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10 QUESTIONS TO ASK ABOUT ELECTRICITY TARIFFS

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THE 10 QUESTIONS TO ASK SERIES: FRAMEWORKS FOR DESIGNING GOOD ELECTRICITY POLICY

The 10 Questions to Ask Series, or the 10Q Series, is an initiative of the World Resources Institute's (WRI) Electricity Governance Initiative (EGI) and Prayas, Energy Group. It aims to build the capacity of electricity sector stakeholders—government agencies, regulators, utilities, the private sector, civil society, and others—to design and participate in policy making and implementation processes. Each paper in the series asks a set of 10 questions relevant to a particular topic within the broader electricity sector. The series pays particular attention to public interests—interests in which society has a stake and that warrant government recognition, promotion, and protection. These interests may include decisions concerning public expenditures, affordability, service quality, and impact on local and global resources. We consider "good" electricity policy to be policies designed to improve effectiveness of public expenditures, reduce unnecessary costs, raise the quality of service, and minimize social and environmental impacts while seeking to reach specific policy objectives. "Good" also references "good governance" as laid out in EGI's flagship publication, the "Electricity Governance Initiative Assessment Toolkit" (EGI Assessment Toolkit) (see Box 1).

CONTENTS

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Box 1 | **TAP–C Key Principles of Good Governance**

THE ELECTRICITY GOVERNANCE INITIATIVE TOOLKIT
Benchmarking Best Practice and Promoting Accountability in the Electricity Sector

Transparency and Access to Information: Transparency is the process of revealing actions and information so that outsiders can scrutinize them. Attributes of transparency include the comprehensiveness, timeliness, availability, comprehensibility of information, and whether efforts are made to make sure information reaches affected and vulnerable groups as appropriate.

Accountability and Redress Mechanisms: Access to justice and redress are necessary to hold governments and actors in the private and public sector accountable. Accountability includes the extent to which there is clarity about the role of various institutions in sector decision making; there is systematic monitoring of sector operations and processes; the basis for basic decisions is clear or justified; and legal systems are in place to uphold public interests.

Participation: Diverse and meaningful public input helps decision-makers consider different issues, perspectives, and options when defining a problem. Elements of access to participation include formal space for participation in relevant forums, the use of appropriate or sufficient mechanisms to invite participation, the inclusiveness and openness of such processes, and the extent to which the gathered input is taken into account.

Capacity: Capacity refers to the government's social, educational, technological, legal, and institutional ability to practice good governance, and the ability of civil society to engage in decision making. This includes the capacity of government and official institutions to act autonomously and independently, the availability of resources (both human and financial) to provide access, and the capacity of civil society (particularly NGOs and the media) to analyze the issues and participate effectively.

Source: Dixit, S., N.K. Dubash, C. Maurer, & S. Nakhooda. 2007. The Electricity Governance Initiative Toolkit: Benchmarking Best Practices and Promoting Accountability in the Electricity Sector. Washington DC & Pune: ERI & Prayas, Energy Group.

The questions raised in the 10Q Series are relevant in a variety of policy making contexts. Individuals in government, utilities, and planning agencies can use the 10Qs to assess or review electricity policies. Civil society groups can draw on the 10Qs as a guide to engaging with policymakers at public hearings or other consultations. Combinations of these modes of engagement can guide multi-stakeholder forums to design policy roadmaps under a common framework. The questions posed are designed to help readers focus on issues affecting their country or region. The questions can be used to identify crucial gaps and challenges within a country's electricity sector; query decision-makers on plans to fill those gaps; and help ensure that electricity policies represent public interests by keeping social, economic, and environmental considerations in mind. Each question is formulated to emphasize the active role that stakeholders can play in policy design and review processes, and is accompanied by an explanation of its relevance to the public interest. Users should feel free to adapt the questions to the knowledge level of different types of stakeholders. For example, pilot tests found that those wanting to build the capacity of consumers to participate in public hearings needed to adopt less technical language.

Additional resources are provided for readers who are interested in pursuing each question in greater detail.

The 10Q Series builds on the Electricity Governance Initiative Toolkit (EGI Toolkit), which provides a set of good governance indicators customized for policy and regulatory processes in the electricity sector. The EGI Toolkit highlights the good governance principles of transparency, participation, and accountability, which correspond to the principles of access to information, decision-making, and justice in Principle 10 of the 1992 Rio Declaration on Environment and Development[1]. The EGI Toolkit adds a fourth principle of capacity (see Box 1). Indicators from the EGI Toolkit may be used to supplement the 10Qs to assess procedural aspects of governance.

To date, the 10Q Series includes:

- 10 Questions to Ask about Electricity Tariffs
- 10 Questions to Ask about Integrated Resources Planning
- 10 Questions to Ask about Scaling On-Grid Renewable Energy

INTRODUCTION TO ELECTRICITY TARIFFS

Tariff determination–the process of determining the price of electricity to consumers–has far-reaching impacts throughout the electricity sector. It not only affects the financial viability of the sector and the quality and affordability of consumer services, but it also raises social and environmental concerns. "10 Questions to Ask about Electricity Tariffs" attempts to capture some of the critical dimensions of tariff determination, primarily in regulated markets.

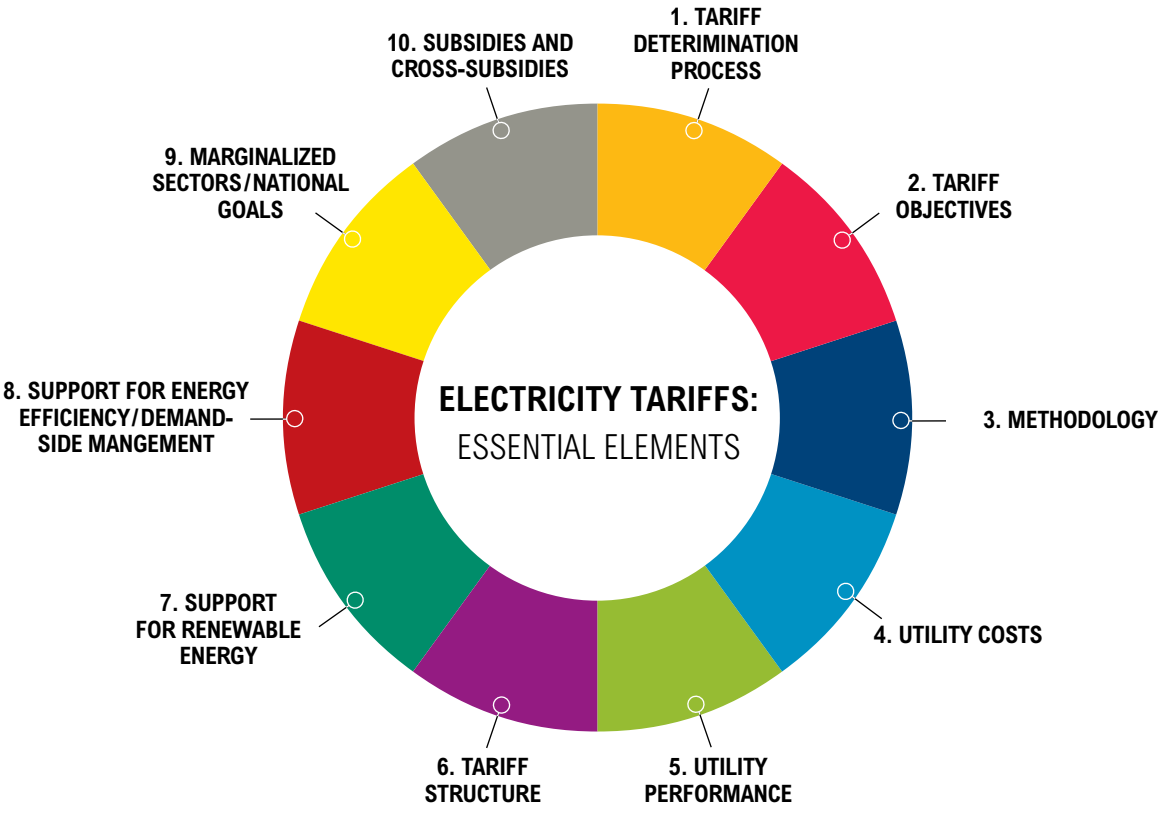
Some countries and regions rely on regulated monopolies to deliver electricity to customers while others have created competitive wholesale and retail marketplaces where electricity is traded. In regulated markets, utilities face little or no competition on generation, and rely on power purchase agreements with generators and their own generation fleet. This is the most common model found in developing countries and several U.S. States.

Similarly, some countries rely on vertically integrated electricity markets, where a single firm owns assets and is responsible for all aspects of production, sale, and delivery of electricity (to include generation, transmission, distribution, and retail), while other countries rely on an unbundled market where those services are disaggregated. Where there has been unbundling of the sector, the user of this 10Qs framework should be aware that different tariff processes can apply for both distribution and transmission services and can have different impacts on electricity tariffs.[2] The user should also be aware that the use of the terms "tariff" and "rate" differs depending on the jurisdiction that one is in and can be used interchangeably for the purpose of this tool.

Figure 1 identifies 10 elements for good tariff determination. Each element is presented as a question that decision-makers and stakeholders should explore. Each question is followed by a short explanation of its significance and issues that merit consideration. Key analysis issues are highlighted at the end of each question as action items.

The questions raised here can serve multiple functions. For example, utilities can use them to design technical workshops and public consultations that seek innovative ways of, for example, better targeting subsidies. Civil society groups can use these questions to prepare for public consultations and assess various aspects of a utility's tariff proposal.

Figure 1 | **Electricity Tariffs: 10 Essential Elements**



10 QUESTIONS TO ASK ABOUT ELECTRICITY TARIFFS

Q1. WHAT IS THE TARIFF DETERMINATION PROCESS?

Electricity rates, or tariffs, best serve the public interest when established through a process that is transparent, accountable, and participatory. Procedural clarity involves identifying legal frameworks, key decision-makers and procedures for setting and revising tariffs, and procedures and forums allowing consumers and other stakeholders to participate in decisions, appeal decisions and seek redress of grievances.

Entities responsible for determining tariffs differ from country to country. They include regulatory commissions (at the national or state level), government ministries, and parliament. In some countries, more than one institution is involved. In Pakistan, for example, the Oil and Gas Regulatory Authority sets fuel tariffs, which are considered by the National Electric Power Regulatory Authority in determining consumer tariffs. The role of electric utilities also differs from country to country. Where tariffs are influenced by multiple entities, procedural clarity requires that the functioning of these entities, their jurisdiction, and how they interact is explicitly articulated.

Tariff determination processes vary by country, can include various points of intervention, and can include multiple documents that influence tariffs set. South Africa's Multi Year Price Determination (MYPD), which describes electricity prices decided by the National Electricity Regulator, NERSA, includes capital expenditures that have been approved for capacity expansion by generation, transmission, and distribution. Capital expenditure for transmission requirements included are based on the national utility's (Eskom) approved Transmission Development Plan.[3]

In some countries, an electric utility submits an application, usually to increase tariffs, to a regulatory commission, which applies a set of criteria (tariff methodology, see Q3) to decide whether the application should be granted. In India, an application for tariff revision is called an Annual Revenue Requirement (ARR). A utility's submission of an ARR to the regulatory commission triggers a two-step process. In the first step, the commission analyzes the application for technical completeness and consistency. At this stage, some commissions allow consumer representatives to participate in this "technical validation" exercise. After issues that arise in the first step are resolved, the second step involves the entire application and supporting data being made public, followed by public hearings.

Review periods for tariff determinations vary. Some countries have an annual review period, whereas others have a multi-year determination period but allow for intermediate adjustments. In either case, audits of the tariff adjustment can resolve differences between the estimated and the actual costs.

Because electricity tariffs affect different sections of society—including households, small businesses, and industries—in different ways, tariff determination processes should mandate a clear mechanism of participation. These should allow for written submissions and public hearings that permit oral evidence. Mechanisms should include equal opportunity for consumers and other stakeholders to participate, and documentation of authorities' responses to public inputs should be publicly available.

A tariff determination process should include clearly defined channels for review and appeal, and mechanisms to address consumer grievances. An appeals process can allow stakeholders to question decision-makers (e.g. regulatory commissions or ministries) on broad grounds of law as well as substance (i.e., facts, analysis, interpretation). Appeals processes can provide "checks and balances" to prevent inefficient or wrong decisions. Mechanisms to address consumer grievances about the service of the utility are also valuable. For example, if a utility bill does not reflect the appropriate tariff, a consumer can file a grievance with the regulatory body. But other forums might be better suited for appeals against orders by tariff determining entities. The appeals process should also allow participation by all stakeholders.

Q1. Analysis Highlights—Key Elements of the Tariff Determination Process

LOOK FOR:

- Clarity about institutional roles and the process of tariff determination
- Opportunity for stakeholder comments and inputs into the tariff-setting process
- Availability of appeals and consumer grievance-redress mechanisms

Additional Resources

Q2. WHAT ARE THE OBJECTIVES OF THE TARIFF DETERMINATION?

The objectives for setting tariffs should be clearly stated. Tariff-setting bodies have multiple objectives: promoting investment, improving utility performance, improving service quality, enhancing energy security, improving the financial health of electric utilities, promoting energy efficiency, expanding services, and alleviating poverty (see Box 2). A clear statement of objectives helps all stakeholders assess the appropriateness of tariff proposals and of the tariff that is set. Thailand's Power Development Fund, which is partially funded by consumer tariffs, is based on a clear set of objectives that help justify tariff decisions. These objectives include: an increase in expansion of electrification in rural areas, and subsidization of electricity services for underprivileged consumers.[4] Clear objectives establish predictability and improve stakeholder confidence in the regulatory process.

The next step is to set specific, measurable, achievable, realistic, and time-bound (SMART) targets to achieve the objectives. For example, to improve consumer service by increasing investments in the transmission and distribution network, a target might guide analysis of the investment needed and document how the proposed tariff will recover the investments. A "tariff philosophy document" containing objectives as well as targets and the methodology (see Q3) used to determine a tariff can contribute to greater clarity and accountability.

Achieving the objectives will be easier with appropriate mechanisms to monitor and enforce targets and impose penalties on defaulters. Furthermore, impacts of tariff revisions are important to evaluate over a broad time frame in order to understand the long-term effects on consumers, and to assess whether overall tariff objectives are being achieved. These mechanisms should generate evidence that can be used to improve future tariff determination processes. They should be periodically evaluated to assess whether they are functioning as planned.

Box 2 | Principles of Tariff Design

Objectives of a sound rate structure often follow a suite of principles called "Bonbright's Principles" and are related to revenue, cost, and practicality. These principles include:

1. Effectiveness of yielding total revenue
2. Stability and predictability of revenue
3. Stability and predictability of rates
4. Discouraging wasteful use of services
5. Understanding of present and future private and social costs and benefits of service provided
6. Fairness of rates in the apportionment of total costs of service among different consumers
7. Avoidance of discrimination in rates
8. Promotion of innovation and cost-effectiveness in the face of changing demand and supply patterns
9. Simplicity, understandability, public acceptability, and feasibility
10. Freedom from controversies as to proper interpretation

Source: Bonbright, J.C., A. L. Danielsen and D.R. Kamerschen. 1988. *Principles of Public Utility Rates, Second Edition.* Arlington: Public Utilities Reports, Inc.

Q2. Analysis Highlights–Objectives of Tariff Determination

LOOK FOR:

- Clearly defined objectives of tariff determination
- Establishment of specific, measurable, achievable, realistic and time-bound (SMART) targets
- Existence of specific mechanisms for monitoring and achieving objectives
- Evaluation of long term impacts of tariff revisions

Additional Resources

Q3. WHAT IS THE TARIFF DETERMINATION METHODOLOGY?

The method by which tariffs are determined is also important from a public interest perspective. Methods might include cost-plus (a process of balancing costs incurred by utilities and future estimated revenues) or performance-based regulation (an extension of the cost-plus approach that provides incentives for improving efficiency and reducing costs). Each method has advantages for achieving specific objectives in a given context. Box 3 introduces common methods for tariff determination. Guidelines for electricity tariffs in South Africa are set out in the country's Electricity Pricing Policy and determined by the independent regulator, NERSA, using the rate of return methodology.[5] On the one hand, this methodology allows for the utility to recover its costs, however, the methodology raises questions about what the allowable rate of return should be and how those costs should be distributed.[6]

The tariff determination process should specify the method used to determine the tariff, as well as the reasons for this choice. This clarity enables stakeholders to assess whether the selected method is appropriate, and whether any shortcomings are adequately addressed. For example, the performance-based approach may provide more flexibility to utilities to improve performance. However, awards can be misused and financial or operational performance could be improved at the cost of service quality.

Box 3 | Tariff Determination Methodology

Various methods are used to regulate electricity prices. Factors such as the scale of the electricity sector, its sophistication in terms of technology use, and the availability of pertinent data can influence the choice of method. Methods include:

- **Rate of return,** which is based on operating costs and cost of capital. In most cases, regulators (or others charged with determining tariffs) review the tariff in response to a claim by the utility that its rate of return is less than its cost of capital, or in response to a consumer group's claim that the actual rate of return is greater than the cost of capital.
- **Price cap,** which allows the utility to change its tariff according to an index typically composed of an inflation measure and a "productivity offset" (Jamison, et al.). The tariffs are adjusted according to a price cap index that reflects the overall rate of inflation in the economy, the ability of the operator to gain efficiencies, and the inflation in the operator's input prices.
- **Performance-based approach,** a comparative competition in which the operator's performance is compared with other operators' performance and penalties or awards are assessed based on an operator's relative performance, for example on cost efficiency. This approach recognizes the revenue requirements of the utility and simultaneously encourages efficiency improvements and cost reductions (Jamison et al.; Ahluwalia).
- **Cost-Plus method/cost of service,** which balances future estimated revenues with costs incurred by the utility. The disadvantage of this approach is the difficulty in correctly establishing costs that reflect efficient performance and preventing excessive costs (operating or investment) being reported by utilities.

Source: Ahluwalia, S., and G. Bhatiani. 2000. "Tariff Setting in the Electricity Power Sector: Base Paper on Indian Case Study." Paper presented at the TERI Conference on Regulation in Infrastructure Services, New Delhi, Nov 14–15. Jamison, M.A. and S.V. Berg. 2008. Annotated Reading List for a Body of Knowledge on Infrastructure Regulation. Washington, D.C.: World Bank.

Q3. Analysis Highlights–Tariff Determination Methodology

LOOK FOR:

- Transparency about methodology of tariff determination
- Assessment of strengths and weaknesses of the chosen method
- Mitigation measures to overcome weaknesses of the chosen method for achieving objectives of tariff determination

Additional Resources

Q4. HOW ARE THE UTILITY'S COSTS CONSIDERED IN THE TARIFF?

Electricity tariffs often depend on a utility's costs, which can include costs related to generation, distribution, and/or transmission. How these costs shape the tariff depends on the methodology used to determine the tariff, the structure of the electricity sector, and the efficiency and performance of the utility. An example of how structure affects tariffs is seen in vertically integrated utilities, where costs related to power generation, transmission, and distribution can be separated, but ultimately are determined by one or more regulators and become defined tariffs. Conversely, for utilities that are not vertically integrated, costs may be easier to identify and can be determined in different ways. In any case, entities engaged in tariff determination should disclose information about utility costs to all stakeholders (see Box 4).

The nature and extent of the disclosure of utility costs depends on the methodology of tariff determination. For example, if a cost-plus method is adopted, all details about the costs of generation (such as fuel and maintenance); transmission and distribution; finance (e.g., quantum and terms of loan, loan repayment costs, depreciation); and human resources should be disclosed. This disclosure enables the public, regulators, and independent experts to identify areas for improvement and judge the appropriateness of tariff proposals.

Several utilities assess surcharges for energy efficiency measures, renewable energy, or improved services (see Q7 and Q8). In some cases, however, the revenue generated by these additional charges may, or may not be used optimally. For example, in the Indian state of Maharashtra, a distribution company levied additional charges on certain consumers to help minimize power cuts and improve service quality. However, investigations by civil society groups found that this additional revenue was not being used efficiently.[7] Other examples of additional charges include fuel cost increases and power purchase charges. Tariff-setting authorities and utilities may be called on to document the justification and impactof these charges.

The nature of the costs—whether they are internal and controllable, or external and non-controllable—is relevant when evaluating how costs shape the electricity tariff. For example, costs associated with employee wage increases are controllable because they can be planned for. In contrast, costs associated with an increase in international market prices for fuels, general inflation, or currency depreciation are non-controllable. However, the risks associated with uncontrollable costs can be anticipated and reduced through better planning. For stakeholders to hold utilities to account for efficient performance and appropriate planning, they must be able to assess the nature of the utilities' costs. Financial costs, such as return on equity, profitability, working capital requirements, and debt service should also be analyzed to ensure fiscal responsibility.

Box 4 | Range of common utility costs associated with power projects

Utility costs associated with power projects can be classified as fixed or variable, and are recovered from consumers through tariffs.

Fixed Costs:

- Operations and Maintenance (O&M): O&M costs cover the cost of repairs of lines, transformers, or power stations.
- Salaries and human resources: Salaries, pensions and benefits for utility personnel, as well as the cost of outsourced labor for O&M functions, form part of a utility's fixed costs.
- Return (profit) on equity: It is legitimate for the project owner to seek a profit that is justifiable and transparent.
- Income Tax: Income tax of the utility is recovered from the tariff.
- Interest on Loan: Project owners have to pay the interest on the loan taken out to construct the project.
- Repayment of loan/Depreciation: Depreciation measures the reduction of the value of an asset due to aging and use. Depreciation is recovered through the life of the equipment.

Variable costs: Fuel based power projects are dependent on the unit price of fuel and the actual generation of the plant, a variable cost. The risks associated with variable costs can be anticipated and reduced through appropriate planning processes.

Source: Sreekumar, N., and G. Sant. 2004. Know Your Power: A Citizen's Primer on the Electricity Sector. Pune: Prayas Energy Group.

Q4. Analysis Highlights–Utility Costs

LOOK FOR:

- Availability of adequate and reliable information about different costs of utility
- Transparency about taxes, surcharges, and other components that affect tariffs
- Clarity about the nature of costs (i.e., whether they are controllable or uncontrollable by the utility)

Additional Resources

Q5. HOW DOES THE UTILITY'S PERFORMANCE AFFECT THE TARIFF?

A utility's performance—in terms of energy services, environmental and social impacts, finances, and operations—affects consumer tariffs.

A utility's energy performance depends on its plants' fuels (nuclear, coal, oil, natural gas, wind); their technology and vintage;[8] their heat rates, load factors, and availability; and how often they are refurbished. For example, as the heat rate (efficiency of generation) attained by a coal plant increases, the fuel costs can fall, thus theoretically decreasing the electricity tariff. At the same time, technology that is efficient and has a better heat rate could be expensive and thus increase the capital cost of a plant. It is critical that the tariff design recognize that capital and operating performance norms and hence, costs, are interdependent.

Other energy performance parameters include transmission and distribution losses, metering efficiency, and network reliability. It is essential that reliable data about such performance parameters is made available as part of the tariff process. If performance norms are controversial or disputed, independent studies, possibly with involvement of independent civil society, consumer groups, or academics, may be conducted before the tariff-setting process begins. Since 2010, electricity companies in Kyrgyzstan have agreed to accurately report on technical losses. Such public disclosure has resulted in significant drops in electricity distribution losses and has become an important aspect in ensuring appropriate electricity tariffs are set.[9]

A utility's environmental and social performance can be measured by its power plants' emissions, waste water treatment, and pollution control measures, and by the utility's involvement in community development, its provision of compensation for land acquisition, and its labor management plans. Such performance parameters can affect the tariff.

A utility's financial performance can be measured by indicators of efficiency in managing working capital and cost of capital.

In operations, performance parameters that include mandated improvements, reliability and service standards, timely metering and bill collections, and commercial and technical losses in the system, are key to assessing how performance impacts tariffs.

Because utility performance affects the tariff for consumers, performance information should be disclosed and scrutinized as part of the tariff determination process. For public scrutiny to be most effective, regulators or other agencies responsible for setting tariffs should make comprehensive data for performance indicators publicly available.

Regulators might also establish clear targets and norms for performance indicators and carry out periodic utility performance comparisons (among similar utilities, within or outside the country). Whether plans are in place to improve utility performance if it falls below mandated standards is also relevant.

Q5. Analysis Highlights—Utility Performance

LOOK FOR:

- Transparency of performance parameters presented by the utility (energy services, environmental and social impacts, finances, and operations)
- Evaluation of impact of performance norms on overall tariff as well as tariff for different consumer categories
- Assessment of potential improvement in performance norms
- Clarity on performance norms and targets to be achieved by the utility

Additional Resources

Q6. HOW HAS THE TARIFF STRUCTURE BEEN DETERMINED?

Another element in the tariff determination process is the tariff structure (or rate design). A tariff structure is a set of rules and procedures that determine how much different categories of consumers are charged. The prices customers pay for utility services can vary from category to category and from utility to utility.

The tariff structure for residential consumers has three essential elements:

1. The fixed charge per billing period must be low, at least for small-use customers, to ensure that access to essential levels of electric service is affordable.[10]
2. Different tariffs are charged for different levels of energy consumption. Most countries have "increasing block tariffs," in which essential needs service is priced at a low rate, and incremental and discretionary usage is priced at a higher rate.
3. Differential rates are set for seasonality and times-of-use that closely align prices with costs, and are explained clearly.

The tariff structure should be simple to implement, but should also ensure accountability for the use of electricity and adequate recovery of revenue for the utility.

Depending on the objectives of the tariff determination and needs of the utility, different tariff structures can be adopted (see Box 5). In South Africa, an inclining block tariff is used as a form to subsidize poorer domestic

Box 5 | Electricity Tariff Structures

Multiple types of tariff structures can be applied; these are not mutually exclusive and can be applied in conjunction with one another. Common tariff structures include:

- **Single-part tariffs:** The operator charges a single price per unit of electricity for the entire amount of electricity consumed by the consumer. Though simple to administer and understand, single-part tariffs do not reflect electricity companies' cost structure, which may include significant fixed costs (i.e. costs which may not vary depending on electricity generation). Hence a single-part tariff may lead to inefficient operation of generation assets or inadequate revenues for the electricity company.
- **Multi-part/two-part tariffs:** The operator charges separate prices for different elements of the service. For example, a customer may pay a monthly fee for access to electricity services plus a per unit charge for the electricity consumed. Multi-part tariffs can better reflect a utility's costs and performance. Multi-part tariffs are also often differentiated by season and daily time of use.
- **Block tariffs (increasing, decreasing):** "Decreasing block tariffs" decrease in price as larger amounts of electricity are consumed because it is assumed that the utility's marginal cost of producing electricity is cheaper than the average cost. Conversely, "increasing block tariffs" increase as larger amounts of electricity are consumed. Increasing tariffs discourage consumption and encourage conservation more than decreasing tariffs and also allow better targeting of subsidies for poor consumers.
- **Time-of-day tariffs (TOD, peak-load):** Rates vary depending on when the service is being used. For example, the operator would charge higher prices during peak use hours and lower prices during off-peak hours to reflect the cost of generation. This structure requires sophisticated measurement of customer usage, such as metering technologies. It encourages consumers to use less power during peak hours. With decreasing costs of ToD meters, use of the ToD tariff structure is becoming more common.
- **Seasonal tariffs:** These rates allow higher charges for electricity in summer and winter when demand for cooling or heating is higher. Typically they are used in climates where utilities experience significant seasonal cost differences. With traditional regulation, seasonal rates reduce net revenue stability for utilities by concentrating revenue into the weather-sensitive seasons.

consumers.[11] Brazil applies a two-part tariff in part to control peak and off-peak demand.[12] The most common tariff structure is a two-part tariff, in which each consumer is required to pay a fixed charge (or several fixed charges) per billing period (for example, minimum consumption charges, load charges, or connection fees) and additional charges based on actual consumption. Other tariff structures include single-part tariffs, block tariffs, seasonal tariffs, and time-of-use (time-of-day) tariffs.

The tariff structure can have a significant impact on crucial issues of public interest, such as achieving the stated objectives of the tariff revision, improving the performance and efficiency of the utility, and enhancing accountability to consumers. For example, if an objective is to improve bill collection efficiency, then the tariff might offer a discount to consumers who pay on time to incentivize timely bill payment and thus reduce revenue losses to the utility.

Q6. Analysis Highlights—Tariff Structure

LOOK FOR:

- Clarity and simplicity of tariff structure
- Tariff structure ensures accountability and adequate recovery of revenues for utility
- Appropriateness of tariff structure to achieve tariff objectives

Additional Resources

Q7. HOW DOES THE TARIFF SUPPORT RENEWABLE ENERGY?

Tariff determination can promote and support renewable energy (RE) in two ways. First, by introducing policies such as feed-in tariffs (FIT), net energy metering, renewable portfolio obligations, or subsidies to renewable project developers, policymakers can encourage penetration of renewable energy on the supply side. Second, by providing incentives (such as rebates for use of renewable energy technologies like solar water heating and solar home systems) or by allowing consumers to buy only renewable energy, policymakers can promote renewable energy on the consumer demand side. Thailand's National Energy Policy Commission has approved a FIT program that encourages power generation from RE by providing RE power producers with a variety of price premiums including a generation-based technology adder.[13]

The costs of renewable energy technologies are decreasing at an encouraging rate. However, many sources of renewable energy are still more costly than conventional energy sources. Thus, promoting renewable energy sources can have tariff impacts. For example, the tariff determination may stipulate or incentivize a certain percentage of renewable energy, which may cost more than conventional fuel. Similarly, some utilities provide preferential tariffs to renewable energy sources to encourage deployment of clean energy. These measures increase the costs of power procurement for the utility. Subsidies and rebates given to consumers to install solar home systems, water heaters, and similar technologies also increase the operational costs of utilities. Some utilities levy a surcharge on electricity consumers to generate revenue for supporting renewable energy projects. Such an increase in utility costs or taxes levied on consumers to promote renewable energy can drive up the tariffs for electricity consumers.

As an increasing number of consumers install renewable energy systems at their homes or businesses, the role of the utility may gradually change from "power supplier" to "grid manager," coordinating thousands of points of supply to provide reliable service. The tariff structure may need to include a separate set of reliability service products, paid for by all beneficiaries. If renewable resources significantly decrease the use of grid-supplied power, revenue regulation[14] or decoupling schemes[15] may be needed in the tariff structure to assure the financial health of the electric utility.

Of course, utilities should promote renewable energy, which ameliorates local pollution, diversifies the energy portfolio, and creates domestic jobs. However, stakeholders should assess how any additional costs of renewable energy might affect consumer tariffs especially for marginalized consumers. Such an analysis can also lead to innovative approaches that balance multiple objectives.

Q7. Analysis Highlights—Tariff For Supporting Renewable Energy

LOOK FOR:

- Supply-side and demand-side elements of tariff that support renewable energy
- Transparency about cost impacts of renewable energy supportive tariffs
  - Overall
  - By consumer category
  - Availability of data that documents different cost impacts

Additional Resources

Page

Q8. HOW DOES THE TARIFF SUPPORT ENERGY EFFICIENCY, DEMAND-SIDE MANAGEMENT, AND DEMAND-RESPONSE MEASURES?

Tariff structure can play an important role in capturing savings by promoting energy efficiency, demand-side management, and demand-response measures, which allow end-use electric customers to reduce their electricity usage in a given time period or shift that usage to another time period in response to a price signal. Such tariff designs include time-of-day tariffs, block tariffs, and demand-response tariffs. To mitigate power shortages, a main concern in China, the government has adopted a variety of tariff design measures and incentives to promote energy conservation, including time-of day tariffs, seasonal tariffs in areas where seasonal demand fluctuation is evident, and compensation for users who avoid peak hour consumption.[16]

Under a time-of-day tariff, electricity consumed during peak hours is charged at a higher rate than electricity consumed during off-peak hours. This tariff encourages consumers to use electricity prudently during peak hours. Not only does it encourage overall energy efficiency, but it also leads to better peak load management, savings from avoided generation of costly peak-load power plants, and defers investments in new power plants. As described in Box 4, increasing block rates charge a progressively higher tariff for higher consumption of electricity, assuring each consumer a low-cost source of power for essential needs while discouraging waste. Similarly, real-time or demand-response pricing give consumers hourly information about the cost of electricity, allow them to schedule usage during periods of low demand to pay cheaper rates and, therefore, signal consumers to reduce loads. Peak-time rebates can incentivize large consumers (such as hotels, office buildings, and industries) to use methods that reduce their load during peak hours or when the reliability of the grid is at stake. Load-reducing measures include the adoption of energy efficient appliances and/or thermal energy storage systems and household appliances, such as water heaters and air-conditioning systems that can be cycled on and off. Utilities could also levy surcharges on electricity tariffs that support energy efficiency measures. For example, a utility can collect a charge per kWh and use it exclusively to fund EE projects.

Supply-side improvements can also promote energy efficiency. Measures such as mandates for utilities to conduct power factor assessments[17] and maintaining infrastructure can help reduce transmission and distribution losses.

It is important to recognize that reducing electricity sales through energy efficiency measures can reduce revenues for utilities if their profits are linked to sales. Governments may also lose revenue if taxes on electricity use contribute significantly to their revenue stream. Disincentives such as these can be addressed through "decoupling" mechanisms—tariff structures or other measures that allow utilities and governments to recover foregone profits and taxes on reduced sales.

The tariff-setting process should quantify and clearly communicate the benefits of energy efficiency and demand-side management measures. This communication could serve two purposes: it could help consumers understand that energy efficiency and demand-side management can lead to lower tariffs in the long run, and it could allow increased transparency about whether the benefits of energy efficiency and demand-side management are being achieved.

Q8. Analysis Highlights—Tariff for Supporting Energy Efficiency, Demand-Side Management, Demand Response

LOOK FOR:

- Supply-side and demand-side tariff elements that support energy efficiency, demand-side management, and demand response
- Measures to decouple utility profits or government revenue as improvements in efficiency lower energy use
- Clearly quantified and explained costs and benefits of energy efficiency and demand-side management measures covered in the tariff

Additional Resources — Page

Q 9. HOW DOES THE TARIFF SUPPORT MARGINALIZED SECTORS OF SOCIETY AND BROADER NATIONAL GOALS?

Because electricity has become an essential service, it is important to consider the impact of tariffs on poor and remotely located residents, who spend a relatively large percentage of their income on electricity. Subsidies and cross-subsidies of consumed electricity are the most common forms of support and can include subsidies for free connections and "lifeline" amounts of electricity for very poor consumers as well as provision of off-grid goods and services such as solar lanterns.[18] Pakistan has adopted an inclining block tariff structure designed to protect lifeline consumers by minimizing per kWh user charges for residential consumers who utilize less than 50kWh of electricity per month (see Table 1). The "lifeline" tariff rate has been criticized, however, since a minimum charge for lifeline users has been implemented making the average cost of electricity for many lifeline users far higher than other users.[19] Periodic evaluations and reviews of lifeline tariffs are important to ensure that their intended benefits are being delivered and tariff objectives are being met.

Trade-offs between grid access and financial viability should be kept in mind. For example, while access to electricity in remote areas might be a priority, extending the grid could be weighed against cost-effective alternatives, such as providing off-grid electricity services or setting up a decentralized system. Where off-grid electricity services are offered, regulators can monitor and evaluate tariffs paid by off-grid consumers to ensure equitable tariffs are in place. Even so, the choice of option need not be dominated by short-term financial considerations.

The tariff determination process is important in achieving broader national goals, such as energy security, access to electricity, poverty alleviation, food security, delivery of basic health and education services, economic development, and environmental protection. The tariff determination process and tariff proposals should include clear analyses of the impacts of tariffs on sector objectives and national goals. For example, if achieving food security is a national development priority, then electricity tariff supports might favor the agricultural sector.

Table 1 | **Inclining Block Rate structure in Pakistan designed to protect lifeline consumers, March 2011**[20]

KWH/MONTH	CONSUMER TARIFF (RS/KWH)
Up to 50	1.87
0-100	4.45
101-300	6.73
301-700	10.65
Above 700	13.29

Q9. Analysis Highlights—Marginalized Sectors and National Goals

LOOK FOR:

- Analysis of adverse impacts of tariff determination on marginalized sectors
- Analysis of options and implementation of specific measures for supporting marginalized sectors
- Analysis of impacts on broader national goals (e.g. economic development, food security)

Additional Resources

Q10. WHAT ARE THE SUBSIDIES IN THE TARIFF?

The electricity sector is capital intensive and natural resources intensive. Several countries use preferential pricing (e.g., selective access to lower-cost resources) or overt subsidies to assist low-income groups to access electricity. Subsidies are sometimes offered to electricity generators to encourage them to deploy new technologies, and to energy-related sectors such as coal mining, water supply, and fuel transportation. Subsidies may also be offered to industries to encourage investment, and to farmers to promote food production. Further, many countries cross-subsidize electricity, whereby one group of consumers pays higher rates for electricity to cover or subsidize lower rates for other consumers. This could include lower tariffs for residential use by low-income or vulnerable residential consumers and higher tariffs on industrial or commercial consumers (see Box 6. Tariff Subsidies).

Subsidies are sometimes criticized for jeopardizing the financial viability of utilities, for being subject to capture by unintended groups, and for leading to inefficient use of natural resources. An example of a subsidy captured by an unintended group comes from India where subsidies were given to agricultural consumers to protect the interests of small farmers. However, since many smaller farmers did not have access to electric pumps or electricity services, these subsidies were captured by larger farmers who did not require them.[21] Poorly designed subsidies can also lead to the inefficient use of natural resources. In the Indian example, electricity subsidies exacerbated farmers' indiscriminate use of groundwater, speeding the depletion of aquifers. Moreover, poorly designed or implemented subsidies can have perverse effects. For example, cross-subsidies resulting in very high electricity tariffs for industrial users can lead those users to opt for alternative sources, such as captive power,[22] which could financially strain electric utilities, increase pollution, and diminish system reliability. In order to minimize negative effects of subsidies, and to ensure that the objectives of the subsidies are being met, periodic reviews of the subsidy, its benefits, beneficiaries, and outcomes is a crucial exercise to be completed by regulators.

A tariff determination process that provides a transparent view of subsidies and cross-subsidies is more likely to be aligned with the public interest. Periodic review and analysis of the outcomes of subsidy allocations can prompt measures to prevent perverse impacts. While evaluating the implementation of subsidies, groups can also consider issues of transparency and accountability.

Box 6 | Tariff Subsidies

Electricity Tariff Subsidies are policies that decrease energy prices or production costs through some form of unrequited value transfer to economic agents (individuals, firms, or other institutions; public or private). The financing of subsidies can take place in a number of ways, including explicit subsidies, implicit subsidies, and cross-subsidies.

Explicit subsidies are transfers from the government budget to the producer or consumer that is receiving the subsidy, and are transparently reflected in the budget.

Implicit subsidies occur where there is no immediate transfer from the government to the company to cover the shortfall in revenue caused by the presence of the subsidy.

Cross-subsidies are policies that reduce costs to particular types of customers or regions by increasing charges to other customers or regions.

Source: Bacon, R. et al. 2010. *Subsidies in the Energy Sector: An Overview.* World Bank Group Energy Sector Strategy.

Q10. Analysis Highlights—Subsidies and Cross-Subsidies

LOOK FOR:

- Transparency about various subsidies and cross-subsidies embedded in tariffs
- Periodic analysis and review of beneficiaries, benefits, and outcomes of subsidies
- Specific measures to prevent excessive perverse impacts of subsidies and cross-subsidies on different stakeholders

Additional Resources

SUMMARY TABLE

	QUESTIONS	ANALYSIS HIGHLIGHTS: WHAT TO LOOK FOR
Q1	What is the tariff determination process?	■ Clarity about institutional roles and the process of tariff determination ■ Opportunity for stakeholder comments and inputs into the tariff-setting process ■ Availability of appeals and consumer grievance-redress mechanisms
Q2	What are the objectives of the tariff determination?	■ Clearly defined objectives of tariff determination ■ Establishment of specific, measurable, achievable, realistic and time-bound (SMART) targets ■ Existence of specific mechanisms for monitoring and achieving objectives ■ Evaluation of long term impacts of tariff revisions
Q3	What is the tariff determination methodology?	■ Transparency about methodology of tariff determination ■ Assessment of strengths and weaknesses of the chosen method ■ Mitigation measures to overcome weaknesses of the chosen method for achieving objectives of tariff determination
Q4	How are the utility's costs considered in the tariff?	■ Availability of adequate and reliable information about different costs of utility ■ Transparency about taxes, surcharges, and other components that affect tariffs ■ Clarity about the nature of costs (i.e., whether they are controllable or uncontrollable by the utility)
Q5	How does the utility's performance affect the tariff?	■ Transparency of performance parameters presented by the utility (energy services, environmental and social impacts, finances, and operations) ■ Evaluation of impact of performance norms on overall tariff as well as tariff for different consumer categories ■ Assessment of potential improvement in performance norms ■ Clarity on performance norms and targets to be achieved by the utility

	QUESTIONS	ANALYSIS HIGHLIGHTS: WHAT TO LOOK FOR
Q6	How has the tariff structure been determined?	■ Clarity and simplicity of tariff structure ■ Tariff structure ensures accountability and adequate revenues for utility ■ Appropriateness of tariff structure to achieve tariff objectives
Q7	How does the tariff support renewable energy?	■ Supply-side and demand-side elements of tariff that support renewable energy ■ Transparency about cost impact of RE supportive tariff elements ▫ Overall ▫ By consumer category ▫ Availability of data that documents different cost impacts
Q8	How does the tariff support energy efficiency, demand-side management, and demand-response?	■ Supply-side and demand-side tariff elements that support energy efficiency, demand-side management, and demand response ■ Measures to decouple utility profits or government revenue as improvements in efficiency lower energy use ■ Clearly quantified and explained costs and benefits of energy efficiency and demand-side management measures covered in the tariff
Q9	How does the tariff support marginalized sectors of society and broader national goals?	■ Analysis of adverse impacts of tariff determination on marginalized sectors ■ Analysis of options and implementation of specific measures for supporting marginalized sectors ■ Analysis of impacts on broader national goals (e.g., economic development, food security)
Q10	What are the subsidies in the tariff?	■ Transparency about various subsidies and cross-subsidies embedded in tariffs ■ Periodic analysis and review of beneficiaries, benefits, and outcomes of subsidies ■ Specific measures to prevent excessive perverse impacts of subsidies and cross-subsidies on different stakeholders

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ABOUT EGI

The Electricity Governance Initiative (EGI) is a unique network of civil society organizations dedicated to promoting transparent, inclusive, and accountable decision making in the electricity sector. We facilitate collaboration of civil society, policymakers, regulators, and other electricity sector actors using a common framework to define "good governance."

Since 2003, we have worked with civil society organizations around the world to complete assessments of electricity governance in their respective countries, and to advocate for improvements in governance. More than 30 organizations around the world are now partners in the Initiative. The World Resources Institute serves as the global secretariat for EGI, with the Prayas, Energy Group (India) serving as our special knowledge partner.

ABOUT WRI

WRI is a global research organization that works closely with leaders to turn big ideas into action to sustain a healthy environment—the foundation of economic opportunity and human well-being.

ABOUT PRAYAS, ENERGY GROUP

Prayas is a nongovernmental, nonprofit organization based in Pune, India. Members of Prayas are professionals working to protect and promote the public interest in general, and interests of the disadvantaged sections of the society, in particular. Prayas, Energy Group (PEG) has been active since 1990 in the electricity sector. We believe that effective control and influence on governance by people and civil society organizations is the key to efficient governance that would protect and promote the public interest. Public interest issues include consumer issues as well as broad social issues. In consumer issues, PEG gives more attention to the issues affecting the poor and the disadvantaged. Social issues include environmental sustainability and equity. http://www.prayaspune.org/peg/

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