PRICING AND INCENTIVES

ENERGY EFFICIENCY TOOLKIT – TECHNICAL GUIDE

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LIST OF ACRONYMS

DI	Direct Install
CDM	Clean Development Mechanism
CFL	Compact Fluorescent Lightbulb
CPP	Critical Peak Pricing
DSM	Demand Side Management
EE	Energy Efficiency
ESA	Energy Services Agreement
ESCO	Energy Service Company
ESPC	Energy Savings Performance Contract
HVAC	Heating, Ventilation, and Air Conditioning
IEA	International Energy Agency
kW	Kilowatt
kWh	Kilowatt-hour
MW	Megawatt
PACE	Property Assessed Clean Energy
RTP	Real Time Pricing
TOE	Tons of Oil Equivalent
UNFCCC	United Nations Framework Convention on Climate Change

VISUAL REPRESENTATION OF SECTORS

Examples of energy efficiency incentive and pricing-related projects and programs from around the world have been included throughout this guide. Links to full descriptions of these projects are listed in the Project Examples Resources section of the guide. The icons below are used to indicate which sector each project targets.


Industrial


Commercial and Industrial


Residential


Agricultural


Transportation

OVERVIEW

In regulated energy markets, governments can affect market structure, pricing, incentives, and other market interventions. This guide focuses on energy pricing, especially in electricity markets, and on customer incentives, as two leading policy strategies than can encourage market uptake of energy-efficient technologies and behaviors.

In electricity markets, government regulators can apply a variety of rate designs that encourage the adoption of energy efficient technologies and influence consumer behavior to use less energy. Adopting an energy pricing scheme that encourages conservation can complement and support incentive and rebate programs.

Customer incentives can be provided through government channels or administered through utility programs. Governments can use a broad range of taxation, grant making, publicly-funded programs, education, awareness campaigns, and other policy and program solutions to encourage energy efficiency. Utilities and government ministries can deliver energy efficiency programs, including incentives and other services, tailored specifically to their consumers' needs.

Incentives can be provided in two forms: financial or non-financial. Financial incentives aim to overcome the first-cost barrier to efficiency investments and also provide a sense of urgency to act now rather than later. Non-financial incentives can include services (such as energy audits or other technical assistance that show customers the benefits of efficiency investment), information (such as benchmarking reports that compare a customer's usage to its peers), and recognition (such as providing public praise for customers who achieve energy savings goals).

It is important to distinguish energy efficiency incentives from general energy subsidies. Historically, many governments have subsidized fuel and/or electricity prices to keep energy access affordable for households and energy prices competitive for businesses. While the goals of energy affordability and access remain vital, many governments are moving toward rationalizing energy prices (such that retail prices reflect the true cost of generating and delivering energy). This tends to raise prices, and higher prices do serve as incentives for efficiency. However, because of persistent barriers in end-use markets, energy prices alone are not sufficient to realize the energy efficiency potential in end-use markets.

This technical guide discusses how electricity pricing and incentives can be harnessed to improve energy efficiency as well as the conditions that enable these strategies to be effective. Listed below are a series of questions to determine the most effective and feasible courses of action.

GUIDING QUESTONS

The guiding questions below are a starting point for those interested in implementing energy pricing and incentive schemes. More information on how to approach the considerations listed below can be found in the Energy Pricing, Direct Government Incentives, and Demand Side Management Incentives sections of this guide. Additional information on financing can also be found in the Financing Strategies section of the toolkit.

Legislative and Regulatory Environment

- What is the process for establishing electricity prices?
- Who is involved (e.g. the utility, the regulator, the government)?
- What is the history of energy price regulation?
- Are subsidies used to reduce retail energy prices?

Metering Infrastructure

- Have utilities deployed, or are they planning to deploy, electricity meters that record electricity consumption in intervals of an hour or less, communicate consumption to the utility, and enable remote service connection and disconnection (often known as "smart meters")?
- Does metering typically occur at a building or sub-building level (i.e. individual apartments or the entire apartment complex)?

Communications

- How is the price of electricity communicated to customers (e.g. printed tariffs, monthly bills, daily or hourly messages)?
- What percentage of customers do utilities have a formal means of communication with?
- How does the utility, the regulator, and government ministries communicate with customers and the general public about electricity pricing?

Direct Government Incentives

- Has the government created funding (such as grants, incentives, financing subsidies) for energy that would be applicable to energy efficiency?
- Has the government created tax policies that provide incentives for energy-related investments, such as investment tax credits?
- Is the government able to obtain funds through regional or international programs, such as bilateral or multilateral funding institutions?

Demand Side Management Incentives

- Does the utility or government ministry administer any customer energy efficiency programs?
- Is the utility required to gather or set aside any funds specifically for energy efficiency?
- If the utility is government-owned or does the government direct the utility to address policy objectives through customer programs?

1.0 ENERGY PRICING

Energy pricing, and the rate designs which determine pricing in the power sector, can be shaped by government, regulators, and utilities in ways that help promote energy efficiency.

1.1 PRICING AND RATEMAKING

In regulated electricity markets, pricing is typically encoded in legal documents called “tariffs,” which specify electricity “rates” for specified customer classes. While a rate can sometimes constitute a single price, rates often contain different prices based on the amount or the timing of consumption. For example, a traditional “declining-block rate” might charge a higher amount for the first 100 kWh consumed in a defined period and lower amounts for subsequent increments of usage. A “time-of-use rate” might set different prices for on-peak, mid-peak, and off-peak hours. The specific ratemaking formulas for regulated commodities such as natural gas and electricity vary significantly by jurisdiction, but they are often complex, multi-faceted, and subject to approval (or are directly established) by government regulators. Cross subsidization is common in emerging markets, whereby one target customer segment subsidizes another via the ratemaking process. For example, the industrial sector subsidizes the residential sector.

As discussed in the overview, many governments have subsidized energy prices to support broad economic policies. However, artificially reducing energy prices imposes other costs: excessive consumption and associated environmental damage, undermining competition from alternative supply options, and weakening the financial health of energy providers by preventing them from recovering the full cost of providing services. Well-designed, economically -efficient rates should be consistent with the long-term costs of the energy provider (see Project Example 1).

The main participants in utility ratemaking processes typically include government ministries or regulatory bodies, utilities, and customer representatives.

Project Example 1:
Impacts of Subsidies in Indonesia

TARGETED SECTOR:

SUMMARY

According to the International Institute for Sustainable Development (IISD), Indonesian electricity subsidies have accounted for between 6.5 percent and 12 percent of total government expenditures from 2006 to 2013 but may not necessarily yield the intended economic benefits for the poor.

The Indonesian government sets the electricity tariffs for all sectors, and the subsidy is determined annually using the difference between the average cost of electricity production proposed by the state-owned electric company, Perusahaan Listrik Negara (PLN), and the average electricity tariff set by the government. In 2009, PLN’s revenue was only half of the cost of electricity supply. Because utilities do not expect high returns due to the subsidies, there is no incentive to invest in new capital and the result is stagnating generation capacity and frequent blackouts.

Subsidies reforms can reallocate government funding towards social welfare (e.g. food, contraception, education, etc.) and specific businesses that target those members of society who are most in need. Administrators should identify those who are most vulnerable to subsidy withdrawal and implement complementary measures to ensure a smooth transition period.

1.2 LEGISLATIVE AND REGULATORY ENVIRONMENT

While energy subsidies can be politically popular and economically appealing in a narrow sense, policymakers need to understand the unintended consequences, and move toward pricing policies that are transparent and based on true and full costs. However, even if pricing policies reach those fundamental goals, pricing structures must be enforceable. In many developing countries, electricity theft is a considerable barrier to modernizing pricing schemes. The World Bank has issued a helpful background paper on reducing technical and non-technical losses in the power sector, which outlines the three primary sources of non-technical (avoidable financial) losses: (1) electricity theft, (2) non-payment by customers, and (3) errors in accounting. Non-technical losses are avoidable financial losses. Mitigating these losses increases revenue and electricity demand tends to decrease as customers are held accountable for the electricity they use. Reducing non-technical losses should be a priority for the state if non-technical losses are a prevalent issue (see Project Example 2).

Project Example 2: Regulatory Reforms in Latin America

TARGETED SECTOR:

SUMMARY

Latin America, led by Chile in 1982, has implemented a variety of regulatory reforms in the electricity supply industry, to combat chronic poor service quality, low productivity, inadequate revenue, theft and nonpayment.

The steps listed below are considered components of the standard reform model, and while privatization is a common first move, sustained success is dependent upon the regulatory scheme that follows:

- Privatizing government-owned utilities to legally separate them from the government restored financial discipline
- Passing laws to mandate restructuring and create legitimate regulatory authority added trustworthy oversight
- Vertical and horizontal unbundling facilitates healthy competition

The fundamentals of efficient pricing apply regardless of utility ownership structure. While there is a trend in many regions toward privatization of utilities, prices should still reflect costs, be transparent to customers, and be designed to encourage efficient usage. Beyond the fundamentals of rate design, additional ratemaking practices can also be important, including measures to address the "throughput incentive," which is based on the fact that a utility's costs are recovered based on the volume of its energy sales. If sales do not meet projected levels, the utility fails to recover its full costs. Because energy efficiency reduces sales, it creates a potential cost recovery problem for the utility. This can be fixed through "decoupling" and similar mechanisms, which typically create a rate mechanism that "trues up" revenues each year so that the utility's revenues are not penalized if energy efficiency or other factors reduce sales. However, for utilities in developing countries where the focus is on serving more of the population (increasing access), reducing load shedding, and meeting increasing energy demand due to projected economic growth, the impact of energy efficiency is quite different. Increased efficiency can stabilize a utility, support improved customer service, and provide a cost-effective strategy for meeting the energy needs of customers.

There are two main categories of rate design that influence energy consumption. One approach is to adjust the rate paid by consumers for energy with the time of day or season (“dynamic pricing”). Another approach is to adjust prices based on the quantity of the commodity consumed (“block pricing”). Dynamic pricing and block rate structures and their application to energy efficiency are described in more detail below.

1.3 DYNAMIC PRICING

A dynamic rate structure (commonly called “time of use”) aligns the price of energy with the cost of producing that energy by time of day or season. For example, electricity typically becomes more expensive to produce as demand increases and/or peaks and utilities bring more costly generation resources on line. Increasing the price per unit of energy consumed during peak times provides a disincentive for customers to use electricity at those times (see Project Example 3).

Under a dynamic pricing scheme, informed customers can choose to: a) install efficient technologies with lower peak demand; b) avoid or curtail energy use at peak times (when energy is most expensive); and/or c) shift energy use away from peak times. Dynamic pricing programs have shown some consumption reduction impacts, especially from actions of type (a) or (b) above, but their main impact is on peak demand.

Dynamic rate structures applied to the electricity sector require digital or “smart” meters (also called ‘interval’ meters) which, at minimum, record electricity consumption by time of use at hourly or shorter intervals. Smart meters also often have the ability to receive communications from the utility for service connection and disconnection, for example; this feature can help reduce non-technical losses. More advanced program designs can include automated signaling to specific customer devices, such as HVAC thermostats or electric water heaters for peak load management purposes. Some utilities engage large groups of residential or smaller commercial customers in load management programs, using remotely-communicable devices to cycle residential air conditioners or water heaters on and off during times of peak demand. By aggregating large numbers of customers, the utility can avoid the use of expensive peaking equipment, or can avoid the need for load shedding.

Project Example 3:
Ghana Time of Use Case Study

TARGETED SECTOR:

SUMMARY

In Ghana, chronic capacity and energy shortages regularly force customer load shedding, which impacts all sectors of the population. The industrial sector is hit particularly hard by the lack of reliable power supply.

In response to this crisis, USAID recommended the implementation of a Time of Use (TOU) tariff, as industrial customers already have the necessary infrastructure in the form of smart meters installed at their facilities. In addition, industrial customer electricity demand holds the greatest potential for load modification, and accounts for a high share of the total electricity usage.

After a thorough analysis of local circumstances, it was determined that a two-tier tariff would achieve total demand savings of just over 2 percent of the current system peak load within five years. On a financial basis, this program, as driven by the utility, would save 4.7 GHc (Ghanian Cedi) for every 1 GHc invested.

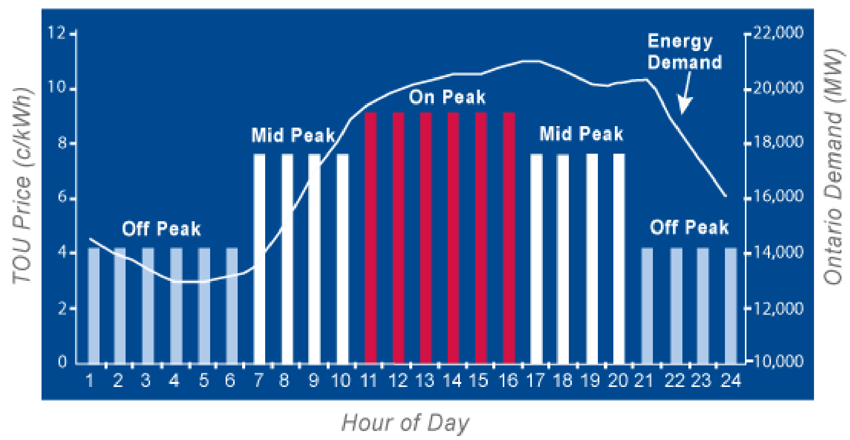
For larger customers, dynamic rates can be linked to specific and complex usage scheduling and operational changes. For example, an industrial operation may be able to delay an energy intensive cooling operation from high-priced on-peak hours to lower-priced off-peak hours. Some large industries have permanently shifted their operations to keep all major energy systems offline during peak hours.

Advanced metering and other “smart grid” infrastructure can also help utilities incorporate variable renewable energy, such as solar photovoltaics, electric vehicles, and storage devices such as customer-level or grid-scale battery storage. These capabilities improve the overall operational efficiency of the grid, making it more flexible, reliable, and cost-efficient.

There are three categories of dynamic rate structures: basic time-of-use pricing, critical peak pricing (CPP), and real-time pricing (RTP). Under a **basic time-of-use rate structure**, the price of the commodity varies on a fixed schedule. For example, this could mean peak rates from 10 am to 5 pm, and mid-peak rates from 7 am to 10 am and 5 pm to 10 pm, and off-peak rates from 10 pm to 7 am. These daily rates tend to apply only on weekdays; in some cases, the hours and rates may change seasonally.

Figure 1: Example of basic dynamic rate structure, in Ontario, Canada; note the close relationship between energy demand and price.

(Source: Environmental Commission of Ontario)



Critical Peak Pricing (CPP) is designed to impose very high prices during critical system peak (i.e. when demand is the highest for the season or the year). For example, prices per kWh of electricity could be several times higher than the base rate during critical peak hours. A CPP scheme can be achieved on a fixed schedule (e.g. 11 am to 2 pm on a designated CPP day) or real-time basis (CPP hours defined by situational conditions). In either case, rapid and effective communication between the utility and customer is required so that customers are able to respond to CPP price signals.

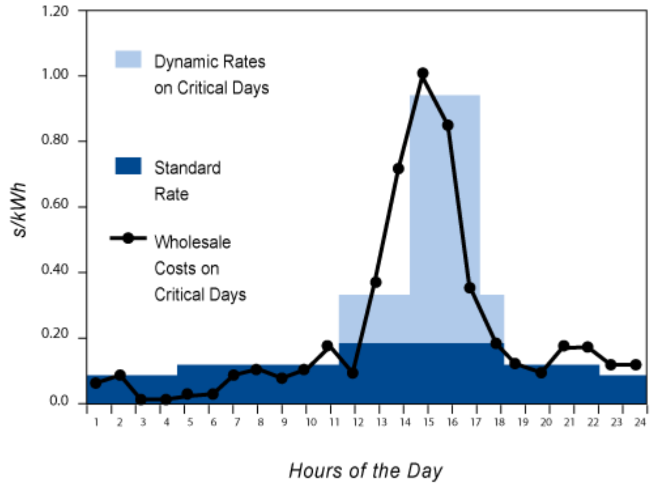


Figure 2: Generic example of critical peak pricing; note how the rate scheme is designed to match the wholesale costs on critical days.

(Source: R. Miller)

Finally, **Real-Time Pricing (RTP)** adjusts the energy price to reflect the delivered cost on a real-time basis, typically hourly. Under a RTP scheme, the price of energy is adjusted at a regular interval; customers may be provided with pricing information in advance, typically on a day-ahead or hour-ahead basis. Once again, smart meters are required for this approach.

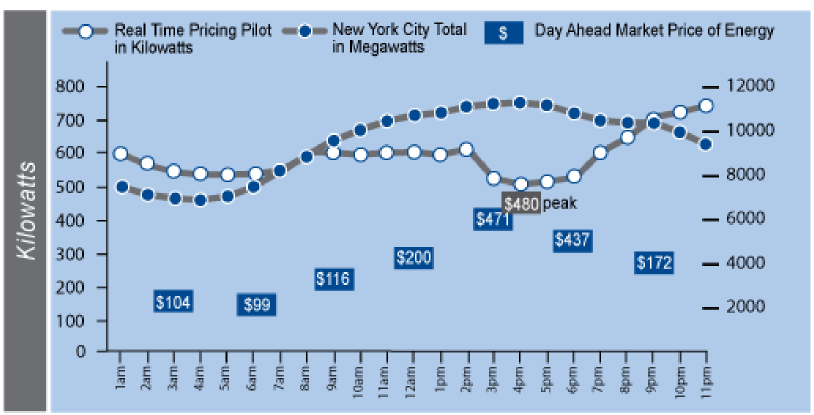


Figure 3: Results of a real-time pricing scheme pilot in New York City, in the U.S.; note how the electricity demand from pilot sites (white dotted line) decreases during the system peak (blue dotted line), as the price of electricity increases (blue boxes).

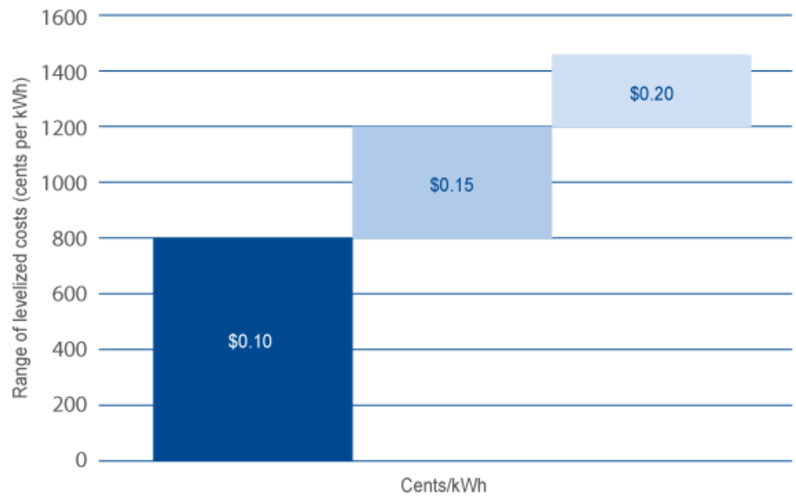
(Source: Carnegie Mellon Electricity Industrial Center)

1.4 BLOCK PRICING

A block-pricing rate structure varies the price per unit for each "block" or amount of consumption. Traditionally, many rates were designed with a "declining block" rate structure, where prices declined once the initial "block" of consumption was exceeded, based on the fact that the marginal cost of supplying additional units of energy declined as usage increased. While economically correct, declining block rates served as incentives to increase consumption, because the average price fell as customers used more electricity. More recently, utilities and regulators have devised "inverted block rates," where each successive block of usage increases in price, creating an incentive to avoid increased consumption. For example, the price per unit of electricity consumed from 0 to 500 kWh per month may be $0.20 per kWh, while the electricity consumed from 501 to 1000 kWh may be $0.25 per kWh.

Figure 4: Example of an inverted block rate. The first 800 kWh, in blue are sold at a lower price ($0.10 / kWh), than the last 300 kWh, in orange ($0.20 / kWh).

(Source: American Electric Power)



Block pricing structures can include multiple tiers (such as the example above), and typically requires cost-of-service analysis to establish the basis for block sizes and prices levels, for different customer classes. Inverted block pricing can also be used as an economically progressive rate structure, as wealthier households typically use more energy, while lower income households are more likely to use less. Some utilities accordingly design “lifeline” rates for the first block of consumption, with eligibility defined by income or other criteria.

1.5 METERING INFRASTRUCTURE

Understanding how customers currently consume energy within a utility’s service territory is the first step towards developing effective Demand Side Management (DSM) strategies. Smart meters, which can provide hourly electricity consumption data, can help by enabling the derivation of sector-specific end-use load profiles. Without smart meter data, it would require expensive load research to identify trends in electricity consumption and understand how consumption varies by sector, season, and time of day. Smart meters can be installed at whole-building, dwelling-unit or tenant-space levels (so that renters can pay their own electric bills), which provides direct price signals to each resident or business and thus encourages efficient usage. See Project Example 4 on how smart meters facilitated the development of several demand side programs in Tanzania.

1.6 COMMUNICATIONS

The influence of rate design on energy efficiency is dependent upon the response of utility customers to the price signals rates provide. Therefore, it is crucial that pricing information is communicated clearly through channels that are most effective at reaching each customer type: this can range from public awareness campaigns to inserts in monthly bill postings to email and text messages. With the proliferation of cellphones in many countries, text messaging and related channels can be both inexpensive and effective in reaching customers.

For dynamic pricing, communications must also be timely, so that customers are aware of and can respond effectively to peak demand and peak pricing events. This is where electronic media such as email and text messaging can be most effective. Regardless of the channel or the timing, communications should be designed such that the customer understands how the rate structure and their response to it affect their costs. For more approaches on communicating rates to consumers, see the Information and Education Technical Guide, particularly the section on DSM.

2.0 DIRECT GOVERNMENT INCENTIVES

2.1 GRANTS AND LOANS

Financial assistance from national, regional, or local governments may be provided in the form of grants and loans to households or businesses interested in pursuing energy efficiency projects. These may be delivered directly by government ministries under authorizing legislation that earmarks funding for energy efficiency projects, or through government policies that define various benefits such as tax exemptions, loan guarantees, and loan interest subsidies.

Grant or loan programs are most effective when targeted to priority sectors of the economy and to the energy efficiency opportunities most applicable in those sectors. For example, industrial customers often use significant amounts of electricity, and may be targeted with loans or loan subsidies that target specific technologies such as motor drives, lighting, and compressed air systems, as well as customized projects involved process equipment. Grants are more typically targeted to populations with special

Project Example 4:
Energy Efficiency in Tanzania 2014

TARGETED SECTOR:

SUMMARY

In Tanzania, USAID worked with a utility, the Tanzania Electric Company Limited (TANESCO), to: 1) build utility staff capacity on demand side management (DSM) and 2) support integrated resource planning. The project team trained utility staff in building energy analysis; meter data analysis; and DSM program planning, management, regulation, administration, and evaluation. Additionally, the project sought to provide TANESCO with the tools and data that can inform long-term planning.

The activities performed for this project included a literature review of the Tanzania power sector (e.g. cost structure, customers, load, challenges, sociopolitical environment), advanced meter data analysis (roughly 16,000 customers had advanced meters installed previously), the development of load profiles by sector, establishment of a DSM measures database including energy and demand savings by measure, analysis of technical, economic, and achievable potential, and the development of a series of implementation guidelines for programs identified through the achievable potential analysis.

economic challenges, such as low-income residential customers, non-profit institutions, or schools and hospitals. See the Financing Strategies section of the toolkit for more information.

2.2 TAX INCENTIVES

Tax incentives can be offered in several forms: personal or business income tax credits or deductions to companies or individuals, excise or sales tax waivers for efficient products or materials, or property tax credits or abatements. Personal and business income tax credits reduce the amount of tax a customer pays by allowing the costs of efficient items to be deduced from income or directly credited to tax obligations. Excise/sales tax waivers are aimed primarily at retail sales of efficient products and are typically offering for a short, defined time period that creates a rebate-like incentive at the point of sales. Property tax credits are aimed primarily at buildings: efficient or “green” buildings can be designated for reduced tax rates.

The tax incentives described above are targeted at specific sectors and technologies. As a higher-level policy that affects energy pricing across the economy, carbon taxes are a broad instrument that increases the price of carbon-intensive energy types. Its effects on energy efficiency are more indirect; rather than encouraging the use of a specific behavior or technology, carbon taxes increase the operating costs of end-use technologies that use carbon-intensive fuels (see Project Example 5). Because they impose broad impacts across entire energy markets and do not directly address market barriers that affect end-use markets, carbon taxes tend to have greater effects on the mix of energy supplies and may not be the most effective way to encourage energy efficiency. Carbon taxes can also be accompanied by broader tax-shift policies, such as reducing income or other taxes to keep total government revenues neutral. These policies can be important for addressing the regressive nature of carbon taxes, which raise energy prices for all users. They also reinforce the notion that carbon taxes, while effective at providing broad price signals, are not especially well targeted for encouraging energy efficiency either through investment or behavior change. Additional information can be found in the Policy Technical Guide.

Project Example 5:
Carbon Tax in South Korea

TARGETED SECTOR:

SUMMARY

South Korea’s government has implemented a levy on gasoline and diesel. On top of the excise tax, South Korea has a 10 percent consumption tax in place. This tax is collected on the import and purchase of gasoline and diesel, and then used to fund government transportation projects such as road and railway construction.

3.0 DEMAND SIDE MANAGEMENT INCENTIVES

Programs providing incentives and technical assistance to energy end-users to promote energy efficiency are critical to overcoming financial and informational barriers in these end-use markets. The roles of designated ministries, utilities, and third-party delivery entities in administering such programs can be important. They can contribute substantially to market transformation by providing financial and non-financial incentives and technical services to encourage technology investment and energy-efficient behavior among end-users (see Project

Example 6). Government entities or utilities can actively administer such programs directly, or can outsource some or all program functions to third-party entities, via contracts or similar agreements. Regardless of the program administration model, end-user programs can serve an important role in conditioning markets for high-efficiency technologies within a broader set of policy objectives. This is particularly true for standards and labeling policies, where labeling provides the information infrastructure that supports end-user programs, and these programs in turn shift markets to the point that certain technology efficiency levels can become mandatory standards. For more information on standards and labeling, please see the Standards, Rating and Labeling Technical Guide.

3.1 FINANCIAL INCENTIVES

A program administrator can offer incentives on a wide variety of energy efficient measures and in various forms. The measures selected for incentive eligibility are typically chosen based on their commercial availability and their potential to save energy relative to the "baseline" energy use (or the level of use at the beginning of the program). Once the measures are selected, incentive levels are typically set to offset a portion of the incremental cost between the efficient and baseline options. Specific incentive levels can vary depending on market conditions, but are generally set high enough to generate market uptake but lower than full incremental cost.

Based on the measure mix and incentive levels, program designers estimate the level of participation for each measure (for example, if a market sells 1000 electric motors annually, what percentage of that market can be shifted to high-efficiency options?). Participation projections can be based on previous program experience or on new market research, which can include information from industry experts, regional sales data, product availability, and other sources. These participation estimates are then used to project the program's total impact and cost.

During the program planning and design stage, detailed attention is given to the economic screening of individual measures and whole programs. Based on projected savings and costs, program planners apply economic tests to determine which measures and programs are most cost-effective (typically using net present value calculations). At this stage, measures can be

Project Example 6: Super-efficient equipment program (SEEP) in India

TARGETED SECTOR:

SUMMARY

In 2008, as part of India's National Action Plan on Climate Change, the Government of India (GoI) enacted the National Mission for Enhanced Energy Efficiency (NMEEE), the implementation of which was entrusted to the Bureau of Energy Efficiency (BEE). The BEE, designed the Super-efficient Equipment Program (SEEP) under NMEEE. This program aims to encourage manufacturers to produce energy efficient appliances.

The BEE agreed to provide financial incentives to manufacturers so that they would be able to produce and sell efficient ceiling fans for a price comparable to a standard model. The funding will be provided by the Clean Technology Fund (CTF), administered by the World Bank. Manufacturers will submit bids against set funding and quota levels and five manufacturers will be selected. The fans sold under this program are expected to save 232 GWh of electricity annually from 2017-2027 or 2028.

selected, bundled, and re-bundled as needed to maximize the cost-effectiveness of overall programs. This can involve the use of optimization techniques to produce the greatest savings impact for the least cost. Incentives can be administered through a number of forms and channels, such as:

- **Bill Credits:** This involves applying a credit directly to the customer's utility bill in the amount of the applicable incentive. If an efficient lighting fixture is assigned a rebate value of X, that currency amount would be credited in the subsequent billing cycle.
- **Cash Rebates:** In this form, customers submit rebate applications, which are processed and, if approved, generate a direct payment, which can be in the form of a check or debit card. Many product manufacturers routinely offer such cash rebates, for purely commercial purposes; energy efficiency programs can simply emulate this method to leverage a widely-used market practice. A rebate amount is specified for each eligible measure or action taken and, once a customer participates in the program, they receive the incentive in the form of payment separate from their utility payments.
- **Instant Rebates:** This approach, sometimes called a "buy-down," works with retailers or others in the supply chain to provide incentives "upstream" of the ultimate customer purchase. The program administrator pre-negotiates such arrangements so that, for example, when a customer enters a retail store, the shelf displays offer "instant rebates" for defined products. By eliminating the application phase, this form of incentive has proven very effective in generating market activity.
- **Direct Installation:** In a direct installation program, selected products or materials are installed directly by program administrator representatives while at the customer site, typically at little or no direct cost to the customer. Measures are typically simple, low-cost and cost-effective, such as light bulbs and hot water conservation measures like tap aerators and showerheads. In small commercial installations, lighting fixtures and heating, ventilating and air conditioning controls tend to be the primary focus (see Project Example 7).

Project Example 7:
Direct Installation in Vietnam

TARGETED SECTOR:

SUMMARY

Vietnam has experienced unprecedented growth, with resulting electricity demand increasing by 15–18% annually for more than a decade. A small number of commercial energy efficiency service providers have emerged but have experienced difficulties growing their businesses due to the lack of lending culture and perceived risks associated with energy saving projects. Small enterprises were interested in saving energy but were unwilling to approach banks for credit, preferring to use equity or small loans from family members.

The World Bank, with Global Environment Facility support, initiated an US$1.1million small grants program where up to $8,000 would be provided for each audit and up to $30,000 as an investment bonus for each project implemented. Part of the audit grant was held back to incentivize the service providers to encourage the customers to implement the projects. The amount of the grants was reduced during the project period as customers began sharing a greater portion of the costs.

The project is expected to leverage about USD $7.5 million in private investment and, to date, about 111 projects have been registered with a total estimated investment of $4.8 million, with 59 under construction and 17 completed.

3.2 NON-FINANCIAL INCENTIVES

Non-financial incentives are designed to help consumers make energy-efficient choices (for purchases or behaviors) that result in decreased energy consumption and/or demand without a direct monetary payment. As with other end-user program designs, this type of incentive can be administered by various entities, including government ministries, utilities, and third parties. More information about non-financial incentives can be found in the Information and Education Technical Guide.

Technical Assistance

Technical assistance can consist of various mixes of information, analysis, tools, and training that helps end-users understand and act on energy efficiency opportunities. It can take many forms:

- Onsite energy assessments or "audits," which examine the facility's energy systems, analyze savings opportunities, and recommend specific actions,
- Tailored training sessions focused on individual facility energy system operations and other improvements,
- Online resources such as fact sheets, calculator tools, and installation guides.

Behavior-Based Programs

Behavioral-based programs aim to leverage information, feedback, "social norms," and other methods to change end-user behavior in ways that reduce energy usage. For example, "benchmarking" information programs that compare a user's consumption to their peers' can leverage social norms to encourage high-users to moderate consumption. Leveraging smart meter data, as another example, can show users the cost effects of energy use on-peak or the amount of energy used by specific devices. This kind of feedback helps users understand when and where to conserve energy. Broader education and awareness campaigns that focus on common, simple solutions, such as turning off lights or adjusting thermostats, can have similar behavior-change impacts that save energy and reduce peak demand.

Broad-Based Education and Training

Most governments taking a comprehensive approach to energy efficiency include broad-based education and training to serve several purposes, including public awareness, technical training, and shaping of social norms. General awareness efforts tend to focus on the key issues associated with energy usage and the benefits of energy efficiency for addressing these issues. Such efforts can support a range of more specific programs, including the aforementioned incentive programs. Trainings provide end-users with skills specific to energy efficiency with the end goal of increasing the adoption of efficient technologies or behaviors. For example, local workshops that teach residential users how to "weatherize" or seal their homes using simple low-cost techniques can drive wider acceptance of these techniques and reduce energy use accordingly. As with other program types, government ministries, utilities, and third parties can play a role in such efforts. Governments typically sponsor the broadest types of education and awareness initiatives; while utilities tend to focus on specific actions related to the energy type they provide. Third parties such as non-governmental organizations can be effective in reaching targeted audiences. Compared with direct incentive programs, broad-based education and training typically requires a longer timeframe with efforts remaining in place over multiple years to achieve the desired broad impacts.

KEY PLAYERS

Government

As discussed in the Policy Technical Guide, there are many factors that influence whether and in what form governments offer energy efficiency programs. In any case, government leadership in terms of making energy efficiency a cornerstone of energy and environmental policy is key in driving action among stakeholders and across markets. Once the government makes energy efficiency a priority, funding can be provided from public revenues, utility ratepayers, or donor institutions. The government may then choose to play a number of roles in the energy efficiency policy suite and market supply chains, from passing national legislation to conducting awareness campaigns to administering incentive programs. Governments can leverage existing ministries, set up new agencies to design, administer, and deliver energy efficiency programs, or play a role in directing utilities to take on those responsibilities. Active government support in any of the aforementioned roles can prove critical in achieving progress.

Regulators

Regulatory bodies, typically created by government legislation to set rules and provide guidance on ratemaking and other key facets of energy markets, often become engaged in the planning, approval, and evaluation of utility end-user programs. The regulatory agency typically works with utilities, customer representatives, and other stakeholders to implement the policy directions set by government. Regulators can encourage energy efficiency by supporting studies of efficiency potential, administering resource planning processes that recognize efficiency as a utility resource, engaging with the community via public hearings, setting cost-effectiveness methods for efficiency program design and approval, and approving program funding plans.

Utilities

Depending on the utility's ownership structure and on legislative precedent, governments may need legislative or regulatory action to enable utilities to engage actively in energy efficiency programs. The utility can play a unique and significant role in energy efficiency programs as an administrator, either as a government-owned or privately-owned entity. Utilities have the advantage of direct relationships with their customers and access to the usage data that is invaluable in designing effective efficiency programs. They also have personnel with technical skills and business capacity to support a range of end-user program needs.

Customer Representatives and Other Stakeholders

In many jurisdictions, utility customers have formal or informal representation in planning processes and other forums related to energy sector policy. Customer representatives can include business and professional associations, advocacy groups, research and technical societies, and others with interests in energy matters. It is generally considered good practice to structure stakeholder participation in processes that are open and transparent, and that give stakeholders a chance for their views to be heard.

PROJECT EXAMPLE RESOURCES

Project Example 1: Carbon Tax in South Korea

"South Korean Parliament Approved Carbon Trading System," Bloomberg (2012): http://www.bloomberg.com/news/articles/2012-05-03/south-korean-parliament-approves-carbon-trading-system

Project Example 2: Impact of Subsidies in Indonesia

"A Citizen's Guide to Energy Subsidies in Indonesia," International Institute for Sustainable Development (2011): https://www.iisd.org/GSI/citizens-guide-energy-subsidies-indonesia

Project Example 3: Regulatory Reforms in Latin America

"World Development Report 1994: Infrastructure for Development," The World Bank (1994): http://bit.ly/1BZxAMM "Electricity Reforms," The World Bank (2012): http://bit.ly/1U9Avbq

"Electricity Reforms," The World Bank (2012): http://bit.ly/1U9Avbq

Project Example 4: Ghana Time of Use Case Study

"Partnership for Growth - Ghana TOU Tariff Analysis and Program Development," USAID (2014)

Project Example 5: Energy Efficiency in Tanzania

"Partnership for Growth – Energy Efficiency in Tanzania: Demand Side Management," USAID (2014)

Project Example 6: Super-efficient equipment program (SEEP) in India

"Project Appraisal Document: Super Energy-Efficient Equipment Project (SEEP)," The World Bank (2013): https://www.climateinvestmentfunds.org/cif/sites/climateinvestmentfunds.org/files/SEEP%20PAD_CTF.pdf

ADDITIONAL RESOURCES

Ashok Sarkar and Jas Singh, "Financing energy efficiency in developing countries – lessons learned and challenges," Energy Policy, Issue 38:
http://regulationbodyofknowledge.org/wp-content/uploads/2014/06/Sarkar_Financing_Energy_Efficiency.pdf

Explores factors and approaches for the successful application of financing instruments for energy efficiency, discusses lessons learned and remaining barriers.

"Customer Incentives for Energy Efficiency Through Electric and Natural Gas Rate Design," U.S. Environmental Protection Agency (2009):
http://www.epa.gov/cleanenergy/documents/suca/rate_design.pdf

Outlines the factors and options available to motivate consumers to reduce the energy they consume through energy price and rate design.

"Promoting Energy Efficiency," International Development Finance Club (2014):
https://www.idfc.org/Downloads/Publications/02_other_idfc-expert_documents/IDFC_Energy_Efficiency_Paper_01-12-14.pdf

Describes the best practices identified and lessons learned from member development banks in their efforts to promote energy efficiency.

"Saving Electricity in a Hurry," International Energy Agency (2011):
https://www.iea.org/publications/freepublications/publication/Saving_Electricity.pdf

Draws on case studies to outline key steps and factors in implementing energy saving programs, including communications, price, and technology, with a focus on meeting short term energy savings goals.

"Technology Roadmap: Smart Grids," International Energy Agency (2011):
https://www.iea.org/publications/freepublications/publication/smartgrids_roadmap.pdf

Provides an overview of the current status of smart grid technologies, and provides recommendations to facilitate the expanded use of smart grids.