considered before planning to build new power plants; (ii) the environmental and social costs of all types of power plants (fossil-fuel, nuclear, and renewables), and transmission and distribution systems to be considered in making choices about new generation; and (iii) the risks and probabilities involved in different energy sector scenarios to be fully considered. It also factors in environmental and social costs of different new utility generation and supply options. In addition, the IRP seeks more rational planning for new generation projects and could potentially limit opportunities for corruption and sweetheart deals in large projects, the excessive costs of which are paid by the poor or require subsidized tariff increases.[234]

9. Access and Affordability—Energy Efficiency and Water Efficiency Programs

Regulators can lead energy efficiency efforts in several ways. Regulators can require utilities to institute demand-side management (DSM) measures, including public education. If regulators have the power to set the tariif, ensuring the tariff reflects the full costs of service provides an initial incentive for linking the costs of the service with its use. Regulators can institute regulations requiring utilities to reduce technical losses (or waste), in delivering electricity and water, and can monitor and enforce the extent those standards are complied with. Regulators can also approve a revenue-cap tariff that decouples revenues from sales tariff that sets forth the terms under which the utility will provide grants and loans to pay for energy efficiency measures for all consumers. The programs for low-income consumers must reflect the fact that they do not have the ability to make investments in energy-efficient appliances or equipment. Regulators can also play a role in overseeing that electricity services can become more affordable by transferring gains from energy efficiency back to consumers. These measures are described in detail in Chapter 4.

10. Access and Affordability—Hook-up Fee Waivers

Hook-up fees are commonly applied when new consumers add significant new electric load that will require augmentation of the utility distribution, transmission, or generation system, whether immediately or over time. Regulators normally must approve the imposition of hook-up fees and the utility's accounting for the revenue received. Under regulatory principles that encourage universal service, it is common to apply hook-up fees to new consumers' connections with expected large electric load, but to exempt consumer connections to low-income households, which are expected to generate only small additional electric load.

Hook-up fees may be based on the connected electric load (in kW) of new buildings, industrial facilities, or agricultural loads. The collected fees can be used to repay consumer advances or go into the utility capital fund for system upgrades.

A man exchanges his incandescent light bulbs with compact fluorescent lamps

11. Access and Quality of Service—Hook-up Standards

Hook-up standards are standards that apply before utility service may be connected. Regulators may consider minimum building efficiency standards for connecting to utility service. For example, a tariff may restrict access to service for very low-efficiency appliances, or those with electrical characteristics that can impair reliable service to other consumers.

12. Affordability—Designing the Tariff Structure and Level

Regulators must approve the rate design for all utility tariffs, including those applicable to low-income consumers. Regulators normally participate in rate design through a rate case, or tariff determination, in which all of a utility's costs and revenues are examined and prices are determined. Regulators may be able to establish different cost bases for different classes of consumers or establish different rate levels for different types of consumers.

Regulators would consider whether to apply an inverted rate or a lifeline rate in a rate case, and approve them specifically. Regulators would also establish the basic service charge, which would typically be based on the costs of metering, meter reading, and billing (leaving the cost of the distribution system and power supply to be recovered in the usage-related prices). Chapter 7 discusses how regulators can ensure affordability for poor consumers.

13. Quality

Regulators are usually required to establish performance and quality of service standards, which set targets and benchmarks for the performance of utilities. Such standards cover many aspects of the quality and quantity of supply, the continuity of service, and the quality of consumer service and response time. Chapter 6 discusses how regulators can set pro-poor service quality.

a. Electricity Provision

In the electricity sector, poor quantity and quality of supply due to frequent interruptions, planned interruptions or load shedding, and low voltage levels affect the poor in rural areas more than those in the urban areas. Some of the possible solutions to address these problems are set out below.

- **Load shedding.** A possible solution to minimize the frequency and length of load shedding is to reduce the demand–supply gap. The regulator can play a role in this reduction, which can be achieved by encouraging people to reduce consumption by creating disincentives for unnecessary electricity use. Another method the regulator may use to address the load shedding problem is to make it more equitable by requiring the electricity service provider to request approval as to the time, length, and area where the electricity service provider will reduce power. Box 8.5 sets out examples of how regulators deal with load shedding.
- **Unplanned interruptions.** The main cause of unplanned interruption is fuse failure. This failure should be addressed by the electricity service provider through better planning and maintenance of its equipment.[235] The regulator's role is to require the electricity service provider to properly maintain its equipment and to monitor and enforce this requirement. Unexpected interruptions due to the fault of the electricity service provider may warrant a penalty, such as compensating the consumer a certain sum of money for each hour or day of the delay in returning the supply of power.[236]

Box 8.5: Dealing with Load Shedding

Akshay Prakash Yojana Program in Maharashtra, India
Villages were asked to reduce their electricity use during peak hours, give up appliances that consumed high amounts of electricity, and use electricity for agricultural pumps, flour mills, and schools only at certain times to address the problem of load shedding. In return, the villagers were assured of 22 hours uninterrupted electricity supply. The scheme was implemented in 4,611 villages and reduced peak demand by 960 megawatts but was discontinued due to an extreme electricity shortage.[a]

Load Management Charge
The Maharashtra Electricity Regulatory Commission issued a tariff order that required consumers consuming more than 300 units/month to reduce their consumption to 80% of what it was the same month a year ago.[b] Consumers that were unable to achieve this would be charged a premium rate for the incremental consumption.

[a] Prayas Energy Group. 2008. *Awareness and Action for Better Electricity Service: An Agenda for the Community.* Pune.
[b] Ibid.

- **Voltage problems.** An electricity service provider can address voltage problem through more effective planning and operational practices.[237] Similar to unplanned interruptions, the regulator's role is to require the electricity service provider to be more effective and efficient in its operations and to monitor and enforce this requirement. Regulators can specify in the electricity service provider's performance target that voltage must not fluctuate beyond a certain level or it will impose a penalty for such voltage fluctuations.[238]

b. Water Provision

In the water sector, service quality refers to drinking water quality; the level of service the water utility provides (including water pressure levels, continuity of supply, response to complaints, and emergency water service provision); and environmental quality (including pollution).[239] Drinking water quality must adhere to the World Health Organization's *Guidelines for Drinking Water Quality.* Regulators are tasked with maintaining all three aspects of service quality. However, there are instances when the task of maintaining drinking water quality and environmental quality belong to a different government ministry or agency (such as the health or environmental ministries or agencies) and not with the water regulator. In such cases, frequent and ongoing coordination through a task force or coordinating committee is needed.

Regulators can set lower tariffs for intermittent water service. Regulators can also provide consumer compensation schemes wherein noncompliance of minimum standards for service quality will entail penalties or fines for the water utility payable to the consumer. Box 8.6 sets an example of a consumer compensation scheme.

Box 8.6: Consumer Compensation Scheme in Jamaica

The Office of Utilities Regulation sets a minimum standard for service quality, which the National Water Commission must comply with.[a] These standards include connection to supply, issue of first billing statement, keeping appointments, response to complaints, meter installation, restoration of service after emergency interruptions, among others. Noncompliance requires the commission to automatically compensate affected consumers by crediting the amount directly to the consumer's account.

[a] A. Jouravlev. 2000. *Water Utility Regulation: Issues and Options for Latin America and the Caribbean.* Santiago, Chile: Economic Commission for Latin America and the Caribbean.

14. Transparency and Consultation

Consumers, particularly poor and low-income consumers, often have difficulty understanding their rights and entitlements relating to the provision of electricity and water utility services. Many consumers even have difficulty understanding the utility bills sent by the provider. As a result, regulators can play a very significant consumer protection role by consumer outreach and requiring clear and informative invoices clarifying the basis for tariff structure, tariff levels, and related calculations, as well as the obligations of the utility to conduct regular metering and the like.

Despite the mandate of most utility regulators to protect the interests of consumers, not all utility regulators sufficiently disclose electricity and water supply information in a form and in languages that are readily accessible to consumers, particularly poor consumers. All information other than commercially sensitive information should be disclosed. This information includes financial audits of regulators and the regulated bodies; tariff reviews and decisions and the bases upon which they were made; the opportunities for appeal; and the base for metering. Box 8.7 describes different energy regulators' efforts at transparency.

Box 8.7: Transparency and Consultation

Transparency and Consumer Advocacy in India

In its effort at transparency and consumer advocacy, the Karnataka Energy Regulatory Commission publishes a bilingual monthly newsletter for the purpose of creating consumer awareness and a compendium of cases, which supports consumer awareness workshops. It also conducts regular consumer surveys and has set up a consumer advocate office.

The Orissa Energy Regulatory Commission has published and distributed several information packets, a "Frequently Asked Questions" book, and newsletters all concerning the regulatory process; and conducts a series of consumer workshops.[a]

The Philippine Magna Carta for Residential Electricity Consumers

In the Philippines, the Energy Regulatory Commission has promulgated the Magna Carta for Residential Electricity Consumers, which sets out the rights and obligations of residential electricity consumers. Residential consumers are entitled to the following basic rights: (i) quality, reliable, affordable, safe, and regular electric power; (ii) courteous, prompt, and non-discriminatory service; transparent, non-discriminatory, and reasonably priced electricity; (iii) adequate access to information on matters affecting electric service; (iv) prompt and speedy resolution of complaints; and (v) organized consumer organizations.[b]

continued on next page

Box. 8.7: continued

Other consumer rights set out in the Magna Carta include, the right to (i) be connected to a distribution utility for electric service upon full compliance of requirements; (ii) refund of deposits upon termination of service and refund of overbillings; (iii) meter testing once every 2 years; (iv) extension of lines and facilities for consumers located within 30 meters from the distribution utilities existing secondary voltage lines at the expense of the distribution utility; (v) information of power interruptions, rate schedules, and other pertinent information; (vi) notice prior to disconnection; (vii) reconnection within 24 hours upon payment of arrearages; and (viii) electric service despite arrearages of the previous tenant.

[a] Prayas Energy Group. 2008. *Awareness and Action for Better Electricity Service: An Agenda for the Community.* Pune.
[b] Energy Regulatory Commission. 2004. *Magna Carta for Residential Electricity Consumers.* Manila.

D. Conclusion

The regulator has an important and potentially significant role in promoting pro-poor water and energy services. Most pro-poor policy and regulatory measures will fall directly within a regulator's mandate of protecting consumers, even if they do not have a direct reference to the poor in their mandate. To advance the poor's interests, regulators must take the lead in rural electrification and low-income energy and water efficiency programs. Establishing effective pro-poor policy and regulation for water and energy supply services is one important way of removing barriers to accessible, affordable, and quality energy and water services that improves the quality of life of the poor. In short, pro-poor policy and regulation is one important way of attaining access to energy and water services for all.

APPENDIX

Pro-Poor Covenants

A. Overview

This appendix sets out sample covenants for several of the issues discussed in this guide. Most of them have been used in existing projects and adapted. Before including them in a memorandum of understanding or a financing agreement, they should be discussed with the team and the relevant government.

Many governments will only be able to comply with pro-poor covenants that are integrated into a project design, if given a specific budget allocation. The following covenants are samples of pro-poor covenants. As explained in other parts of this guide, the profiles of the poor and what is appropriate for delivering services to them will differ by country and project. Hence, appropriate covenants will also differ on these bases.

B. Definitions

1. The Poor

As discussed above, the definition of "poor" will depend on the particular context and project. The definitions of "poor" and "very poor" below were used in one prior project. It is illustrative only and should not be treated as a formal precedent.

Section [•] Definitions

(a) "Poor" means people who (i) live in ordinary slums; (ii) are employed in the casual or informal sector, including taxi, bus or private car drivers, small traders, factory workers, shopkeepers, tailors, and small businesspersons; (iii) receive a monthly average income per household member of [insert threshold wage]; (iv) receive two to three adequate meals a day; and (v) are frequently from vulnerable

groups, including widows, female-headed households, or recent migrants from rural areas.

(b) "Very poor" means people who (i) live in real slums, shanty towns, streets, near factories, waste dumps, riverbeds, or hillsides, and are often members of a floating or transitory population; (ii) are employed in the casual or informal sector, including garment workers, hawkers, rickshaw drivers, manual car pullers, garbage or waste disposal collectors, day laborers, house servants, or street vendors; (iii) receive a monthly average income per household member of less than [insert threshold wage]; (iv) receive an average of one adequate meal a day or two inadequate meals a day; and (v) are frequently from vulnerable groups, including widows, female-headed households, recent migrants from rural areas, beggars, the disabled, and the unemployed.

2. Alternative Service Providers

Section [•] Definitions

(a) "Alternative service provider" means any individual or entity that supplies [energy/water] to households including small-scale vendors, *[insert others as relevant to project],* except for the main [electricity/water] network service provider.

C. Industry Structure and Regulation

1. Institutional and Sector Restructuring Policies

Section [•] The [Borrower]* shall ensure that it provides ADB with notice and opportunity to comment upon any proposed policies, legislation, reports, plans, or policies relating to institutional and sector restructuring (including with respect to their effects on the poor) before they are finalized and including, to the maximum extent permissible, all such documents of development partners.

[OR]

* Replace with Recipient or Beneficiary where appropriate.

Section [•] The [Borrower] shall ensure that ADB is kept informed of the [Borrower's] policies and programs related to the [energy/water] sector that will affect the performance and financial viability of the Project, particularly policies and regulations relevant to [energy/water] supply, pricing, use, and efficiency, and their effects on the poor.

2. Autonomous Economic Regulation

Section [•] (a) The [Borrower] shall ensure that (i) economic regulation of [*name of the electricity utility*] and technical regulation are coordinated, and (ii) [*name of electricity regulator*] adequately considers economic and technical regulation and the provision of a lifeline tariff in determining tariff petitions.

(b) Within 6 months of the effective date, the [Borrower] shall ensure, by issuing a regulation, that [*name of the electricity regulator*] considers the following in determining appropriate tariff rates: (i) [*name of the electricity utility*] debt service; (ii) a rate of return to be agreed upon between [*name of the electricity regulator*] and [*name of the electricity utility*]; and (iii) a lifeline tariff to protect poor consumers.

3. Regulation by Contract

Section [•] (a) The [Borrower] shall develop a standard form of regulation by contract ("Regulation by Contract") to the satisfaction of ADB, for [the distribution and transmission of electricity/generation of electricity/provision of water supply].

(b) The Regulation by Contract shall be developed in a transparent manner that allows all stakeholders an opportunity to participate and comment, and shall include provisions reflecting the following:

(i) fair balance of the interests of consumers with those of investors so as to be politically sustainable;
(ii) a performance-based, multi-year tariff;
(iii) an obligation for [the generator to provide reliable electricity/the water provider to provide continuous quality water];
(iv) an obligation to ensure the following operational performance improvements:

   a. expanded coverage area to [•] percent, including to poor areas;

b. [increased electricity distribution and transmission efficiency to [•] percent/reduction in nonrevenue water to [•] percent]; and
c. *[insert others].*

4. Allocation of Connection Kits and Grievance Review

Section [•] (a) The [Borrower] shall [or shall cause the {*name of project executing agency*} to] establish transparent, participatory, objective, and verifiable selection criteria for the allocation and award of [electrification/water] connection kits that are acceptable to ADB. The [Borrower] shall ensure that the award and allocation of [electrification/water] connection kits under the Project are conducted in accordance with such criteria.

(b) In relation to the award of [electrification/water] connection kits set out in Section (a) the [Borrower] shall establish an independent complaint investigation and resolution mechanism acceptable to ADB. The complaint investigation and resolution mechanism shall be responsible for the following:

(i) reviewing and addressing complaints from end users, beneficiaries, and other Project stakeholders in relation to the award of [electrification/water] connection kits under the Project; and
(ii) establishing the threshold criteria and procedures, subject to ADB's satisfaction, for handling such complaints, for proactively and constructively responding to them, and for providing the public with notice of such mechanism, including publishing notices in local newspapers or arranging public meetings.

D. Diversifying Quality and Offering Different Levels of Service

1. State-Owned Utilities

Section [•] The [Borrower] shall cause the [*name of state-owned utility service provider*] to review and assess whether it could offer flexible customer service arrangements, including flexible payment schemes or flexible payment options, to promote access and affordability of the [electricity/water] service for the Poor.

2. Contracts with Private Sector Service Providers

Section [•] The [Borrower] shall [or shall cause {*name of state-owned utility service provider*} to] include a requirement in any contract with a private sector service provider that it consider offering flexible consumer service arrangements, including flexible payment schemes or flexible payment options, to promote access and affordability of the [electricity/water] service for the Poor.

E. Affordability

1. Cost Recovery and Tariff Reform

Section [•] The [Borrower] shall [or shall cause {*name of project executing agency*} to] ensure that

(a) [electricity/water supply and wastewater] tariffs for all users are restructured to cover all costs associated with [electricity/water] supply and [sewerage services];
(b) annual reviews of tariffs and fees are conducted;
(c) no entity receiving [electricity/water] supply services is exempted from payment of the tariff, or excused for delays in payments without penalty; and
(d) a review is conducted of the impact of increased [electricity/water and sanitation] tariffs on the poor, taking into account the ability of consumers, particularly vulnerable people, to pay for such increases.

2. Lifeline Tariff Policy

Section [•] Within [•] months of the effective date, the [Borrower] shall establish a [policy guideline/regulation] to ensure the existence of a lifeline tariff to protect poor consumers, and shall ensure that [*name of the relevant ministry or regulatory body*] appropriately consider that policy guideline in making tariff determinations. The [Borrower] shall provide the subsidy that corresponds with such lifeline tariff as a line item in the [Borrower's] budget.

3. Pro-Poor Tariff Obligations

Section [•] The [Borrower] shall ensure that before the implementation of any tariff increases, the [*name of the Borrower's relevant ministry of energy/water/wastewater project executing agency*]/[*regulatory agency*] shall

(a) review and conduct research to determine the number of poor persons, including those equal to or below the poverty line, who would be affected by such tariff increase, and the impact of such tariff adjustments on the Poor;
(b) prepare a plan or scheme to be provided to ADB for review, which may include price subsidies or other measures such as lifeline tariffs, to ensure that the tariff increase does not cause the livelihoods or standard of living of the Poor to decline;
(c) issue a decree before such tariff increase takes effect to ensure that all such Poor be provided such subsidy or measures; and
(d) monitor the Poor provided such subsidies to determine the effectiveness of such subsidies.

F. Energy Efficiency

Section [•] The [Borrower] shall [or shall cause {*name of the project executing agency*} to], in consultation with ADB, review and provide recommendations on the revision of its local regulations for

(a) management of the electricity supply systems;
(b) effective collection of electricity tariffs;
(c) effective promotion and implementation of energy efficiency, metering, and energy conservation measures;
(d) monitoring energy consumption and technical losses; and
(e) controlling electricity connections, including illegal connections.

Section [•] The [Borrower] shall [or shall cause {*name of the project executing agency*} to] monitor distribution of compact fluorescent lamps (CFLs) to residential and other consumers under the [*name of CFL project*].

Section [•] To ensure effective implementation and monitoring of CFL distribution, the [Borrower] shall

(a) cause [*name of the project executing agency*] to enter into implementation agreements with the electric cooperatives;
(b) cause [*name of the project executing agency*] to enter into implementation agreements with the private utilities, with terms and conditions satisfactory to ADB; and
(c) where possible, cause the electric cooperatives to enter into agreements with qualified nongovernment organizations that are acceptable to ADB, with terms and conditions satisfactory to ADB.

G. Water Conservation and Water Reforms

Section [•] The [Borrower] shall [or shall cause {*name of the project executing agency*} to], in consultation with ADB, review and provide recommendations on the revision of its local regulations for

(a) management of the water supply and sanitation systems;
(b) effective collection of water supply and sanitation tariffs;
(c) effective promotion and implementation of water loss reduction, metering, and water conservation measures;
(d) monitoring water consumption, leakage, and wastewater discharges; and
(e) controlling water connections, including illegal connections.

Endnotes

[1] See, for example, S. Tremolet and J. Halpern. 2006. Regulation of Water and Sanitation Services: Getting Better Services to Poor People. *OBA Working Paper Series*. No. 8. (hereinafter "S. Tremolet and J. Halpern, 2006"); D. Parker, C. Kirkpatrick, and C. Figueira-Theodorakopoulou. 2008. Infrastructure Regulation and Poverty Reduction in Developing Countries: A Review of the Evidence and a Research Agenda. *Quarterly Review of Economics and Finance* 48. pp. 177–188. (hereinafter "D. Parker, C. Kirkpatrick, and C. Figueria-Theodorakopoulu, 2008"); T. Irwin and P. Brook. 2003. Private Infrastructure and the Poor: Increasing Access. In P. Brook and T. Irwin, eds. *Infrastructure for Poor People: Public Policy for Private Provision.* Washington, DC: World Bank. (hereinafter " T. Irwin and P. Brook, 2003")

[2] United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP). 2009. *Achieving the Millennium Development Goals in An Era of Global Uncertainty: Asia–Pacific Regional Report.*

[3] UNESCAP. 2009. *Achieving the Millennium Development Goals in An Era of Global Uncertainty: Asia–Pacific Regional Report.*

[4] UNESCAP. 2007. *The Millennium Development Goals: Progress in Asia and the Pacific 2007.* Available: www.unescap.org/stat/mdg/04.Part1-MDGreport2007-P3-19.pdf (Data available for water and sanitation are as of 2004.)

[5] Asian Development Bank (ADB). 2008. *Strategy 2020: Long-Term Strategic Framework of the Asian Development Bank 2008–2020.* Manila. p. 6. (hereinafter "Strategy 2020").

[6] United Nations (UN) Advisory Group on Energy and Climate Change (AGECC). 2010. *Energy for a Sustainable Future.* New York: UN.

[7] ADB. 2008. *Energy for All Initiative.* Technical Assistance Project No. 40629. para. 3. Manila. (hereinafter "Energy for All Initiative, 2008").

[8] See endnote 1. Refers to all articles generally.

[9] UNESCAP. 2009. *The Millennium Development Goals Report 2009.* www.un.org/millenniumgoals/pdf/MDG_Report_2009_ENG.pdf (hereinafter "*The Millennium Development Goals Report*, 2009").

[10] *The Millennium Development Goals Report*. 2009. Goal No. 1 is to eradicate extreme hunger and poverty by halving the proportion of people whose income is less than $1 a day between 1990 and 2015. Goal No. 4 is to reduce child mortality, Goal No. 5 is to improve maternal health, while Goal No. 8 is to ensure environmental sustainability. The achievement of all these goals is critically dependent on the poor's ability to access electricity and water.

[11] The Universal Declaration of Human Rights is a declaration adopted by the General Assembly of the UN in 1948, whose implementation has resulted in two international covenants: The International Covenant on Civil and Political Rights and the International Covenant on Economic, Social and Cultural Rights.

[12] United Nations Committee on Economic Social and Cultural Rights 2002. *The Right to Water: 26/11/02.* CESCR General Comment No. 15. para. 1. Available: www.unhchr.ch/html/menu2/6/gc15.doc (hereinafter "General Comment No. 15, 2002").

[13] United Nations General Assembly. 1948. Universal Declaration of Human Rights. Art. 3.

[14] United Nations General Assembly. 1966. International Covenant on Economic, Social and Cultural Rights. Art. 12. 16 December.

[15] Ibid., Art. 11.

[16] United Nations General Assembly, Human Rights Council. 2007. Report of the United Nations High Commissioner for Human Rights on the Scope and Content of the Relevant Human Rights Obligations Related to Equitable Access to Safe Drinking Water and Sanitation Under International Human Rights Instruments. para. 2, general comment no. 15. This document also affirmed the human rights obligations related to equitable access to safe drinking water and sanitation. (hereinafter "United Nations General Assembly, 2007").

[17] United Nations General Assembly, 2007. para. 52; general comment no. 15, paras. 17–38.

[18] United Nations General Assembly, 2007. para. 53.
[19] V. Modi, S. McDade, D. Lallement, and J. Saghir. 2006. *Energy Services for the Millennium Development Goals.* New York: Emergency Sector Management Assistance Programme, United Nations Development Programme, United Nations Millennium Project, and the World Bank.
[20] United Nations Industrial Development Organization. 2009. *Towards an Integrated Energy Agenda Beyond 2020.* Conference Report. International Energy Conference, Vienna, 22–24 June.
[21] United Nations (UN) Advisory Group on Energy and Climate Change (AGECC). 2010. *Energy for a Sustainable Future.* New York: UN (hereinafter "Energy for a Sustainable Future, 2010").
[22] ADB. 2001. *Water for All: The Water Policy of the Asian Development Bank.* Manila (hereinafter "Water for All, 2001"); Energy for All Initiative, 2008.
[23] ADB. 2004. *Fighting Poverty in Asia and the Pacific: The Poverty Reduction Strategy.* Manila. Available: www.adb.org/Documents/Policies/Poverty_Reduction/challenge.asp?p=policies (hereinafter "Poverty Reduction Strategy, 2004").
[24] Poverty Reduction Strategy, 2004. p. 1
[25] Water for All, 2001; ADB. 2009. *Energy Policy.* Manila. para.14. Available: www.adb.org/Documents/Policies/Energy-Policy/Energy-Policy-2009.pdf. (hereinafter "Energy Policy, 2009").
[26] Water for All, 2001, and Energy for All Initiative, 2008.
[27] Poverty can be viewed in absolute and relative terms and is measured and assessed through a variety of methodologies and instruments. L. Bjornestad. 2009. Fiscal Decentralization, Fiscal Incentives, and Pro-Poor Outcomes: Evidence from Viet Nam. *ADB Economics Working Paper Series* No. 168. Manila: ADB (hereinafter "Bjornestad, 2009).
[28] Poverty Reduction Strategy, 2004. p. 5; and ADB. 2006. *Poverty Handbook Analysis and Process to Support ADB Operations: A Working Document.* Manila. Available: www.adb.org/Documents/Handbooks/Analysis-Processes/appendix01.pdf (hereinafter "*Poverty Handbook*, 2006")
[29] Poverty Reduction Strategy, 2004. p. 5; and *Poverty Handbook*, 2006.
[30] *Poverty Handbook*, 2006. Appendix 1, p. 91.
[31] Ibid. This definition of absolute poverty is different from that of D. Parker, C. Kirkpatrick, and C. Figueria-Theodorakopoulu, 2008, p. 178, which distinguishes absolute poverty from relative poverty.
[32] The term "absolute" poverty is a bit of a misnomer because the poverty line is defined differently by different people, states, and communities. It is often used interchangeably with the term "extreme poverty," although what counts as extreme poverty will depend on local circumstances and interpretations.
[33] Poverty Reduction Strategy, 2004. p. 6.
[34] Ibid.
[35] Ibid.
[36] Ibid.
[37] Ibid.
[38] S. Tremolet. 2002. Pro-Poor Regulation: Challenges and Implications for Regulatory Design. Background paper for Infrastructure Development: Private Solutions for the Poor: The Asian Perspective, Manila, 28–30 October. Available: www.ppiaf.org/conference/docs/Papers/Regulation.pdf (hereinafter "S. Tremolet, 2002").
[39] K. Komives et al. 2005. *Water, Electricity, and the Poor: Who Benefits from Utility Subsidies?* Washington, DC: World Bank (hereinafter "K. Komives et al, 2005").
[40] K. Komives et al. 2005.
[41] Ibid., p. 116.
[42] Ibid.
[43] T. Argo and A. Laquian. 2007. The Privatization of Water Services. In A. Laquian, V. Tewari, and L. Hanley, eds. *The Inclusive City: Infrastructure and Public Services for the Urban Poor in Asia.* Washington, DC: Woodrow Wilson Center Press. pp. 227–228 (hereinafter "T. Argo and A. Laquian"). Uncontrolled settlements are uncontrolled because government officials have no way of knowing or planning for their populations, which are generally illegal poor squatters and slum dwellers.
[44] T. Argo and A. Laquian. p. 227–228.

[45] S. Tremolet and J. Halpern, 2006.
[46] T. Argo and A. Laquian. p. 227–228.
[47] Ibid.
[48] G. Clarke and S. Wallsten. 2003. Universal Service: Empirical Evidence on the Provision of Infrastructure. In P. Brook and T. Erwin, eds. *Infrastructure for Poor People: Public Policy for Private Provision.* Washington, DC: World Bank (hereinafter "G. Clarke and S. Wallsten, 2003").
[49] G. Clarke and S. Wallsten, 2003. p. 36.
[50] Ibid.
[51] Ibid.
[52] B. Baker and S. Tremolet. 2003. Regulation of the Quality of Infrastructure Services in Developing Countries. In P. Brook and T. Irwin, eds. *Infrastructure for Poor People: Public Policy for Private Provision.* Washington, DC: World Bank (hereinafter "B. Baker and S. Tremolet, 2003").
[53] T. Irwin and P. Brook, 2003. p. 8.
[54] Ibid.
[55] Ibid.
[56] Public–Private Infrastructure Advisory Facility (PPIAF). 2002. New Designs for Water and Sanitation Transactions. *Water and Sanitation Program.* Washington, DC (hereinafter "New Designs"). pp. 32–33. One example of the benefits of privatization can be seen in Gabon. The government invited the private sector to operate its water and electricity utility on a concession basis with the objectives of increasing coverage, improving service quality, eliminating the need for public financing, and maintaining affordable tariffs. In 1997 Generale des Eaux, a French company, won a 20-year concession with a bid that promised a 17.25% reduction in tariffs. The contract specified 5-year coverage targets and quality standards for both water supply and electricity, with penalties for failure to achieve them. The customer base for water supply increased by 50% between 1996 and 2000 and water quality has increased substantially, with tariffs still lower than pre-private sector participation levels.
[57] A. McIntosh. 2003. *Asian Water Supplies: Reaching the Urban Poor.* Manila: ADB. IWA Publishing. (hereinafter "A. McIntosh, 2003")
[58] See endnote 1 for examples of the effects of restructuring and regulatory reform on the poor.
[59] D. Ehrhardt. 2000. Impact of Market Structure on Service Options for the Poor. In P. Brook and T. Irwin, eds. *Infrastructure for Poor People: Public Policy for Private Provision.* Washington, DC: World Bank. p. 184. (hereinafter "D. Ehrhardt, 2000"); A. Chong and F. Lopez-de-Silanes. 2004. Privatization in Latin America, What does the Evidence Say? *Economia*. 4(2). pp. 37–111. Quoted in D. Parker, C. Kirkpatrick, and C. Figueria-Theodorakopoulu, 2008. p. 180; A. Estache, A. Gomez-Lobo, and D. Leipziger. 2000. Utility Privatization and the Needs of the Poor in Latin America: Have We Learned Enough to Get it Right? *World Bank Policy Research Working Paper* No. 2407. Washington, DC: World Bank; D. Benitez, O. Chisari, and A. Estache. 2003. Can the Gains from Argentina's Utilities Reform Offset Credit Shocks? In Ugaz and C. Waddams, eds. *Utility Privatization and Regulation: A Fair Deal for Consumers.* Cheltenham, United Kingdom; E. Elgar, S. Galiani, P. Gertler, E. Schargrodsky, and F. Sturzenegger. 2005. The Benefits and Costs of Privatization in Argentina: A Microeconomic Analysis. In A. Chong and F. Lopez-De-Silanes, eds. *Privatization in Latin America: Myth and Realities.* Chicago: Stanford University Press.
[60] W. Smith. 2000. Regulations Infrastructure for the Poor: Perspectives on Regulatory System Design. Infrastructure for Development: Private Solutions and the Poor. World Bank. London. 31 May–2 June. ("the exercise of state control over private conduct [is] usually asserted to be in the public interest"). p. 7. (hereinafter "W. Smith, 2000"). The situation in some industrialized countries, where firms operate under monopoly regimes with service expansion expected to be funded through cross-subsidies between more affluent and poorer customers, has not been successful in increasing access for the poor; C. Harris. 2003. Private Participation in Infrastructure in Developing Countries: Trends, Impact and Policy Lessons. *World Bank Working Paper* No. 5. Washington, DC: World Bank. Quoted in D. Parker, C. Kirkpatrick, and C. Figueria-Theodorakopoulu, 2008; R. Clarke and S. Wallsten. 2002. Universal(ly bad) Service: Providing Infrastructure Services to Rural and Poor Urban Consumers. *World Bank Policy Research Paper* No. 2868. Washington, DC: World Bank. These studies suggest that privatization had a marginal effect in terms of widening the poor's access to infrastructure.

[61] A. Weitz and R. Franceys, eds. 2002. *Beyond Boundaries: Extending Services to the Urban Poor.* Manila. In general, private sector participation (PSP) has taken various forms including divestiture (full or partial sale of state-owned operations), concession agreements (agreements between a host developing country government and a private company granting rights to own or operate local utility service infrastructure), and management contracts (contracts between a public entity and a private investor conferring operational or management control to the private sector) (hereinafter "A. Weitz and R. Franceys, 2002"); D. Ehrhardt, 2000. p. 186.

[62] D. Parker, C. Kirkpatrick, and C. Figueria-Theodorakopoulu, 2008. p. 178.

[63] A. McIntosh, 2003. p. 89.

[64] G. Clarke and S. Wallsten, 2003.

[65] S.K. Saha and D. Parker. 2002. *Globalization and Sustainable Development in Latin America: Perspectives on the New Economic Order.* Cheltenham: Edward Elgar. Cited in D. Parker, C. Kirkpatrick, and C. Figueria-Theodorakopoulu, 2008. p. 181. This study provides examples of regulatory failings following privatization and market liberalization practices in Latin America.

[66] K. Gassner, A. Popov, and N. Pushak. 2009. Does Private Sector Participation Improve Performance in Electricity and Water Distribution? *Trends and Policy Options.* No. 6. Washington, DC: World Bank and PPIAF.

[67] For example, in Buenos Aires, a 30-year concession contract to supply water and sanitation services was awarded to a private company. The contractual price decreases accrued mostly to middle- and upper-income consumers who were already connected; on the other hand, connection fees remained unaffordable to many poor households, G. Clarke and S. Wallsten, 2003. pp. 64–65.

[68] G. Clarke and S. Wallsten, 2003. p. 65.

[69] T. Irwin and P. Brook, 2003. p. 10.

[70] D. Ehrhardt, 2000. p. 188.

[71] S. Tremolet, 2002.

[72] Ibid., p. 1.

[73] B. Baker and S. Tremolet, 2003. p.256.

[74] Ibid., p. 252.

[75] Ibid., pp. 256–258.

[76] The Allen Consulting Group, et al. 2001. *Strengthening Operational Aspects of APEC Energy Micro-Economic Reform: Phase II.* Manual of Strategic Principles. Report for the APEC Energy Working Group.

[77] D. Parker, C. Kirkpatrick, and C. Figueria-Theodorakopoulu, 2008. p. 180.

[78] B. Baker and S. Tremolet, 2003. p. 244.

[79] W. Smith, 2000. p. 7.

[80] K. Bakker et al. 2006. Disconnected: Poverty, Water Supply and Development in Jakarta, Indonesia. *Human Development Report 2006.* Human Development Report Office Occasional Paper. New York: United Nations Development Programme (hereinafter "K. Bakker et al, 2006").

[81] Regulation body of knowledge FAQ.

[82] Prayas Energy Group. 2008. *Awareness and Action for Better Electricity Service: An Agenda for the Community.* Pune. (hereinafter "Prayas Energy Group, 2008").

[83] Ibid.

[84] Ibid.

[85] K. Bakker et al. 2006.

[86] T. Irwin and P. Brook, 2006. p. 6.

[87] Prayas Energy Group, 2008.

[88] Ibid.

[89] S. Tremolet and J. Halpern, 2006. p. 6.

[90] Prayas Energy Group, 2008.

[91] G. Clarke and S. Wallsten, 2003.

[92] Ibid.

[93] D. Ehrhardt, 2000. p. 195.

[94] D. Ehrhardt, 2000. p. 195.

[95] Prayas Energy Group, 2008.

[96] Poverty Reduction Strategy, 2004.
[97] Ibid.
[98] Ibid., p. 6.
[99] See endnote 1. Refers to all articles generally.
[100] Poverty Reduction Strategy, 2004. p. 6.
[101] Strategy 2020. para. 26.
[102] Water for All, 2001. para. 61.
[103] Ibid., 2001. para. 61.
[104] Ibid., 2001. para. 65.
[105] Other elements of the policy include fostering integrated management of water resources, improving and expanding the delivery of water services, fostering the conservation of water and increasing system efficiencies, promoting regional cooperation, facilitating the exchange of water sector information and experience, and improving governance. Water for All, 2001. para. 22.
[106] Water for All, 2001.
[107] ADB. 2008. Issues Paper: *The Hows and Whys of Water Connection Charges.* Manila.
[108] Water for All, 2001. para. 66.
[109] ADB Water Knowledge Center. *Water, Sanitation, and the Millennium Development Goals.* Available: www.adb.org/Water/Knowledge-Center/statistics/water-sanitation-mdgs.asp (hereinafter "*Water, Sanitation, and the Millennium Development Goals*").
[110] *Water, Sanitation, and the Millennium Development Goals*.
[111] ADB. *Water Financing Program 2006–2010.* Available: www.adb.org/Water/WFP/default.asp (hereinafter "*Water Financing Program 2006–2010*").
[112] *Water Financing Program 2006–2010*.
[113] Energy Policy, 2009. para. 14.
[114] Ibid., para. 19.
[115] Ibid., para. 20.
[116] While energy efficiency measures generally reduce energy consumption, from the tariff side, energy efficiency or demand-side management (DSM) can actually increase rates through its ability to defer capital expenditure (CAPEX) requirements for supply-side system upgrading. Examples include DSM cost recovery across an entire customer class or slow tariff increases over the long term. Lifeliners paying fixed minimum rates may also not experience a reduction in energy expenditures. In these cases, other tariff subsidies or lifelines may still be required.
[117] Energy Policy, 2009. para. 21, Appendix 1.
[118] Ibid., para. 27
[119] Ibid., para. 28.
[120] Ibid., paras. 27–28.
[121] Ibid., para. 14.
[122] Ibid., para 46.
[123] Energy for All Initiative, 2008. p. 3
[124] "Energy is often a critical factor in achieving significant improvements in infant and maternal healthcare and combating disease (refrigeration, lighting, sterilization, transport, etc.); education (lighting, heating, telecommunications, information technology, etc.); agriculture; and the eradication of hunger (irrigation, transport, storage, processing, etc)." ADB. 2008. *Access to Energy for the Poor—an Asia-Pacific Regional Initiative. The Foundation for Development Cooperation.* Manila. Available: www.adb.org/Documents/Papers/Access-Energy-Poor/Access-Energy-Poor.pdf
[125] V. Modi, S. McDade, D. Lallement, and J. Saghir. 2006. *Energy Services for the Millennium Development Goals.* New York: Emergency Sector Management Assistance Programme, United Nations Development Programme, United Nations Millennium Project, and the World Bank.
[126] Energy for All Initiative, 2008. para. 6.
[127] Ibid., para. 5.
[128] S. Tremolet and J. Halpern, 2006. p. 3.
[129] New Designs. p. 113.
[130] S. Tremolet and J. Halpern, 2006. p. 10.
[131] D. Ehrhardt, 2000. p. 190.

[132] Ibid.
[133] B. Baker and S. Tremolet, 2003.
[134] S. Tremolet and J. Halpern, 2006. pp. 10–13.
[135] D. Ehrhardt, 2000. p. 2002.
[136] B. Baker and S. Tremolet, 2003. p. 260.
[137] Ibid.
[138] New Designs. p. 58.
[139] Ibid., p. 23.
[140] ADB. 1997. *Regional and Technical Assistance: Governance and Regulatory Regimes for Private Infrastructure Development.* Manila. p. 21.
[141] A. Weitz and R. Franceys, 2002. p. 76.
[142] B. Sovacool. 2009. Running on Empty: The Electricity–Water Nexus and the U.S. Electric Utility Sector. *Energy Law Journal* 30 (11). p. 16.
[143] United Nations Environment Programme. 2006. *Energy Efficiency Guide for Industry in Asia.* Available: www.energyefficiencyasia.org/aboutee.html (hereinafter "*Energy Efficiency Guide*, 2006").
[144] *Energy Efficiency Guide*, 2006.
[145] While energy efficiency measures generally reduce energy consumption, from the tariff side, energy efficiency or demand-side management (DSM) can actually increase rates through its ability to defer CAPEX requirements for supply-side system upgrading. Examples include DSM cost recovery across an entire customer class or slow tariff increases over the long term. Lifeliners paying fixed minimum rates may also not experience a reduction in energy expenditures. In these case, other tariff subsidies or lifelines may still be required.
[146] L. Schwartz. 2009. The Role of Decoupling Where Energy Efficiency is Required by Law. *Issues Letter*. Montpelier, Vermont: The Regulatory Assistance Project (hereinafter L. Schwartz. 2009).
[147] See Eskom. Energy Efficiency. Available: www.eskom.co.za/live/content.php?Item_ID=2787 &Revision=en/1; Sustainable Energy Ireland. Home Energy Saving Scheme. Available: www.sei.ie/Grants/Home_Energy_Saving_Scheme/; Energy Efficiency and Conservation Authority. Warm Up New Zealand: Heat Smart. Available: www.eeca.govt.nz/node/3107; and US Department of Energy. Energy Efficiency and Renewable Energy. Financial Opportunities by Audience. Available: www1.eere.energy.gov/financing/consumers.html
[148] The European Union phaseout on incandescent bulbs could be mentioned; quote follows. "In March 2009 the European Commission adopted an Eco-Design Regulation to improve the energy efficiency of household lamps, which stipulates the progressive phasing out of incandescent bulbs starting in 2009 and finishing at the end of 2012 [COM2008b]. The Regulation applies to non-directional lamps. Directional (reflector) lamps, such as spots, will be covered by a dedicated measure at the end of 2009 or in 2010."
[149] Regulations can also require lamp waste management processes in the market.
[150] The Regulatory Assistance Project (RAP). 2002. *International Survey of Low-Income and Rural Development Programs for the Electricity Sector.* Jakarta and Washington, DC: United States Agency for International Development (USAID). p. 12
[151] ADB. 2009. *Report and Recommendation of the President to the Board of Directors: Proposed Multitranche Financing Facility and Administration of Cofinancing Islamic Republic of Pakistan: Energy Efficiency Investment Program.* Manila. Appendix 9.
[152] Collaborative Labeling and Appliances Standards Program. General Information on Standards and Labeling. Available: www.clasponline.org/clasp.online.resource.php?no=21&page=1
[153] Indiana Family and Social Services Administration's Weatherization Assistance Program. Available: www.incap.org.
[154] ESRI. 2009. *Enterprise GIS and the Smart Electric Grid.* New York. (hereinafter "ESRI, 2009").
[155] Ibid.
[156] Ibid.
[157] Power System Engineering, Inc. Loss Reduction. Available: www.powersystem.org/services/resourceplanning/ lossreduction/lossreduction.aspx
[158] Africa Energy Efficiency Toolkit of REEEP. Renewable Energy & Energy Efficiency Partnership. 2009. *Energy Efficiency Module 13: Supply-side Management*. Available: http://africatoolkit.reeep.org/

Power%20Point%20Presentations/Energy%20Efficiency%20-%Module%2013%20Presentation.ppt#361,13.Transmission

[159] The power factor is the ratio of power actually being used in an electric circuit to the power that is apparently being drawn from the power source. A more efficient system will have a higher power factor. A low power factor means more apparent power beyond actual power—what the electric load actually requires. The difference is an electricity loss, which requires the utility to upsize its conductors and transformers. For this reason, customers with a low power factor can be penalized with additional charges. Customers with low power factor problems are typically industrial and commercial end users with several or large induction motors.

[160] Technically speaking, this is described as improving the system load factor: the load factor is the ratio of average demand to the peak demand, usually through a 24-hour period. An efficient system will have a high load factor (approaching 100%). A high load factor occurs when there is relatively no variation in the demand for electricity throughout the day. A low load factor is inefficient, as the utility will need to provide substantially more power supply through a limited peak demand period. A typical developing member country has low to medium-low load factor as households switch on their lights (incandescent) and appliances through the peak hours of 6:00–10:00 pm, causing demand to rise to nearly double that of daytime demand.

[161] US Patent No. 6373150. Electric Service Load Limiter. Available: www.patentstorm.us/patents/6373150.html (hereinafter "US Patent No. 6373150").

[162] Ibid.

[163] Ibid.

[164] Ibid.

[165] Prayas Energy Group, 2008.

[166] L. Schwartz, 2009.

[167] Ibid.

[168] RAP. 2008. *China's Power Sector: A Backgrounder for International Regulators and Policy Advisors.* Montpetier, Vermont and Gardiner, Maine. Available: www.raponline.org/docs/RAP_ChinaPowerSectorBackground_2008_02.pdf1; S. Dixit et al. 2008. Background paper on the Clean Energy, Good Governance and Regulation Forum. Singapore. March; and S. Nakhooda et al. 2007. Empowering People—*A Governance Analysis of Electricity in India, Indonesia, Thailand and the Philippines.* Washington, DC: The World Resources Institute.

[169] ADB. 2005. *Electricity Sectors in CAREC Countries: A Diagnostic Review of Regulatory Approaches and Challenges.* Manila. p. xiii.

[170] J. Barry. 2007. *Watergy: Energy and Water Efficiency in Municipal Water Supply and Wastewater Treatment*. Alliance to Save Energy. p. 2. Available: www.rivernetwork.org/resource-library/watergy-energy-and-water-efficiency-municipal-water-supply-and-wastewater-treatment (hereinafter "J. Barry, 2007").

[171] J. Barry, 2007. p. 1.

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[174] G. Stiles.

[175] Australian Demand Management.

[176] Ibid.

[177] Ibid.

[178] Ibid.

[179] J. Barry, 2007. p. 10. (does not include rainwater harvesting)

[180] US Department of Energy. Office of Energy Efficiency and Renewable Energy. 2002. *United States Industrial Electric Motor Systems Market Opportunities Assessment.* Available: www1.eere.energy.gov/industry/bestpractices/pdfs/mtrmkt.pdf

[181] Ibid., p. 12.

[182] J. Barry, 2007. p. 12.

[183] Ibid.

[184] Ibid., p. 12.
[185] Ibid.
[186] Ibid.
[187] Ibid., p. 1.
[188] Ibid.
[189] Ibid., p. 15.
[190] Ibid.
[191] Ibid., p. 1.
[192] Ibid., p. 11.
[193] General Comment No.15. 2002. para. 2. Substantive Issues Arising in the Implementation of the International Covenant on Economic, Social and Cultural Rights: The right to water. Subcommission report. paras. 12 (c)(i) and 37 (c); and S. Salman and S McInerey-Lankford. 2004. *The Human Right to Water: Legal and Policy Dimensions.* Washington, DC: World Bank.
[194] S. Tremolet, 2002. p. 4.
[195] T. Irwin and P. Brook, 2003. p. 15.
[196] D. Ehrhardt, 2000.
[197] S. Tremolet and J. Halpern, 2006. p. 14.
[198] D. Ehrhardt, 2000. p. 196,
[199] G. Clarke and C. Wallsten, 2003. p.40.
[200] S. Tremolet and J. Halpern, 2006. p. 6.
[201] ADB. Asia Pacific Renewable Energy Knowledge Hub. Available: www.aprekh.org/
[202] US Department of Energy. 2004. The Smart Grid: An Introduction (hereinafter Smart Grid. 2009).
[203] Water for All, 2001. para. 59
[204] Ibid.
[205] Smart Grid, 2009.
[206] The following examples were taken from B. Baker and S. Tremolet, 2003. p.250.
[207] See A. Weitz and R. Franceys, 2002. p. 75; and D. Ehrhardt, 2000. p. 197.
[208] B. Baker and S. Tremolet. 2003. Regulating Quality Standards to Improve Access for the Poor. *Public Policy for Private Sector*, View Point 219. Washington, DC: World Bank. pp. 3–4.
[209] In developed countries, this could also be done through sophisticated metering, but it would be too costly in a pro-poor context.
[210] B. Baker and S. Tremolet, 2003. pp. 254–255.
[211] K. Bakker et al, 2006.
[212] S. Tremolet, 2002. p. 3.
[213] A. McIntosh, 2003. p. 74.
[214] Ibid., pp. 78–79.
[215] Ibid., p. 78.
[216] Ibid., p. 78.
[217] Ibid., p. 79.
[218] G. Clarke and S. Wallsten, 2003. p. 32.
[219] A. McIntosh, 2003. p. 82
[220] Ibid., p. 82.
[221] Ibid., p. 83.
[222] G. Clarke and S. Wallsten, 2003. p. 32.
[223] S. Tremolet and J. Halpern, 2006. p. 7.
[224] United Nations General Assembly. para. 56 ("access to safe drinking water and sanitation from a human rights perspective and its close nexus with the right to life, health, an adequate standard of living and the protection of human dignity, implies a need for procedural safeguards in case of water and sanitation disconnections.") See also para. 57.
[225] US Patent No. 6373150.
[226] See examples of prepayment meters in Box 6.1
[227] W. Smith, 2000. p. 12.
[228] P. Prayas, 2007. National Consultation on Regulation and the Poor in Electricity and Water Sectors. New Delhi. July 12–13. (hereinafter "P. Prayas, 2007").

[229] Ibid.
[230] Ibid.
[231] Ibid.
[232] S. Tremolet, 2002. p. 6.
[233] J. Swisher, et al. 1997. *Tools and Methods for Integrated Resource Planning.* Denmark: UNEP Collaborating Centre on Energy and Environment.
[234] Prayas Energy Group, 2008.
[235] Ibid.
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Attaining Access for All: Pro-Poor Policy and Regulation for Water and Energy Services

Universal access to safe, reliable energy is a necessary condition for providing the poor with safe water and sanitation, for maintaining adequate standards of living, and for achieving any of the Millennium Development Goals. The Asian Development Bank recognizes the importance of electricity and water access for the poor and has committed to providing such access by establishing the Energy for All and Water for All initiatives.

While broad efforts aimed at regulatory reform and increasing energy and water access may be helpful, targeted interventions, measures, and approaches are often needed to ensure that the poor benefit from these efforts. This publication identifies specific infrastructure and utility service reform measures that can be taken to advance the interests of the poor.

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ADB's vision is an Asia and Pacific region free of poverty. Its mission is to help its developing member countries substantially reduce poverty and improve the quality of life of their people. Despite the region's many successes, it remains home to two-thirds of the world's poor: 1.8 billion people who live on less than $2 a day, with 903 million struggling on less than $1.25 a day. ADB is committed to reducing poverty through inclusive economic growth, environmentally sustainable growth, and regional integration.

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Asian Development Bank
6 ADB Avenue, Mandaluyong City
1550 Metro Manila, Philippines
www.adb.org
ISBN 978-92-9092-139-4
Publication Stock No. TIM102037

Printed in the Philippines