



# **A Pilot Project on Capacity Building on Electricity Reforms In Bangladesh, India and Nepal (RESA Project)**

TERRITORIAL TRAINING MANUAL  
ON  
POWER SECTOR REFORMS IN NEPAL

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# Chapter I

## Reforms and regulations of the electricity sector

### 1.1 Introduction

Electricity is considered as the most versatile and civilised form of energy. Its environment-friendly nature makes it the most preferred energy source at the consumer ends. It is used as a basic input in production process in agricultural, commercial and industrial sectors. Therefore, it invites wide attention on part of all sections of society for un-interrupted service delivery at affordable prices.

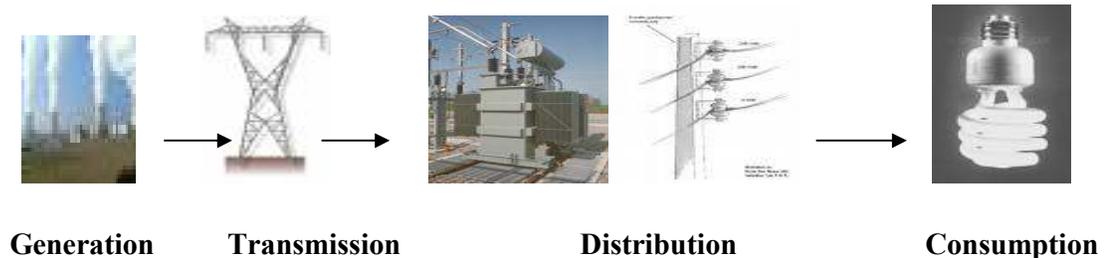
It is one of the important factors responsible for economic shape of a country. Low availability of electricity adversely affects the economic as well social development of a country. Recognising its importance, various international agencies such as United Nations Development Programme (UNDP) has given due weight to *per capita electricity consumption* in concluding *Human Development Reports (HDR)*. Therefore, most of the nations have started to pay due attentions to increase the availability of electricity. In this process, they have taken reforms initiatives in the power sector. Before going into discussion on reforms, it is desirable to introduce some of the important characteristics of electricity supply that isolate it from other services/industries.

### 1.2. Electricity supply industry

There are three distinct features of the electricity in comparison to other services that requires the policy makers, regulators, producers as well as consumers to treat it in a different way. These are:-

*i. Continuous network requirement:* It requires that production as well consumption points are continuously connected. From production to consumption points, on the industry side there are three activities-generation, transmission and distribution.

**Figure 1: Flow of electricity from generation point to consumption point**



*ii. Non-storable output:* another important feature is non-storability of output. It is not feasible to store the output at large scale. Suppliers are required to match the supply to the demand at the very point of time. At the same time, if consumption does not take place at very moment, electricity cannot be stored for future use. There are other industries such as telecommunications (wire lines), water and gas-pipelines requiring a network for supply of service where non-storability is not an issue in planning the service as in case of electricity.

*iii. Changing demands:* The demand for electricity never (hardly) remains constant. It varies across the different months of year and hours of a day. There are well-defined

reasons/justifications for these (wide) variations in demand. For example, in a typical city, the demand for electricity for lighting and heating/cooling is expected to be higher in the evening hours. Like this, the demand in the summer or winter months is likely to be higher than the normal months of a year. These variations in the demand impose a challenge on the suppliers to make appropriate adjustment on the supply side to match the supply with demand.

All the above stated characteristics provides strong basis to consider the electricity supply industry as a natural monopoly. Consequently, in most of the countries of the world, it was designed in a monopolistic structure. There are certain advantages of keeping the industry under monopoly.

### **1.3. Economies of scale and scope**

It is possible to exploit the economics of scale and scope. Economies of scale are resulted from larger volume of output or size of the plants/firm. It is because of certain fixed costs inherent in the production process. Producing in larger amount, per unit cost, especially the fixed component, would be reduced. For example, the cost of installing Pollution Control Equipment is Rs 10,000 per year. The cost of pollution control is Rs 2.00 for a firm producing 5000 units per year. If the firm is able to produce 10, 000 units in a year, this part of the cost must be Rs 1.00. Similar justification may be given for other fixed costs such as lump sump tax, insurance, safety equipments, vehicles, management and regulatory cost. Even in the current scenario, the economics of scale are highly relevant. In case of India, where Ultra Mega Power Plants (UMPP) each having a size of 4000 MW are being installed to exploit the economics of scale.

Economies of Scale results when two or more associated economic activities are completed under a single operational system. For example, if shoe-making companies also produce raw lather within it instead of purchasing it from outside. There are certain advantages that result from this vertical integration.

Historically, most of the utilities were designed in an integrated system to reap out the benefited resulted from economics of scale and scope. For example, in India, State Electricity Boards (SEBs) were created in an integrated system combining three major functions-generation, transmission and distribution at the state level. However, in the recent time most of the integrated utilities have been unbundled all over the world. It has been assumed that it will facilitate competition in the sectors. The most common model of reforms in electricity sector includes establishment of electricity regulatory agency, unbundling and privatisation of the generation, transmission and distribution business.

### **1.4. Production and consumption of electricity in Nepal**

Nepal, endowed with a hydropower generation potential of 83,000 Mega Watts (MW) and a commercially viable capacity of 42,000 MW, presently exploits a mere 0.67 per cent (i.e., 556.4 MW). Electricity is also generated from thermal power plants and solar plants, which presently produce 55.028 MW and 100 KW, respectively. This takes the total electricity generation in Nepal to 611 MW. All 75 districts have access to electricity facility. The number of customers of the Nepal Electricity Authority (NEA), the state-owned utility that generates, transmits and distributes about 98 per cent of the public power supply in Nepal, reached 1.39 million in 2006/07, an almost 9 per cent increase over the previous year. Only 45 per cent of Nepali households have access to electricity.

Energy consumption by source in Nepal can be divided into three categories: traditional, commercial and renewable. According to the *Economic Survey 2006/07*, the traditional source meets the bulk of total energy consumption with an 85.5 per cent share, followed by commercial and renewable energy sources at 13.54 per cent and 0.61 per cent, respectively. Fuel wood, agriculture residue and animal residue provide 88.68 per cent, 4.85 per cent and 6.47 per cent of the total traditional energy consumption, respectively. As far as consumption of commercial energy is concerned, petroleum products have a predominant share (58.54 per cent), followed by coal (22.74 per cent) and electricity (18.81 per cent). This shows high dependence of the Nepali economy on traditional sources of energy, with electricity consumption at a minimum level.

### **1.5. Regulatory framework**

The Department of Electricity Development (DoED) under the Ministry of Water Resources regulates the electricity sector. It also facilitates and promotes private sector involvement in power development. In addition, it provides technical support for developing power plants. The Electricity Tariff Fixation Commission reviews and approves retail electricity tariff structures. The Nepal Electricity Authority (NEA), a government-owned and controlled utility, dominates Nepal's electricity sector. NEA is the sole actor in transmission, distributes about 99 per cent and generates about 75 per cent of the public power supply in Nepal. There are also 38 private sector independent power producers (IPPs) that generate about 25 per cent and distributes about one per cent of Nepal's public power supply.

### **1.6. Electricity reforms**

Nepal's power sector is undergoing reforms through different policy and legal measures. The reform process in Nepal started from 1992 when a newly elected democratic government paved the way for the private sector's entry into electricity generation, transmission and distribution. The Government introduced policy instruments such as the Hydropower Development Policy, 1992 and legislation such as the Electricity Act, 1992 and the Water Resources Act, 1992.

The widely sought reform process was accelerated by the introduction of the Hydropower Development Policy, 2001, replacing the one dating from 1992. The policy envisions, *inter alia*, the restructuring of the power sector through the establishment of a regulatory commission which would regulate the purchase and supply of power, oversee tariff rationalisation, and issue and approve licences. The policy has paved the way for the promotion of competitiveness and efficiency in the electricity sector through environmentally sound power sector development.

However, despite these reform initiatives, Nepal's power sector lacks effective competition. This is basically due to low level of private sector participation. Factors like lack of conducive environment owing to the prolonged political instability and the conflicting motives among political actors are impeding private sector participation in the sector. Inconsistencies in legal and regulatory frameworks coupled with the lack of transparency and accountability in the licensing process cause difficulties for the private sector. The transparency of buy-back rates for hydropower projects and inadequate transmission and distribution networks make the sector non-lucrative for the private sector. Hence, the legal and technical monopoly of NEA continues although the ability of NEA to supply adequate and cost-effective electricity has long been questioned.

Against this backdrop, Nepal's power sector is in dire need of effective reforms. Reforms are needed basically to:

- establish a strong, independent and well-resourced regulatory framework
- create market structures and rules supporting the emergence of efficient wholesale and retail markets
- create a conducive environment for timely and efficient new investment
- attract more generating and distributing companies
- put an end to the legal and technical monopoly of NEA
- safeguard consumer rights by including consumers in the regulatory mechanism
- facilitate competition.

The need for a strong and well-resourced regulatory mechanism has been stressed to improve Nepal's underdeveloped power sector. Such a regulatory body is sought to:

- coordinate and integrate the production, transmission and distribution functions while checking the prevailing malpractices
- formulate policies and set out priorities to balance the demand for and supply of electricity in the domestic market
- regulate the electricity tariff rate and reduce it through competitive market practices
- make electricity supply reliable, of good quality, safe and accessible to all.

### **1.7. Regulatory commission proposed by Hydropower Development Policy**

The Hydropower Development Policy, 2001 identified the following institutions responsible for regulating the power sector in Nepal:

- Electricity Tariff Fixation Commission to act as the apex regulatory body with a wider authority
- Water and Energy Commission to be responsible for load forecasting, system planning, and preliminary study of projects
- Energy Management Institution to be responsible for training and research in the fields of management, technical, and environmental issues related to electricity
- Department of Electricity Development assigned with the functions of issuing licences on a competitive basis, providing services conveniently to attract private sector development of hydropower and undertaking hydropower project feasibility studies and studies of multi-purpose projects.

The institutional set-up for regulating the Nepali power sector as envisioned by the Hydropower Development Policy, 2001 is yet to materialise. The policy shares the fate

of most of the policies of the country. All the policies spelt out are rarely fully implemented and even implemented policies do not command full-fledged commitment from the side of the government. Whatever the policy calls for, with the change in governments, ruling parties attempt to push their own policies. Stiff resistance by NEA to any attempts at power sector reforms, including unbundling it, is also hindering tangible reforms in the power sector as envisioned by the hydropower policy.

The National Electricity Regulatory Commission Establishment and Management Bill has a provision for the establishment of a strong and autonomous commission for the overall regulation of the electricity sector. The commission shall be responsible for the regulation and monitoring of technical management, fixation of price and tariff competition, and consumer rights protection. The commission shall also be responsible for monitoring the licences and for the enhancement of their organizational capabilities. The commission is also vested with the right to settle the disputes related to the electricity sector.

### **1.8. Likely benefit to a common consumer**

Electricity is a little talked-about issue among civil society organisations, academia and the general public in Nepal. People at large do not pay much attention to electricity sector reform and they have had little or no involvement in it. The only issue in the electricity sector that draws public attention is that of persistent load shedding. Consumer rights related to the electricity sector are almost non-recognised in Nepal.

The organisational structure at the policy-making level indicates little consumer participation. Of the six members of the Electricity Tariff Fixation Commission, one is supposed to be a consumer representative. However, a consumer representative is rarely nominated. Devoid of officials, the commission itself is non-functional at present. Likewise, although the Board of Directors of NEA has four independent members, they are not consumer representatives per se. Policy making in the electricity sector is a top-down process, with government taking all the decisions, seldom seeking inputs from consumers.

The universal principle of the rule of law states that it is the right of an individual to participate in the formulation of laws that affect him/her. The following basic consumer rights included in the United Nations guidelines for consumer protection, adopted by the UN General Assembly in April 1985, and updated in 1999 are particularly important in protecting the rights of the consumers:

#### *i. The right to be informed*

This right stresses for giving facts needed to make an informed choice, and to be protected against dishonest or misleading advertising or labelling. Consumers in Nepal frequently face power cut without prior notice.

#### *ii. The right to choose*

Given that the NEA exists as the sole provider of electricity in Nepal, consumers can not make use of this right which furnishes consumers to be able to select from a range of products and services, offered at competitive prices with an assurance of satisfactory quality.

#### *iii. The right to be heard*

This right to have consumer interests represented in the making and execution of government policy, and in the development of products and services is also not

implemented in Nepal's case despite the legal provisions for making consumers entertain this right.

*iv. The right to redress*

This right that furnishes consumers receive a fair settlement of just claims, including compensation for misrepresentation, shoddy goods or unsatisfactory services is also in dismal state in Nepal including the electricity sector.

*v. The right to consumer education*

This right envisions consumers to acquire knowledge and skills needed to make informed, confident choices about goods and services while being aware of basic consumer rights and responsibilities and how to act on them. However, consumer education is seldom provided in Nepal. Electricity sector is no exception.

In addition, Nepal's Consumer Protection Act does not explicitly define consumers' rights regarding electricity service. However, it does provide for quality control and checking improper practices in the service sector in general.

Consumer involvement is indispensable for ensuring good governance and checks and balances in the system. The survey shows that the level of consumer awareness is abysmal and they have little or no participation in the decision-making process.

Nepal's power sector is characterised by lack of transparency in power purchase agreements and fixing of tariff rates, political interference in the awarding of licences, imposition of conditions by donors, rampant corruption, and resistance by NEA to reforms, including its unbundling. As a result, electricity consumers face a wide range of problems, including high tariffs, power theft, inadequacy and poor quality of power supply. In the absence of an effective regulatory mechanism as well as due to acute lack of consumer awareness and their absence in the decision-making process, these problems persist. Hence, there is a huge scope for consumer participation in regulatory decision-making which can ensure improvement in quality of service and reduction in electricity costs.

## Chapter II

### Decision-making process

#### 2.1. Background

In Nepal, power utility is operated under government ownership and control. The Nepal Electricity Authority (NEA), a government-owned and controlled utility, dominates Nepal's electricity sector. Apart from the policy decisions, day-to-day operational matters of NEA are influenced by the government. It has resulted the inefficient and unprofessional decision-making process. Most of the decisions taken on key issues such as tariff, subsidy, investment, and recruitments are politically motivated. This has resulted into poor commercial outlook of the sector and unsatisfactory quality of service.

Three institutions—the Department of Electricity Development, the Electricity Tariff Fixation Commission and NEA—are involved in making important decisions in Nepal's electricity sector. The Department of Electricity Development, under the Ministry of Water Resources, stands out as the major regulatory body in that it issues licences to power projects. *Its decision-making process lacks consumer participation.* As regards the Electricity Tariff Fixation Commission, a consumer representative is rarely nominated to the commission despite a provision for it. Similarly, although the Board of Directors of NEA has four independent members, none of them are consumer representatives per se. This shows that consumer consultation in the decision-making process is almost non-existent. During the process of formulation of the laws that govern Nepal's power sector, a limited effort is put on for public debate on the purposed law. However, the trend of more rigorous public debate is increasing recently.

#### 2.2. Requirements of a good decision-making process

One of the main objectives of creating independent regulatory bodies is to insulate the decisions-making process from political interference. The decisions should be taken in a transparent manner by professional body rather than political parties.

There are three basic requirements of a good process:

- Transparency
- Accountability
- Public Participation

A decision making process is said to be transparent when it is open for all stakeholders. The process to be followed should be pre-defined. For example, in India all ERCs have issued Conduct of Business Regulation (CBR) to ensure transparency in the decision-making process. How Commission will conduct public hearings and who will participate in the hearings, have been specified in the CBR.

A good decision making process also demands regulators accountable to their decisions. If any of the stakeholders/involved parties is aggrieved by the decisions, law should allow

them to challenge the decisions before the higher authority such as appellate authority or court of law. In Indian case, Appellate Tribunal for Electricity has been constituted to hear the appeals against the decisions of ERCs. Further, ERC are held accountable to the

Act as well as National Electricity Policy 2005. ERCs are guided by certain policy guidelines in the process of making decisions.

Public participation is a very important issue especially when decision-making authority is an independent agency. Law should make it mandatory for the regulatory bodies to listen consumer views before passing the decision. Effective public participation also helps regulators in passing fair decision. At the same time, it ensures protection of consumer interest. Unless consumers participate adequately in the process, their interest is unprotected in the sector. In India, following general process is followed by various ERC during a decision-making process.

**Step I: Preparation of the draft proposal-** a draft proposal on important issues such as Annual Revenue Requirement (ARR), tariff application, quality of service standards etc. is prepared by respective electricity utilities.

**Step II: Submission of the proposal-** proposal draft is submitted to the regulatory commission before the due date. For example in case of ARR or tariff application, it is filed to the regulatory authority 3 to 4 months before the starting of financial year. It is required to ensure that decision is passed before the start of new financial year.

**Step III: Issuance of public notice-** public notice giving salient features of the proposal are published in newspaper inviting public comments. The information about the relevant documents with respective prices if any is also given.

**Step IV: Response to the public comments-** the respective licensee/company is required to respond to the comments received on behalf of consumers/stakeholders.

**Step V: Public hearings-** the respective regulatory commission conducts public hearing. Consumers are allowed to participate in the open house discussion. Apart from the stakeholders who have submitted written comments, other also may participate in the hearings.

**Step VI: Decision on the proposal-** the commission takes into account views of all stakeholders while processing the decision. Sometime, an interim order is issues to seek further comments/views of the stakeholders in order to make the decision more acceptable.

As shown in the diagram, consumers have important role to play in the decision-making process. They act as a watchdog on the regulatory institutions as well as utilities.

### **2.3. Consumer-friendly provisions in proposed electricity law**

The proposed electricity law has a number of consumer-friendly provisions. The regulatory body, while issuing licence, is obliged to ask local stakeholders to submit in writing their concerns regarding the likely impacts of generation, transmission or distribution of electricity. There are also provisions for compensation for and rehabilitation of people whose land is used for power generation, transmission or distribution. The proposed law delegates the responsibility of operation and maintenance of the generation plants to local cooperative organisations in areas not connected to the national grid.

**Please insert the diagram**

## **Chapter III**

### **Electricity tariff some issues**

#### **3.1. Introduction**

Tariff is a schedule of prices for various consumer categories. Electricity supply like other commodities/services incurs certain cost on the supplier. This cost must be recovered from the beneficiaries to sustain the supply in future.

The decision on tariff is a complex issue. It requires the regulator to make a balance among various interests conflicting in nature. Tariff results as a 'cost' for end-users, therefore, consumers seek for a lower tariff. Higher tariff may result into loss of consumer welfare. On the other, un-reasonably lower tariff may leave the supplier with deficit revenue and lead to poor quality of service. However there are certain principles/objectives that need to be followed while determining tariff for end users.

*Principle of Economic Efficiency:* Economic efficiency implies that the cost of supply is minimum given the level of technology. Tariff should be a signal to utilities forcing them to ensure economic efficiency in the sector. No cost of inefficiency on part of the supplier should be imposed on the consumer.

*Principle of Adequacy:* Approved tariff should be adequate in order to recover all reasonable cost of production. All expenses on part of power purchase, manpower, operation & maintenance, depreciation, acceptable energy losses and reasonable return should be met out of the tariff. If tariff approved is too low, it would not only affect the present financial performance of the company but also hurt level of future investment in the sector.

*Principle of Economy:* Energy is a scarce economic resource. On the consumption side, it should be utilised in a most efficient manner. Tariff should also be a signal for the consumer for making efficient use. It will help in saving energy and further reducing the cost of supply. It requires progressive tariff structure i.e. higher tariff for higher amount of consumption.

*Principle of Affordability:* Affordability implies that existing tariff is not acting as a barrier in fulfilling the basic human needs such as lighting, cooling etc. If certain class of consumers is unable to attain the minimum required consumption at the existing price, some concession in the tariff is desirable. It may be done by cross-subsidy or direct subsidy by the government. Cross-subsidy is the relief given in tariff to one consumer category by generating surplus from other categories. But again, it requires proper identification of the target beneficiaries to avoid misuse of subsidy and cross-subsidy.

#### **3.2. Methods of tariff regulation**

In order to follow these principles of tariff, there are various methods available for the consideration of the regulators. Each of the methods has its advantages and disadvantages. Selection of appropriate method depends upon the socio-economic characteristics and degree of competition existing in the sector. There are three most popular methods/approaches used by different regulatory agencies across the world.

- Cost Plus
- Price Cap
- Performance Based Regulation

*Cost Plus:* This is also termed as Rate of Return (ROR) method. It allows companies to earn a reasonable rate of return on the investment after meeting all other expenses. All cost items are segregated and discussed. On the basis of information available for the last two/three year, cost is approved. Under this method, the licensees are also entitled to make a claim for the unforeseen expenses such as fuel surcharge adjustment etc for the past years. The simple formula used for approving tariff using cost plus method is given below.

$$RR = PPC+E+D+T+(B \times r)$$

Where

RR: Revenue requirement of the utility

PPC: Cost of Power Purchase

E: Operating expenses. Cost of items such as labour (Employees), fuel, repair and maintenance (not used for construction work) etc.

D: Annual depreciation expenses.

T: Taxes payable to the Government.

B: Rate Base, the amount of capital invested in the business

r: Allowed or reasonable rate of return.

*Price Cap:* Under Price Cap regulation, on the basis of historical cost and future efficiency gains, a ceiling price is fixed by the regulator. While approving tariff, no segregation of cost takes place openly. Regulator approve tariff taking into account the general price level and future efficiency gains.

*Performance Based Regulation (PBR):* Under PBR approach, tariff is linked with the performance of the utility. For example if a utility is able to reduce more T&D losses, it may be allowed to earn more return on the capital base. On the other hand, if the distribution has not showed improved poor performance, it may result into no return or negative rate of return.

As stated, the selection of the appropriate method depends upon a number of parameters such as availability of adequate and reliable information, responsiveness of market, degree of competitiveness and other socio-economic factors.

### **3.3 Components of tariff**

The total cost of supply may be segregated into various cost components. Whatsoever method the respective tariff-setting authority uses, calculation of tariff is an important exercise in order to assess the financial performance of the utilities. In the detailed tariff regulation such as rate of return as in case of India, each of the components is explicitly scrutinised by the respective regulatory body. Various stakeholders are invited to make comments on the various cost components. While in case of price cap regulation, detailed cost examination is an internal exercise. The major components of tariff (in case of unbundled utilities) are discussed below.

**Table 1: Cost components of a generation company**

Fuel cost	Depending upon the type of plants such as thermal, nuclear hydro etc. fuel is required. In thermal and nuclear power plants, it is a major cost item. In case of Hydropower plants, it is almost negligible.
Transportation cost	It is mainly the cost incurred in transporting fuel to plants. It may also be a major component if the plant is not located near to pit heads/source of fuel.
Employee cost	This is the cost on account of salaries and other benefits payable to the employees engaged in the Generation business.
Repair and maintenance cost	This is a cost on part of the accidental and routine repair & maintenance of the plants.
Depreciation cost	It is an item for the wear and tear of capital. In other words, it is the cost of one time investment made in the business. Total investment should be recovered during the useful time of the asset.
Pollution control expenses	All thermal power plants are required to install pollution control equipments for the safety of citizens.
Taxes	Any tax, especially in case of private power plants imposed by the government
Return on capital	It is surplus over the expenses. A minimum rate of return is necessary to attract the required capital in the sector.

In case of a transmission company, depreciation, salary of employees, repair & maintenance, metering etc. are major cost items. During the transmission, some energy is lost. The cost on account of the lost is called as transmission losses. For the purpose of a distribution company the generation cost and transmission cost becomes power purchase cost (PPC). In distribution company point of view, PPC is an external cost component because it has no control to reduce this cost. However, if adequate energy is available, a distribution company can ensure merit order purchase. This move may force the high-cost companies to reduce the cost of generation. However, given the shortage of power and existence of long-term agreements between distribution and generation companies, it is not taking place in most of the countries including Nepal.

**Table 2: Cost Components of a distribution company**

Power purchase cost	It is the cost on account on energy purchased from all sources including thermal, hydro and nuclear power plants or imported from other regions/sources
Transmission cost or wheeling charges	The distribution commission has to pay the wheeling charges to the transmission company(s).
Employee cost	This is the cost on account of salaries and other benefits payable to the employees engaged in the distribution business.
Repair and maintenance cost	This is the cost on part of the accidental and routine repair of the distribution lines, transformers etc.
Depreciation cost	It is an item for the wear and tear of capital. In other words it is the cost of one time investment made in the business. Total investment should be recovered during the useful time of the asset.
Energy losses	It is a major cost item for most of the electricity utilities. Theft of power, underestimation of consumption, technical losses (not very much) etc constitute energy losses.

Taxes	Any tax especially in case of private licensee, imposed by the government
Return on capital	It is surplus over the expenses. A minimum rate of return is necessary to attract the required capital in the distribution business.

After examining the various cost components, the total cost of supply, in other words annual revenue requirement, is calculated by the Regulatory authority. Then, the regulatory body is required to fix the tariff on the basis of cost of supply. However, there are some other socio-economic factors such as paying capacity of the consumers that need to be taken into account by the regulatory bodies.

#### **3.4. Single or two-part energy tariff for consumer**

Earlier, most of the electricity utilities used to charge the consumers only on the basis of energy consumption. It is termed as a single part tariff. However, for the efficient use of electricity, two parts electricity tariff at consumer ends is advocated. In the two part tariff, there are two components of tariff- i) capacity charges and ii) energy charges.

Capacity charges are justified on account of network capacity (also generation capacity if the utility is integrated) dedicated to the consumer. Generally, these charges are positively proportionate to the maximum demand or the connected load of the consumer. While energy charges vary according to the energy consumption.

#### **3.5. Nepal's case**

Although Electricity Tariff Fixation Commission (ETFC) has been formed only to oversee the retail tariff, its rights and authorities to act as a true regulator are limited in the ETFC Rules; it has no jurisdiction for the judgment of generation tariff, which are being negotiated through long term PPAs with NEA itself. The commission is non-functional at present. It follows ROR method to fix the tariff rates for the consumers.

## **Chapter IV**

### **Quality of service (QOS): standards and compliance**

#### **4.1. Background**

Tariff and Quality of Service (QOS) are two very important issues affecting the consumer interest. Electricity reform acts enforced in various countries envisage improved QOS standards. Regulatory bodies frame the regulation/code of conduct for the standard of performance. Consumers/CSOs are expected to present their views on the proposed regulations based on upon their experience and knowledge.

On behalf of utilities, adequate information should be made available so that consumers are well aware of the process and procedures. Unfortunately, the quality of consumer services in Nepal is always a debated issue. The consumer survey concluded under this (RESA) project clearly reveals this fact.

#### **4.2. Important issues in quality of service**

##### ***4.2.1. Procedure for making new connections***

The procedure for getting new connection should be simple and consumer-friendly. New connections should be issued in a transparent manner. At the time of submission of application, consumer should be informed about the process and time to be taken in getting the service.

In many cases, it has been observed that no reliable information is provided to the consumers about the process and charges payable for getting new connection. As a result consumers get lots of harassments.

##### ***4.2.2. Metering and billing***

Proper metering and billing of electricity consumption is very important issue affecting the consumer interest at large. Electricity distribution companies should ensure that consumption is estimated with 100 per cent accuracy and consumers are satisfied with the metering and billing process.

The Electricity bills should contain adequate information to understand the bill amount. All the details should be provided in a transparent manner. Difficulties faced by the consumers while making payment of electricity dues are also important problems of consumers. These include;

- Inadequate time available to consumers for making payments
- The payment counters opened just for few hours
- Long queues at the payment counters
- Un-attended of consumer complaint regarding bill correction

##### ***4.2.3. Disconnection and restoration of electricity supply***

Statues authorize the distribution companies to disconnect the connection of a consumer in case of non-payment of electricity bills. But in certain cases it was reported that dues are pending because of the following reasons:

- Consumer was not satisfied with the reading of the electricity meter
- Utility had send a bill that was due for a long time but consumer was not aware of the same

- Dues were pending towards the previous occupant of the house/premise
- Consumers did not receive (current) bill within the stipulated time period, thus it is lying pending

It has been reported that it is very difficult for the consumers to reconnect to the system. A utility also takes restoration charges in addition to the payment of pending dues towards consumer. It is suggested that procedure for re-connection should be made simple and transparent.

#### ***4.2.4. Quality of service monitoring***

Supplying power with continuity and within acceptable voltage limits are main issues concerned with quality of service. It has been reported that consumers suffer from poor quality of service including frequent interruptions, load shedding and low voltage etc. As a result consumers have to make additional investment to ensure uninterrupted power supply and safety of the equipment.

Given the development in the technology, consumer groups/CSOs may keep a check on the quality of service supplied by utility. For example, PRAYAS, a Pune based NGO has initiated the process to monitor the quality of service in the certain areas of Pune City (Maharashtra), India. To take similar initiatives in other areas, consumers should have an access to resources and aware of the technology/process. With the support of distribution companies as well as regulatory bodies, it is possible to empower the consumers with these tools.

#### ***4.2.5. Redressal of consumer complaints***

Redressal of consumer complaints is an important issue. It is duty of the distribution company to take proper and timely action in order to resolve the complaint registered by a consumer. Regulatory bodies are also in process to frame guidelines on the proper redressal of consumer complaints. In this process, CSOs may play important role in helping the regulatory bodies to make the effective regulations on this important issue. However, it requires the CSOs as well as consumers to be well aware of the process and take appropriate actions on behalf of the consumers.

### **4.3. Nepal's case**

At the central level, NEA has a Public Relation and Grievance Handling Department led by the managing director. Besides, NEA has technical, administrative and financial sections as the basic structure in each of its offices in 75 districts. As most of the complaints are in the nature of short circuits, voltage fluctuations and the like, the technical section handles most of the consumers' complaints while complaints of non-technical nature are handled by the administrative section.

The baseline survey shows that lengthy power cuts have been cited as the most pressing consumer problem with 96 per cent of the consumers mentioning it as their major problem. Power theft, cited by 94 per cent, is seen as another major problem for the consumers. For 89 per cent of consumers, the poor quality of supply with frequent voltage fluctuations from the required norms is identified as another major problem. Likewise, 87 per cent of the consumers perceive that the tariff they are paying is too high.

Among the respondents, 69 per cent consider poor metering and billing as another major problem. Three per cent of the consumers also cite problems like lack of safety from

electricity- induced hazards, low rate of electrification, high deposit amount, and high minimum unit ceiling.

Despite so many problems, it is found that only 12 per cent of the consumers have ever registered any complaint. This implies that 88 per cent have never opted for filing any complaint. Regarding why they have not registered any complaint, 55 per cent cite lack of hope of getting their complaint redressed, 22 per cent cite the time involved in registering a complaint and following up on it while 7 per cent give some other reasons. Surprisingly, 34 per cent perceive that there is no reason for registering complaints.

## **Chapter V**

### **Responsibility on part of the consumers**

#### **5.1. Role of consumers**

Consumers have very important role to play in the electricity reforms process. Apart from participating in the decision-making process, they can help the government as well as utilities in reducing the requirement for additional energy. Broadly, their role may be classified into following three areas:

##### **i. Policy and regulatory process**

Consumer participation in policy and regulatory process makes it more transparent and accountable. Unless active participation on behalf of the consumers/CSOs is ensured, consumer interested remains unprotected. Therefore, the consumers should actively participate in the process. Some important areas for consumer participation include:

- Comments on the draft/proposed electricity law (s)
- Views on the draft electricity policy
- Interventions during the regulatory decision-making process
- Feedback on the utility's performance

##### **ii. Reduction of energy losses**

A high T&D loss is one of the major problems in power sector in many countries for both consumers as well utilities. As a result of high losses, honest (paying) consumers suffer from the shortage of power and poor quality of service. On the other, utilities lose substantial part of their revenue that further results into low investment and inadequate infrastructure. High T&D loss is a problem related to consumers, as theft of power constitutes a significant portion of these losses. Apart from being honest, they should educate other consumers. They should inform the utilities about the sites where theft is taking place. They should discourage all unfair mean such as tempering with lines/meter etc. By doing this, they are reducing the cost of supply and finally tariff payable. It is because; ultimately it is the consumer who has to pay for these high losses.

As the baseline survey reveals, electricity theft exists in most of the parts of the country. A legislative step was undertaken by the government in 2001 by enacting the Electricity Theft Control Act followed by the regulation in 2002. There is, however, no evidence of any punishment to ones indulged in the power theft. Local consumers, with mutual unity, carry on the malpractice and resist any intervention from the NEA. At times, NEA is found helpless to curb the power theft. It should take bold steps in line with the Electricity Theft Control regulation in order to minimise the energy loss.

##### **iii. Energy conservation**

Nepal is facing problem of inadequate power supply. Citizens have to remain without power for long hours. There are two ways to deal with this problem. One is to increase the generation capacity. The other one is to reduce the demand by promoting energy saving schemes. The second option will not only help in reducing the cost of supply but also contribute to the sustainable environment.

Consumers can have significant contribution in saving energy. In all segments of the economy-household, industry, business, agriculture etc, there is huge scope for energy saving. Saving energy is more important than producing energy in order to tackle the

problem of shortage. In a county like Nepal with significant T&D loss energy conservation can help in a great deal to meet the energy deficiency.

The first step in this regard is to make the consumer aware. Unless a consumer is aware and prepared to save energy, no better outcome is expected. The following are some suggested measures that may help consumer to save energy.

- **Designing a house/building**

In an economy, significant amount of energy is utilised for lighting, cooling and heating purposes. The design engineering of the building is a major determinant for electricity consumption. More the energy-inefficient design of the building, more the consumption of power. While designing a building, demand for energy should be reduced. Sun and air as natural sources available to us, should be utilised fully as far as possible.

- **Use of energy efficient equipment**

Apart from the purpose of use, energy consumption also depends upon the efficiency/quality of the electrical equipment. Same purpose may be fulfilled by consuming less amount of energy. For example, if we use a Compact Fluorescent Lamp (CFL) instead of an ordinary bulb, it can save energy about 75% and reduce the electricity bill in the same order. Same thing applies to the energy efficient motors, coolers, and refrigerator, AC etc.

The list of energy efficient equipment is available with the government agencies engaged in rating of equipment. For example in India, Bureau of Energy Efficiency (BEE) has made it mandatory for the manufacturers to get their products rated. It makes possible for the consumers to compare different products. Every product has been labelled from one star (\*) to five Stars. More stars mean more energy efficient equipment.

It may be noted that initial cost of equipment having more stars may be slightly higher than one having lesser stars. However, during the lifetime of equipment, consumer saves lot of money since operation cost of more efficient equipment is very low. This message needs to be conveyed to consumers.

- **Stop wastage**

Electricity is a very scarce economic resource. Consumer should make its optimal use. Electricity appliance should be switched off when not in use. Wastage of energy is very common in households as well as in government offices. A consumer has to pay even for the wasteful consumption; wastage is a net social cost.

# Annexure

## Simulation Exercises

**Day 1: Sunday, 21 September 2008**

**Session 3:** Understanding Electricity Consumption and Bill

**Resource Person:** Guna Raj Bhatta

### Simulation exercise I

How to read the consumption reported by electricity metre?

Please refer to the sample bill and prepare the bill for the month of Bhadra on the basis of the given bill.

### Simulation exercise II

Given table shows the total number of lightening devices along with their capacity, energy consumption and duration of their daily use in a certain office. On the basis of this table, please answer the questions given below:

Name of the Equipment	Number	Average running hours	Daily Consumption (Kwh)	Monthly Consumption (Kwh)	Total Expenditure (Rs.)	Name of the Equipment
Tube light (40 W)	4	6				
Bulb (100 W)	3	3				
Bulb (60 W)	4	5				
Fan (50 W)	6	15				
Air Conditioner (2000 W)	1	3				
Iron (2000 W)	1	1				
Geysers (2000 W)	1	1				
Total						

Completing the table, calculate the total amount that the office pays.

Note: Electricity tariff is Rs 7.50/unit

## **Day 2: Monday, 22 September 2008**

**Session 6:** Complaint redressal mechanism

**Resource Person:** Jyoti Baniya

### **Simulation exercise I**

What changes do you suggest in the existing complaint redressal mechanism and what changes are necessary in the application form for making new connection?

### **Simulation exercise II**

What changes are important on the given Electricity development and management bill so as to make it more consumer-friendly? Discuss and elaborate.

## **Day 3: Tuesday, 23 September 2008**

**Session 8:** Quality of service

**Resource Person:** Guna Raj Bhatta

Group discussion and presentation on the important issues on quality of electricity service.

Please list the problems that the electricity consumers of your locality face and suggest the possible solutions for the same.

## **Day 3: Tuesday, 23 September 2008**

**Session 9:** Tariff determination process

**Resource Person:** Dilli Prasad Ghimire

### **Simulation exercise I**

Sugagaon VDC in a rural area has a total of 600 households. NEA will give the electricity to your local cooperative distributor at the wholesale rate of Rs 3.50/unit. The technical loss at the place is 12 per cent. Analyse the tariff rate determination and its breakeven point while making the distribution plans. Please note that 50 per cent consumers at the place consume less than 20 units of electricity.

### **Simulation exercise II**

Sugagaon VDC in a rural area has a total of 300 households. NEA will give the electricity to your local cooperative distributor at the wholesale rate of Rs 3.50/unit. The technical loss at the place is 12 per cent. Analyse the tariff rate determination and its breakeven point while making the distribution plans. Please note that 50 per cent consumers at the place consume less than 20 units of electricity.

### Day 3: Tuesday, 23 September 2008

Session 10: Tariff Regulation: Key issues

Resource Person: Jyoti Baniya

#### Simulation exercise I

Lamjung Community Consumer Society:

#### Energy sale and energy purchased (Monthly basis)

1	2	3	4	5
Month	Energy Purchased (MU)	Energy Sales (MU)	T & D losses (MU) = 2-3	Percentage = (4/2)*100
Jan 07	1004.12	585.72	418.4	42%
Feb 07	1041.69	597.83	443.86	43%
March 07	943.67	567.98	375.69	40%
April 07	914.49	562.26	352.23	39%
May 07	881.91	597.96	283.95	32%
June 07	987.50	623.66	363.84	37%
July 07	908.18	639.64	268.54	30%
August 07	895.74	672.00	223.74	25%
Sept 07	882.9	680.99	201.96	23%
Oct 07	910.87	656.78	254.09	28%
Nov 07	1022.42	664.92	357.5	35%
Dec 07	1044.33	656.18	388.15	37%
2007	11437.87	7505.92	3931.59	34%

For the group:

On the basis of the information given in the table above:

- a) Calculate the month wise percentage distribution losses

T&D losses= Total Energy Purchased from all sources-Energy sale to all consumers  
Percentage T&D losses=Total energy losses divided by total energy purchased.

- b) Average T&D losses for the whole year (2007)

T&D Energy Purchased in the year (=sum of all monthly purchase)- Total Energy sale (Sum of all monthly sale)

- c) Comments on the trend of these losses

#### Simulation exercise II

What changes are important on the new law regarding the electricity tariff fixation provisions? Discuss and elaborate.

**Day 4: Wednesday, 24 September 2008**

**Session 12: Energy efficiency and electrical equipment rating**

**Resource Person:** Rajesh Kumar

1. The government of Nepal put lot of efforts in order to ensure energy conservation at consumer ends. Therefore, it is important for the consumers to be aware on various issues involved.

(i) Why a consumer should save energy? Please write down three most important points you think.

2. In a state economy like Nepal, lighting requirement alone accounts approximately 40% of the total energy consumed. Replacing the ordinary bulb by energy saving light (CFL) can reduce the energy requirement by three to four times.

Assume that a 100 W bulb, 40W Tube light and 20 W CFL do the same work.

(i) It is assumed that you run one of these equipments in room on an average ten hours per day. How much units would be consumed for each type of equipments in a month?

Total energy consumed in a Month

- a) Ordinary Bulb \_\_\_\_\_
- b) Tube Light \_\_\_\_\_
- c) Energy Saving Light (CFL) \_\_\_\_\_

(ii) If the electricity tariff is NR 4.00 per unit (Kwh) then, how much money a consumer would be required to pay in each types of option given above (i)

3. Bureau of Energy Efficiency (BEE), has made compulsory star rating of all electrical equipments. The stars rang from one star (\*) to five stars (\*\*\*\*\*). Please go through the Table 1 carefully and answer the questions given thereafter.

**Table 1: Star Rating of Refrigerators**

Sl. No.	Refrigerator Model No.	Gross Volume, (Litres)	Storage Volume, (Litres)	Electricity Consumption, Units per year	Star rating
1.	GL-366DMQ	350	315	508	4 (Four)
2.	GL-406DMQ	390	353	527	4 (Four)
3.	GL-295TMG4	280	246	480	4 (Four)
4.	GL 295TTG4	280	246	480	4 (Four)
5.	GL-325TMG4	310	274	490	4 (Four)
6.	GL-325TTG4	310	274	490	4 (Four)
7.	GL-365DMQG	350	315	508	4 (Four)
8.	GL-368DMQG	350	315	508	4 (Four)
9.	GL-298LMG4	280	246	480	4 (Four)
10.	GL 244GP	230	203	540	3 (Three)

Sl. No.	Refrigerator Model No.	Gross Volume, (Litres)	Storage Volume, (Litres)	Electricity Consumption, Units per year	Star rating
11.	GL 268LM	250	222	560	3 (Three)
12.	GL 265TT	250	222	555	3 (Three)
13.	GL 244GM	230	203	540	3 (Three)
14.	GL 245TM	230	203	545	3 (Three)
15.	GL 245TT	230	203	545	3 (Three)
16.	GL 265TM	250	222	555	3 (Three)
17.	GL 248LM	230	203	550	3 (Three)
18.	GL-244GP4	230	203	450	4 (Four)
19.	GL 245 LMF	230	203	380	5 (Five)
20.	GL 244GM4	230	203	450	4 (Four)
21.	GL-245TMG4	230	203	455	4 (Four)
22.	GL 245 TTG4	230	203	455	4 (Four)

- (i) For a small household, which model is most efficient consuming minimum amount of energy?
- (ii) Suppose, electricity tariff is fixed NR. 4 per unit for domestic consumers. What will be the Electricity Charges for using the model Sr. No 10, 18, and 19.
- (iii) Suppose price for Sr. no 10 is NR. 10,000 and NR. 15,000 for Sr. no 19. Which model should be purchased by a consumer assuming that life time of both the model is 15 years and tariff remains same NR. 4 per unit.

4. Suppose we have an industrial motor load around 2000 MW in the state. By installing capacitor can reduce the energy requirement by 25%. How much investment requirement can be reduced if the cost of installing one Megawatt (MW) is NR. 4 crore.

5. In a street light system there are 500 lights each 200-Watts. How much money get wasted if the lights are switch off one hour late ever day? Assume the rate is Rs. 4 per unit.