



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

TERRITORIAL TRAINING MANUAL
ON
POWER SECTOR REFORMS IN RAJASTHAN

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CUTS Centre for Consumer Action, Research & Training

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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. Due to its environment friendly nature, it is most preferred energy source at the consumer ends. Its alternative uses in order to fulfil basic human needs such as lighting, heating, cooling etc. it is also treated as a necessity of modern life. It is used as a basic input in production process in agricultural, commercial and industrial sectors. Therefore, it invites wide attentions on part of all sections of society for un-interrupted service delivery at affordable prices.

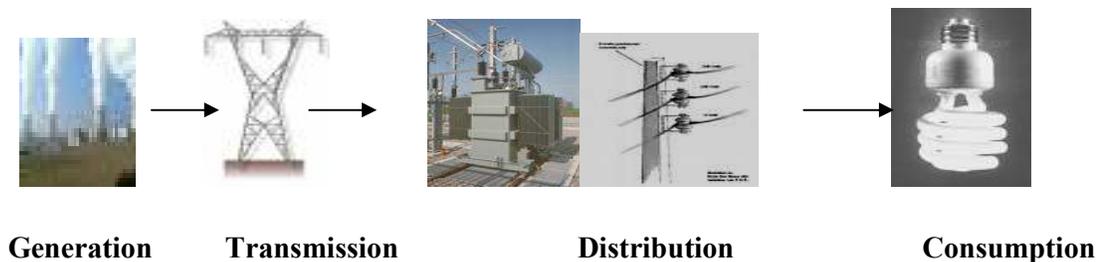
It is one of the important factors responsible for economic shape of a country. Low availability of electricity adversely affects the economic as well social development of a country. Recognising its importance, various international agencies such as United Nations Development Programme (UNDP) has given 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:

1. *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



2. *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. However, non-storability is not an issue in planning the service in these utilities as in case of electricity.

3. Demand remains never constant: 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 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 it 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 considering it's certain advantages.

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 there are certain fixed costs inherent in the production process. By producing larger amount of production, per unit cost especially the fixed component would be reduced. For example, the cost of installing Pollution Control Equipment is INR 10,000 per year. The cost of pollution control is INR 2.00 per unit 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 INR 1.00 per unit. 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 a shoe-making company also produce raw leather with 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 Need for reforms

The power sector is the most important constituent of infrastructure. The performance of the power sector directly impacts the overall economy of the State. The basic problem of developing countries like India mismanagement of the infrastructure sector and due to this most of the state electricity boards (SEBs) incurred heavy financial losses and became dependent on financial support from their respective state governments. When the state provided this service, it had to cross-subsidise between different classes of

consumers, to achieve the stated socio-economic objectives of the state. Introduction of subsidies made the electricity market inefficient and lack of competition led to more inefficiency. These included high T&D losses, skewed tariffs, poor quality of supply, weak and deteriorating T&D network and rapidly declining capability of State Governments to provide budgetary support to the power sector. There was also reluctance on the part of financial institutions to lend funds without reform. All the States were characterized by more or less similar set of conditions in the sector and Rajasthan was no exception. Urgent steps were needed to reinvigorate the sector.

1.5 Electricity Reforms in Rajasthan

As a result of poor technical and financial performance, most of the SEBs became bankrupted. High T&D losses, low Plant Load Factor (PLF) and poor quality were reported as main problems in the sector. Therefore, reforms were initiated in to overcome these problems.

Electricity is listed as a concurrent subject in the Constitution of India. It implies that Centre as well state governments are entitled to enforce a law/rule relevant to the sector. Rajasthan is one of the pioneer states, where restructuring process was initiated at the state level. Government of Rajasthan (GOR) issued Broad Reform Policy Statement in 1995 to promote the role of private sector in electricity generation. In the same process, Rajasthan Electricity Reforms Act 1999 was enacted which came into force w. e f. 01.06.2000. Under this Reforms Act, broadly two types of institutional changes have been initiated.

1. Establishment of Rajasthan Electricity Regulatory Commission (RERC), an independent agency to regulate the generation, transmission and distribution of electricity at the state level.
2. Unbundling of integrated Rajasthan State Electricity Board (RSEB) into separate generation, transmission and distribution entities. Consequently, the following five successor entities have been incorporated to discharge the different functions at the state level.

Generation: Rajasthan Rajya Vidyut Utpadan Nigam Ltd (RVUN)

Transmission: Rajasthan Rajya Vidyut Prasaran Nigam Ltd (RVPN)

Distribution

(i) Jaipur Vidyut Vitran Nigam Ltd (JVVNL)

(ii) Ajmer Vidyut Vitran Nigam Ltd (AVVNL)

(iii) Jodhpur Vidyut Vitran Nigam Ltd, (JdVVNL)

It may be noted that this reforms model is common among various states of India. To ensure more uniformity in the restructuring process and facilitate fair competition in the electricity sector, the Electricity Act 2003 was enforced in June 2003. It replaced all the existing Acts in electricity sector. Consequently, functioning of Electricity Regulatory Commissions (ERCs) and electricity utilities is governed by this Act all over the India except the state of Jammu & Kashmir.

The Rajasthan Electricity Regulatory Commission was established on 2nd January, 2000 under the ERC Act, 1998. Consequent upon coming into existence of the Electricity Act, 2003 w.e.f. 10.6.2003, the Commission is poised to play a more effective role in the development of electricity sector. RERC is mandated to discharge the main functions

such as licensing, framing regulations, tariff fixation, promoting competition and consumer protection.

Once this model is fully implemented, consumers are expected to be better off. As per provisions of the Act, regulators are required to take into account consumer view before passing decisions on important matters such as tariff, quality of standard regulation etc.

1.6 Progress so far

The present scenario in power sector can be best described with, unbearable, increasing financial burden on utilities, inadequate and poor quality of supplies.

Revenue deficit of all the three Discoms as shown below as on 21/07/2006: The financial health of the distribution companies is not sound in the state. All companies showed revenue losses during the FY 2005-06-AVVNL—Rs. 306.85 Crore, JVVNL—Rs. 51.68 Crore and JdVVNL—Rs. 280.08 Crore. (RERC Annual Report, 2006-07)

Available capacity and additional capacity requirements assessed by RERC on 31/03/07

FY	Total Capacity Required (MW)	Addl. Capacity Planned during the year (MW)	Capacity Available (MW) (Existing Capacity=5360 MW)	Addl. Capacity Requirement (MW)
07-08	7348	521	5881	1467
08-09	7796	1325	7206	590
09-10	8310	276	7482	828
10-11	9020	772	8254	766
11-12	9791	00	8254	1537

(Source RERC Annual Report 2006-07)

However there are some positive developments:

- Present installed electricity generation capacity of Rajasthan is 5360 MW. With a view to meeting the increasing power needs, the state is also actively encouraging the use of non- conventional energy sources, such as solar and wind-based energy.
- A policy for promotion of private sector investment for power generation has been notified.
- Rajasthan introduced "open access" in its electricity markets, adopted the International Competitive Bidding Process for seeking private sector participation, formulated Captive Power Plants Policy and also preparing for introduction of private participation in distribution of electricity. A massive feeder renovation programme is underway and by 2008-09 all 8475 rural feeders shall be covered with the aim to reduce transmission and distribution losses by 15 percent.

These moves are to throw open the electricity market in the state to competitive supply, thus offering significant business opportunities for private companies.

1.7 How reforms are beneficial to consumers

- Improvement in quality of service
- Various consumer friendly regulation by independent RERC
- Increased competition resulting in competitive rates and better services at door steps
- Increased role of consumers in decision –making

- Increased investment in power sector resulting in more generation and supply of power
- Promotion of eco- friendly and renewable source of power generation making Rajasthan a investment hub, resulting in generation of more employment opportunities and revenue

Chapter II

Decision-making process

2.1 Key Issues

In the pre-reforms, power utilities were operated under government ownership and control in most of the countries. Apart from the policy decisions, the respective government were reporting interfering into day-to-day operational matters of the utilities. It led to inefficient and unprofessional decision-making process. Most of the decisions taken on key issues such as tariff, subsidy, investment, and recruitments were politically motivated. That further resulted into poor commercial outlook of the sector and unsatisfactory quality of service.

2.2 Requirements of 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

Transparency

Decisions 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.

Accountability

Another important feature is accountability of regulators to the decisions made by them. 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 India, Appellate Tribunal for Electricity has been constituted to hear the appeals against the decisions of ERCs. Further, ERC are bound by the Act as well as National Electricity Policy 2005. ERCs are guided by certain policy guidelines in the process of making decisions.

Public Participation

Public participation is very important issues especially when decision-making authority is an independent agency. Law requires the regulatory bodies to listen consumers' 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. The typical decision-making process followed by various ERC in India is given here.

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- it is submitted to the regulatory commission before the due date. For example in case of ARR or tariff application, it should be 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.

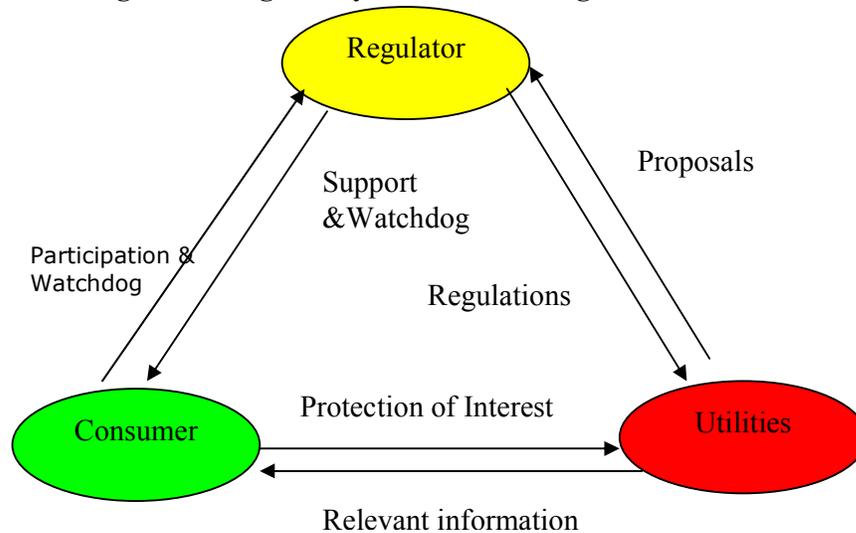
Step IV: Response to the public Comments- the respective licensee/company is required to respond to the comments received on behalf of consumers/stakeholders.

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 issued to seek further comments/views of the stakeholders in order to make the decision more acceptable.

As it is shown in the diagram the consumers have important role to play in the decision-making process after new regulatory regime in power sector. They act as a watchdog on the regulatory institutions as well as utilities.

Diagram 1: Regulatory Decision Making Process



After its constitution in 2000, RERC has issued number of orders including tariff orders for the generation, transmission and distribution companies for the respective years. All the orders were issued after having due consultation with consumers. However, public participation in most of the cases was ineffective. More steps should be taken by RERC to increase public participation in the public hearings.

Chapter III

Electricity Tariff -Some Issues

3.1 Definition

Tariff is a schedule of prices for various consumer categories. Electricity supply like other commodities/services imposes certain cost on the supplier. This cost must be recovered from the beneficiaries to sustain the supply in future. Earlier, the respective government took the decision on consumer tariff. Now, it is the independent regulatory body that fix the tariff payable.

3.2 Objectives and Principles of Tariff Settings

The determination of tariff is a complex issue. It requires the regulator to make a balance among conflicting interests of various stakeholders. Certainly, tariff results as a cost for end-users, therefore, they seek for a lower tariff. Higher tariff may result into loss of consumer welfare. On the other hand, 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. Cost of inefficiency on part of the supplier should not 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, so it should be utilised in a most efficient manner. Tariff should also 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 subsidy given to one consumer category at the cost of another category. But again, it requires proper identification of the target beneficiaries to avoid misuse of subsidy.

3.3 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 competition existed 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 poor performance may result into no return or negative rate of return (= penalty).

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. Almost all Indian Electricity Regulators have followed the rate of returns method.

3.4 Components of Tariff

The total cost of supply may be segregated into various cost components. Whatever method the respective tariff-setting authority uses, calculation of tariff is an important exercise in order to assess the financial performance of the utility. 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 this detailed cost examination is an internal exercise. The major components of tariff are discussed here.

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 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 a major component if the plant is not located nearer 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	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 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 installed 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's 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. But 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 India.

Table 2: Cost Components of a Distribution Company

Power Purchase Cost	It the cost on account on energy purchased from all sources such as directly from the power plants, traders, captive power plants, imported etc. If it is purchased from the market traders, it also includes trading margin that is presently 4 Paise fixed by CERC in case of India.
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	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 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 needs to be taken into account by the regulatory bodies.

Single or Two-part energy tariff for consumer

Earlier, most of electricity utilities used to bill the consumers only on the basis on energy consumption. It is termed as a signal part tariff. However, for the efficient use of electricity, two part electricity tariff at consumer ends is advocated. In the two part tariff, there are two components of tariff- 1) capacity charges and 2) 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.

Chapter IV

Quality of Service Standards and Compliance

Tariff and Quality of Service (QOS) are two very important issues affecting the consumer interest. Electricity Reforms Acts enforced in various countries envisage improved QOS standards. Regulatory bodies are in process to frame the regulation/code of conduct for the standard of performance.

4.1 Parameters affecting consumer's interest

Consumers/CSOs are expected to present their views on the proposed regulations based upon their experience and reports in media etc. Among others, the following are important issues:

1. Procedure for getting a New Connection
2. Metering and Billing
3. Disconnection and Restoration of Electricity Supply
4. Quality of Service Monitoring
5. Redressal of Consumer Complaints

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 is very poor. It has also been revealed from the recent consumer survey conducted under this (RESA) project. Most of the respondents expressed power theft, inadequate supply of power, poor metering and billing, high electricity tariff and poor quality of supply as the major problems related to electricity in their area. This substantiate that the projects like RESA are really need of the hour.

1. Procedure for 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 consumes have to face harassment.

2. Metering and Billing

Proper metering and billing of electricity consumption is very important issue affecting the consumers' interest at large. Electricity distribution companies should ensure that consumption is estimated with 100% 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 detail 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 of the distribution companies are opened just for few hours (Generally between 10:00 to 1400 hours)
- Long queues at the payment counters
- Consumer complaint regarding bill correction is not attended properly

The licensee should ensure that consumers are satisfied with metering process. It is for them to pay the dues.

3. Disconnection and Restoration of Electricity Supply

Statutes 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 simple and transparent.

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. Under its programme, Electricity Supply Monitoring Initiatives (ESMI), three data loggers have been installed at different locations of the city. PRAYAS is providing regular feedback to the regulatory body of the state as well consumes. (For detail, please log on www.prayaspune.org)

To take similar initiatives in other areas, consumes should have an access to resources and aware of the technology/process. With the support of distribution companies as well regulatory bodies, it is possible to empower the consumers with these tools.

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 consumers to be well aware of the process and take appropriate actions on behalf of the consumers.

4.2 System for redressing consumer's complaints in Rajasthan

4.2.1 Setting up of Forum

The Electricity Act 2003, required the distribution licensees to set up forum in accordance with the guidelines issued by the Commission, for redressal of consumer grievances.

The Commission issued the Rajasthan Electricity Regulatory Commission (**Guidelines for Redressal of Grievances) Regulations, 2008** providing for classification of complaints, setting up of forum at different levels, time frame for redressal of grievances.

- Every licensee in the State at its Corporate Office will have a “Grievance Redressal cum Settlement Forum” for the redressal of consumers’ grievance in accordance with the guidelines contained in these regulations.
- The licensee may establish more than one such forum ensuing timely disposal of consumer grievances.

4.2.2 The jurisdiction

Grievances of non-monetary/general nature:

- Divisional Forum - Grievance of LT supply consumers of the division
- Circle (District) Forum - Grievance of HT supply consumers of the circle
- Corporate Forum- Grievance of EHT supply consumers

Grievance of monetary nature:

- Sub-divisional Forum - monetary limit of Rs.10, 000/-
- Divisional Forum - monetary limit of Rs.25, 000/-
- Circle (District) Forum - monetary limit of Rs.3, 00,000/-
- Corporate Forum- More than Rs.3, 00,000/-

4.2.3 Registration of complaint/grievances:

- The licensee will specify its offices where the complaints can be registered by the consumers.
- Complaints can be made orally in person or on telephone or in writing to the duty in-charge at the specified office.
- Each complaint will be entered in a register meant for the purpose under the Rajasthan Electricity Regulatory Commission (‘Distribution Licensees’ Standards of Performance) Regulations, 2003; each complaint will be assigned a number which is to be conveyed to the consumer.
- In urban complaints centres, the licensee will provide the facility of complaint registration via Interactive Voice Recording system through telephone in a phased manner for which a definite time frame will be given and acted upon.
- The licensee shall endeavour its best efforts to redress the consumer complaint at the initial stage. However, in case of non-satisfaction, the aggrieved consumer may approach the appropriate Forum in person or through post for redressal of his grievance and may also be requesting for interim relief, if so required.
- The office of the Forum Chairman or the authorized officer/official will acknowledge the grievance received, indicating the registration number and the date.

4.2.4 Registration Fee:

No fee shall be payable by the consumer for the redressal of non-monetary nature of grievance.

The registration of monetary nature grievances will attract a fee of:

- At Sub-divisional Forum - Rs.50/-
- At Divisional Forum-Rs.100/-
- At Circle Forum-Rs.250/-
- At Corporate Forum - Rs.1000/-

4.2.5 Disposal of grievances:

(1)The Forum will redress the consumer grievances as per provisions of the Act, Rules and Regulations made there-under, general orders/directions given by the Commission from time to time in settling the grievances with mutual consensus:

- Where the mutual consensus is arrived at settlement proceeding will be recorded and a copy thereof will be made available to the consumer.
- Where no mutual consensus is arrived at, the forum will pass speaking orders on merits indicating the contention of the consumer and ruling of the forum.
- The consumer aggrieved by the decision of Sub-Divisional/Divisional/Circle Forum will have the option to approach the Corporate Forum before making an appeal to the Ombudsman. For monetary nature of grievance, a fee of Rs.750/- be deposited while appealing the Corporate Forum.

(2) The Chairman of the Forum, on considering the grievance, if satisfied, may grant an interim relief and keep pending the final disposal of the grievance, where prima-facie appearing to be genuine and the consumer likely to suffer an irreparable loss if, an immediate relief is not provided.

(3) Every Forum, at the office will display the date of meeting last held & the next meeting scheduled number of grievances settled and pending.

5.2.6 Time frame disposal of grievances:

Normally, the grievance will be disposed of in 30 days and in any case not exceeding 45 days from the date of its receipt registration.

4.2.7 Appeal:

- If a consumer's grievance is not redressed by the Forum within the specified time or the consumer is not satisfied with the disposal of his grievance, he will be free to approach the 'Ombudsman' appointed by the Commission as per RERC(Settlement of Dispute by Ombudsman) Regulation, 2003.
- If an appeal is made by the aggrieved consumer due to non-disposal of his grievance by the Forum in the given time frame, the matter with the earlier Forum will stand dropped.

Charter of Consumers' Rights

In terms of clause 12 of the licence granted, the Discoms were asked to publish, with the approval of the Commission, a charter of consumers' rights in respect of supply of safe, reliable and efficient electric energy to the consumers. This Charter has been published but not many people were aware about their rights.

4.3 Effectiveness of present mechanism

The findings of base line consumer survey reveal that the present grievance redressal mechanism is not effective. On being asked whether they have lodged any complaint of electricity problem, surprisingly, 80 percent said that they have never logged any complaint. Out of that 80%, about half of respondents said that they have no hope of getting redressal, while 25% did not complaint due to very time consuming system, despite grievances. Only 20% respondents stated that they have no reason to complain.

4.4 Recent Initiatives at the state level

Energy Department of Rajasthan has started holding 'Electricity Choupals'.

- At Sub-station level: on every Tuesday
- At Sub-Division Level: on 10th of every month,
- At Circle Level: on 20th of every month

Apart form this it issued list of toll- free telephone numbers for consumers to register their complaints. Discoms have initiated the process of spot billing, consumer call centres and feeder renovation programmes to improve quality of service but there are limitations, challenges and internal or external oppositions to such new initiatives.

Chapter V

Responsibilities on part of the consumer's

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 utilities in reducing the requirement for additional energy. Broadly their role may be classified into these three areas.

5.1 Policy and regulatory process

5.2 Reduction of energy losses

5.3 Energy Conservation

5.4 Curbing power theft

5.1 Policy and regulatory Process

The newly established regulatory mechanism supposes electricity consumers to participate in the policy formulation as well as regulatory decision-making process. It will help in making 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

5.2 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 loose 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.

5.3 Energy Conservation

Most of the countries are 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.

With a view to meet increasing power needs and ensure sustainable environment, state should govt should promote the non-conventional sources of energy such as solar and wind power.

Consumers can contribute a great 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 India where T&D loss level is about 50%, you need two units to supply one unit of energy at the consumer ends. It implies that is one unit is saved at consumer's end; it results into surplus of two units that may be supplied to other consumers.

How to save energy

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, about 50% of the total electricity consumption is used to meet 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 is the conservation of power. While designing a building, we should target to reduce the demand for energy. Sun and air, natural resources 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. Encourage the use of non-conventional/renewable energy sources such as solar cookers, solar water heaters, solar heaters, solar lights, solar lamps, gobar gas plants etc.

The list of energy efficient equipment is available with the govt 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 one time 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 scare 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 govt office. Even a consumer has to pay for the wasteful consumption; wastage is a net social cost.

5.4 Curbing power theft

Role of consumers in curbing power theft

In Rajasthan there is annual loss of Rs. 2400 Crore due to theft of electricity, which costs around Rs. 1.2 per unit. Distribution companies are running in huge debts, which are bound to be passed on to the consumers sooner or later and as a result genuine

consumers will have to suffer at the cost of consumers stealing electricity. Loss due to power theft is a big obstacle in reform process. *It has been declared non-bailable and cognizable offence under Section 135 of the Electricity Act, punishable with imprisonment up to 3 years, or fine, or both.* But it still persists in society at large level as has been revealed in the perception survey, where 96% of respondents observed it as a major problem.

Theft of electricity can not be stopped only with legal sanctions, it is a social evil, so social awareness and sensitisation is required to understand its implications. Role of consumers is important in creating awareness on the disadvantages of theft of electricity and as a result help in curbing the act of theft. They can build public opinion against power theft and make people realize that honest consumers pay a heavy price because of corrupt consumers and corrupt officials who indulge in power theft.

As per the recent order of (August 2008) RERC, the Consumer found stealing electricity may attract criminal liability apart from paying cost of electricity for the period up to one full year on the basis of his connected load, computed on the basis as per the norms set as under:

SN	Category	LT Supply * (Units/kw/month)	HT Supply ** (Units/kw/month)
1	Domestic	85	100
2	Non-Domestic	250	600
3	Street Light	300	NA
4	Agriculture general category	200	NA
5	Farm house spl. category	600	NA
6	Small Scale Industries	200 per shift	NA
7	Large Industry	NA	200 per shift
8	Mixed Load Category	150	150

* Total connected load or sanctioned connected load, whichever is higher shall be considered for LT supply.

** Contract demand or highest of the maximum demand recorded during the last 6 months, whichever is higher shall be considered.

Essentials for success of anti-theft measures

- Constitution of Electricity Committees at village level, to create awareness about implication of power theft and grievance redressal procedure
- Research should be carried out to find out exact data of the loss due to theft and loss during transmission and distribution, for better transparency on the part of the utility companies.
- Capacity building of consumers and CSOs on power reforms, so that they can act as watch-dogs on the functioning of the service providers.
- Improving quality of service and reducing tariffs
- Energy Audit and technical measures
- Providing incentives to the people working to curb power theft and welfare activities by Utilities in the area where there is no loss due to power theft.

Annexure 1

Performance Standard for Electricity Distribution Companies

[(Distribution Licensee's Standards of Performance) Regulations, 2003; issued by The Rajasthan Electricity Regulatory Commission]

Interruption in Power Supply

The licensee shall restore power supply, if not due to line fault or distribution and/or power transformer(s) failure, within 4 hours of receiving the complaint in all industrial, municipal and cantonment areas and in case of Military and PHED installations while within 24 hours in rural areas.

In case of failure of distribution transformer (i.e.11/0.4 KV) the licensee shall effect replacement of transformer and restore power supply within 2 days of receiving the complaint/ information in industrial, municipal and cantonment areas as also in case of Military and PHED installations and within 3 days of receiving the complaint/information in rural areas

In case of failure of power transformer or associated switchgear, the licensee shall replace/repair it within 7 days of receipt of complaint/information, efforts will be made by the licensee to restore the supply in 2 days, if technically feasible.

Quality of Power Supply

- (i) The licensee shall attend to consumer complaints in respect of the following conditions within the time specified vide clause 4.
- (a) Neutral voltage exceeding 2% of the supply voltage.
 - (b) Low or high voltage (i.e. phase voltage exceeding tolerance as per IE Rules).
 - (c) Voltage fluctuations or flickering.
 - (d) High leakage current.
 - (e) Supply voltage with individual harmonics exceeding 1%
 - (f) Streetlights off or not operating properly.
 - (g) Inadequate electrical clearances.

In case rectification is not feasible within the time specified, consumer shall be informed within seven days of likely time by which it will be accomplished

Period of Schedule Outages

Period of interruption due to scheduled outage shall be specified well in advance by public notice through newspapers, local radio/TV stations etc. and as far as possible shall not exceed 10 hours on any day. The licensee shall ensure that supply is normally restored by 6 p.m.

Licensee shall inspect, check or test the meter within 21 working days of receiving a complaint.

If a complaint is made by the consumer about the working of the meter and he requests for replacement, it shall be replaced within fifteen days.

In all such cases of the meter being removed/ replaced test/checking report if the consumer is present otherwise within 3 days of removal /replacement of meter, shall be supplied to the consumer

In case burning of the meter/metering system is due to causes attributable to consumer Supply shall be restored only after receiving payment. The meter/metering system shall be replaced within 60 days of receiving payment and necessary corrective action

Release of New Electric Connection

Domestic and Non-domestic

In urban area, the company shall normally issue demand note within 21 days of receipt of application and shall release the connection within 30 days of receipt of demand note amount and completion of requisite formalities in urban area and within 45 days in rural area

Industrial connection:

Industrial connections are to be released, in time bound manner as detailed below:

Time schedule

S.N.	Item / activity	Prescribed Time Limit
1	<i>Loads up to 60 HP</i> <ul style="list-style-type: none"> • Issue of Demand Notice • Release of connection 	<ul style="list-style-type: none"> • Within 21 days of receipt of application. • Within 30 days after compliance of formalities/ demand notice, if no augmentation is required otherwise 45 days.
2	<i>Loads above 60 HP and up to 300 KW</i> <ul style="list-style-type: none"> • Issue of Demand notice • Release of connection 	<ul style="list-style-type: none"> • Within 30 days of receipt of application. • Within 60 days after compliance of Demand Notice.
3	<i>Loads above 300 KW and up to 3000 KW</i> <ul style="list-style-type: none"> • Issue of feasibility clearance • Issue of Demand notice • Release of connection 	<ul style="list-style-type: none"> • Within 45 days of receipt of application. • Within 60 days of receipt of application. • Within 75 days after compliance of Demand Notice/formalities by prospective consumers.
4	<i>Loads above 3000 KW and up to 33 KV Supply</i> <ul style="list-style-type: none"> • Issue of feasibility clearance • Issue of Demand notice • Release of connection 	<ul style="list-style-type: none"> • Within 45 days of receipt of application. • Within 60 days of receipt of application. • Within 90 days after completion of Demand notice/formalities by prospective consumers.
5	<i>132 KV and higher voltage supply</i> <ul style="list-style-type: none"> • Issue of feasibility clearance • Issue of demand notice • Release of connection 	<ul style="list-style-type: none"> • Within 90 days of receipt of application. • Within 120 days of receipt of application. • Within 180 days after completion of Demand notice/formalities by the applicant if no forest clearance is involved.

Agriculture Connections

Time limit to release the connection under this category will be 120 days from receipt of payment of demand note or due date of demand note, whichever is later, subject to the condition that distributing system exists and connection is technically feasible.

Complaints regarding electricity bills

The licensee shall acknowledge a consumer's complaint on wrong billing or incorrect application of tariff or non-receipt of bill or inadequate time allowed to effect payment, immediately if reported in person or telephonically and within 7 working days if the complaint is received by post.

Any other complaint (including that of recurring nature) shall be enquired in to within 30 days of complaint and rectified within 60 days thereafter.

Statement indicating maximum time limits for various activities/redressal of complaints appearing in the s.o.p.

SN	Name Of Activity / Type Of Complaint	Prescribed Maximum Period
1.	Complaints of no voltage/ interruption in Power Supply on account of any reason including blowing of HT/LT fuse at consumer premises or of distribution transformer/MCB trouble or due to loose connections/disconnection at meter, MCB or service line, (not due to line fault or distribution and/or power transformer(s) failure (Complaints received during 8 A.M. to 10 P.M.) Clause 4(i)	4 hours in industrial, municipal & army/cantonment & PHED installations. 24 hours in rural areas
2.	Individual complaints received during night times (10 P.M. to 8 A.M.) Clause 4(i)	4 hours on next day in industrial municipal & cantonment areas & military/PHED installations Next day in rural areas
3.	Routine line faults Clause 4(iii)	In 8 working hours in industrial municipal & cantonment areas & military/PHED installations 24 hours in rural areas
4.	Failure of distribution transformer Clause 4(iv)	<ul style="list-style-type: none"> Replacement of transformer & restoration within 2 days in industrial municipal & cantonment areas & military/PHED installations 3 days in rural areas
5.	Failure of power transformer/ associated switchgear Clause 4(v)	7 days, Restoration in two days, if technically feasible.
6.	<p><u>Quality of power supply</u></p> <ul style="list-style-type: none"> Poor quality due to - Neutral voltage exceeding 2% of the supply voltage. Low or high voltage (i.e. phase voltage exceeding tolerance as per IE Rules). Voltage fluctuations or flickering. High leakage current. Supply voltage with individual harmonics exceeding 1% Streetlights off or not operating properly. 	<ul style="list-style-type: none"> Improvement in 7 days or to inform to consumer, if beyond licensee's control. Inadequacy of distribution system to be resolved in 180 days subject to material availability and techno-economic feasibility.

SN	Name Of Activity / Type Of Complaint	Prescribed Maximum Period
	<ul style="list-style-type: none"> Inadequate electrical clearances. Clause 5 	
7.	Scheduled outages	Not to exceed 10 hours during daytime on any day.
8.	<u>Meters</u> Regular Inspection, checking & testing of large/MIP industrial & NDS consumers.	Once in six months.
9.	Regular Inspection, checking & testing of other consumers.	Once in three years.
10.	Replacement of defective meter. On request of consumer	<ul style="list-style-type: none"> 60 days. 15 days.
11.	<u>Billing Complaints</u> Complaints on wrong billing / incorrect tariff/ non receipt of bill/ inadequate time	<ul style="list-style-type: none"> Immediate, if reported in person or telephonically. 7 working days, if complaints received by post.
12.	Complaints of arithmetical errors or non receipt or inadequate time for payment Clause 11(ii)	<ul style="list-style-type: none"> Same day, if made in person. On the day of acknowledgement, if complaint sent by post
13.	Any other billing complaints-Clause 11(ii)	7 days.
14.	Other complaints (including of recurring nature)- Clause 13	<ul style="list-style-type: none"> Enquiry in 30 days. Rectification within 60 days thereafter.
15.	<u>Release Of Connections</u> New Connection-Domestic/NDS Issue of demand note Release of connection.	<ul style="list-style-type: none"> Within 21 days of receipt of application 30 days of deposit of DN and completion of formalities in Urban Areas and 45 days in Rural Areas
16.	<i>Loads above 300 KW and up to 3000 KW</i> <ul style="list-style-type: none"> Issue of feasibility clearance Issue of Demand notice Release of connection <i>Loads above 3000 KW and up to 33 KV Supply</i> <ul style="list-style-type: none"> Issue of feasibility clearance Issue of Demand notice Release of connection <i>132 KV and higher voltage supply</i>	<ul style="list-style-type: none"> Within 45 days of receipt of application. Within 60 days of receipt of application. Within 75 days after compliance of Demand Notice/formalities by prospective consumers. Within 45 days of receipt of application. Within 60 days of receipt of application. Within 90 days after completion of Demand notice/formalities by prospective consumers.

SN	Name Of Activity / Type Of Complaint	Prescribed Maximum Period
	<ul style="list-style-type: none"> • Issue of feasibility clearance • Issue of demand notice • Release of connection 	<ul style="list-style-type: none"> • Within 90 days of receipt of application. • Within 120 days of receipt of application. • Within 180 days after completion of Demand notice/formalities by the applicant if no forest clearance is involved.
17.	Release of New Ag. Connection**	120 days from receipt of DN amount or due date of DN, whichever is later.

**Subject to the condition that the distribution system exists and connection is technically feasible

Annexure 2

RERC (Supply Code and Connected Matters) Regulations 2004

1. Application fee

For LT – Supply:

- LT - Single Phase – Rs. 200/-
- LT - Three Phase – Rs. 500/-

For HT - Supply:

- 11 KV -- Rs. 1000/-
- 33 KV – Rs. 2000/-
- 132 KV—Rs. 4000/-
- 220 KV—Rs. 4000/-

2. Expenses for providing electric line / plant and extension of distribution mains and/ or service line

(1) Amount to be deposited with application

I. For LT - Supply

S.N.	Category of Consumer	Amount to be deposited (Rs.)
1	Domestic	<ul style="list-style-type: none"> • Tribal sub plan - 750/- • Rural - 1500/- in Abadi area • Kachhi Basti - 2000/- • Urban -5000/-
2.	Non-domestic	<p><u>Rural</u></p> <p>Load upto1 KW -2000/- 1KW-5KW -3000/- 5KW-10KW -5000/- (above 10KW -additional sum @ Rs 250/- for each KW or part beyond 10KW)</p> <p><u>Urban</u></p> <p>Load upto1KW -3000/- 1KW-5KW -4000/- 5KW-10KW - 6000/- (above 10KW -additional sum @ Rs 250/- for each KW or part beyond 10KW)</p>
3.	Public Street Lighting	Rs 5000/- per pole with a normal span of 50 meters.
4.	Agriculture	<ul style="list-style-type: none"> • Rural-general -11,500/- • Urban and Farm House -12,200/-
5.	Small industry, Medium Industry & Mixed Load	<p><i>Load Up to 1 KW -3000/-</i> 1KW-5KW -4000/ 5kW-10KW -6000/- (above 10KW -additional sum @ Rs 250/- for each KW or part beyond 10KW)</p>

II. *For HT - Supply -- (Rs 10,000/-)*

III. *Cost of meter box / panel (along with I or II, as the case may be)*

S.N.	Particulars	Amount in Rupees
1.	Meter Box for LT Single phase meter	350/-
2.	Meter Box for L.T. 3 phase meter (other than S.N. 3)	950/-
3.	Meter Box for L.T. 3 phase meter for medium industry	2000/-
4.	Meter Box / Panel for HT /EHT supply	10500/-

(2) Additional amount to be deposited on demand for extension of distribution mains/supply line

I. For LT - Supply

S.N.	Category of Consumer	Amount to be deposited in addition to sum payable under '2(1)(I)' above
1-	Domestic and Non-domestic (in urban area and in rural area beyond abadi)	For extension of distribution mains and/or service line beyond 300 metres- <ul style="list-style-type: none"> For single phase supply: Rs 100/mtr For three phase supply: Rs 150/mtr
2.	Public Street Lighting	As per item 2(1)(I)(3) above in case of additional pole, if required
3.	Agriculture	For extension of distribution mains and/or service line beyond first pole- <ul style="list-style-type: none"> General: Rs 11,500/pole with 70mtr span Urban / Farm House: Rs 12,200/pole with 70mtr span
4.	Small industry, Medium Industry & Mixed Load	For extension of distribution mains and/or service line beyond 50 metres- <ul style="list-style-type: none"> For single phase supply: Rs 100/mtr For three phase supply: Rs 150/mtr

II. For HT - Supply

(i) Line cost

Cost of extension of transmission lines, distribution mains and associated substation bay based on standard estimated cost as under

kV	Line particulars	Span	Cost of line/km
11	S/C on 8m PCC poles with ACSR-Weasel	70m	Rs 0.9lacs
11	S/C on 9m PCC poles with ACSR-Weasel	70m	Rs 1.0 lacs
33	S/C on 9m PCC poles with ACSR-Dog	70m	Rs 3.9 lacs
33	S/C on 9m PCC poles with ACSR-Dog	50m	Rs 6.1 lacs
132	S/C with ACSR- Panther	335m	Rs 7.6 lacs
132	D/C with ACSR- Panther	335m	Rs 13.5 lacs
220	S/C with ACSR- Zebra	335m	Rs 12.6 lacs
220	D/C with ACSR- Zebra	335m	Rs 22.2 lacs

Note: Cost of line with other specification shall be charged on material cost plus 50% towards overhead.

Plus

(ii) Towards Plant cost: Rs 250/- per KVA of contract demand

Less

(iii) Amount deposited.

Amount deposited with application as per **item 2(1) (II)** above shall be adjusted.

3. Security for meters

S.N.	Particulars	Amount (Rupees)
1.	Energy meter 1-phase static type (All Capacities)	350/-
2.	Energy meter 3-phase 4-wire static type 10-40 Amps. 10-60 Amps.	650 /- 650/-
3.	Energy meter 3-phase 4-wire : C.T. operated, 100/5 AMP	650/-
4.	L.T. Trivector meter (static)	8,000/-
5.	HT Trivector meter-0.5 class	8,000/-
6.	LT CT – class 0.5, burden 15VA, bakelite type	600/-
7.	LT CT – class 0.5, burden 10VA, resin cast type	300/-
8.	11kV CTPT set – all ratings	20,000/-
9.	33kV CTPT set – all ratings	50,000/-
10.	EHT CT– all ratings (per set)	2,80,000/-
11.	EHT PT– all ratings (per set)	5,80,000/-

4. Security deposit from govt. servants living in govt. quarters (towards energy & meter)

Type of residence	Amount of security deposit
‘A’ Type	Rs. 800/-
‘B’ Type	Rs.500/-
‘C’ Type	Rs. 300/-
‘D’ Type	Rs. 200/-
‘E’ Type	Rs. 200/-
‘F’ Type	Rs. 150/-
‘G’ Type	Rs. 150/-
‘H’ Type	Rs. 150/-

5. Rental charges

(1) Transformer rent

Consumers required taking supply on HT and opting for Nigam's transformer & Double Pole Structure (D.P.) shall be charged rent at the following rates towards installation of transformer by the Nigam:

for contract demand up to 60 KVA	Rs. 2500/- per month
For contract demand above 60 KVA but up to 100 KVA	Rs. 3000/- per month
For contract demand above 100 KVA but up to 160 KVA	Rs. 4000/- per month
For Contract demand above 160 KVA	@ 2% per month of the cost of transformer & Double Pole Structure

(2) Other equipments

Particulars	Charges
(a) L.T. Current Transformer	Rs. 100/- per set per month
(b) 11 kV CTPT Set	Rs. 900/- per set per month
(c) 33 kV CTPT Set	Rs.2200/- per set per month
(d) EHT CTPT Set	Rs.9000/- per set per month

6. Line and plant charges for temporary connection

6.1 Fixed charges

S.N.	Particulars	Charges
1	LT supply up to 5 KW	Rs.250/- per connection
2	LT supply above 5 KW & up to 25 KW	Rs. 500/- per connection
3	LT supply above 25 KW & up to 50 KW	Rs.1,000/- per connection
4	11 KV or 33 KV supply	Rs.3,000/- per connection

Note: Above Fixed Charges are inclusive of Rent for CTs & CTPT Sets for the period up to one month. In case the period of temporary connection is more than one month, then the rent for CT/PT shall be charged on per day basis for the number of days beyond one-month period.

6.2 Charges towards line cost

S.N.	Particulars	Charges
1	<i>LT Lines</i>	
2	Single Phase	Rs. 25/- per metre
3	Three Phase	Rs. 37.50 per metre
4	11 KV single circuit line on 9 metre PCC Poles	Rs. 25,000/- per Km.
5	33 KV single circuit line on 9 metre PCC Poles	Rs.1,00,000/- per Km.

6.3 Charges towards transformer (if required)

- (a) Transformer installation & removal charges: Rs 1000/-
- (b) Transformer Rent: 80% of normal charges, prescribed in 5(2)

7. Reconnection charges

Type of service	Amount
<u>Low Tension Service:</u>	
Single Phase:	Rs. 200/-
Poly Phase:	Rs. 600/-
High Tension Service	Rs.2000/-
Extra High tension Service	Rs.10000/-

8. Procedure for determination of connected load

The applicant shall furnish L-form for actual connected load as per definition prescribed in Regulation 2(2) of these Regulations. However, for the purpose of levy of any charges under the conditions of supply or charges for miscellaneous services or Tariffs for Supply of Electricity and also for deciding the supply voltage, the connected load shall be determined as follows in case of LT consumers. The applicant is advised to workout the load for sanction accordingly.

1.	Bulb/ Fan	60 Watt each
2.	Tube Light	40 Watt each
3.	Light Plug (5 Amp.)	60 Watt each
4.	Television (a) Colour (b) Black & White	100 Watt 60 Watt
5.	Power Plug (15 Amp.)	500 Watt each
6.	Fridge	250 Watt
7.	Desert Cooler	250 Watt
8.	Geyser	1500 Watt
9.	Air-Conditioner 1/1.5 Ton	1500 Watt / 2200 Watt
10.	Water lifting pump 0.25 HP or 0.5 HP	180 Watt or 360 Watt (According to Pump) or according to the equipment's original rating (Name plate & Specification).
11.	Arc/Induction furnace	600 KVA per ton capacity of furnace
12.	Any other motor/device	Rated capacity or as per testing

Note:

(1) Total load for S.N. 1 to 5 above, shall be considered with following diversity:

- Domestic-30%
- Public Street Light- 100%
- Others - 80%

- If any equipment is connected with plug point, equipment's load or plug point rating whichever is higher shall be taken. In such case, load of plug point shall not be counted separately.
- The higher rating of only one equipment shall be considered if both Geyser and Air-conditioner are installed.
- Load of fire protection equipments shall not be considered for assessing the connected load.

Annexure 3

Simulation Exercise: Complaint Redressal Mechanism

There are two important issues that affect the wider interest of electricity consumers - Tariff and Quality of Service (QOS). The Electricity Acts 2003 envisages improved QOS standards. Regulatory bodies in India including RERC are in process to 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 reports in media etc. In the same context, this exercise addresses some basis issues related to QOS standards important for the purpose of making interventions. For the benefit of consumers, a draft Performa is also given.

The following issues have been selected regarding QOS/Consumer Grievances

- I. Procedure for getting a New Connection
- II. Metering and Billing
- III. Redressal of Consumer Complaints
- IV. Filling up the Consumer Complaint Performa

I. Procedure for 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 lot of harassment.

For the Group

In your opinion, what are the major problems faced by consumers in getting new connection in your areas? How to ensure a transparent and accountable mechanism so that consumers are able to get connection easily?

II. Metering and Billing

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

The Electricity bills should provide adequate information to the consumers that are necessary to understand the bill amount. All the detail should be provided in a transparent manner.

Difficulties faced in the process of payment of electricity dues is another important problem of consumers. These includes:-

- Inadequate time available to consumers for making payments.
- The payment counters of the distribution companies are opened just for few hours (Generally between 10:00 to 1400 hours)
- Long queues at the payment counters

- ‘wrong bill’ may not be corrected before the due date specified in the bill for payment

The licensee should ensure that consumers are satisfied with metering process. It is for them to pay the dues.

For the Group

What do you suggest to ensure that metering is accurate? How frequently, the functioning of meters should be checked by the distribution companies to satisfy a consumer?

In the current scenario, what alternative ways (other than counters of the companies) such as spot billing /advance payment etc) of payment should be adopted by companies so that it is easy for the consumers to pay the dues by required time?

III. 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 on 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 consumers to be well aware of the process and take appropriate actions on behalf of the consumers.

For the Group

- How to ensure that consumer complaints are registered properly?
- What alternative methods (other than personal visit to office) do you suggest for the purpose of registering complaints?
- Suppose that for the last three days there was no electricity supply at your premise, make a complaint to the utilities filling up the Performa given below.

IV. Filling up the Consumer Complaint Performa

Consumer Complaint Form

(Fill separate form for each complaint. The Complaint will be entertained only if checklist is filled.)

1. Name of Consumer:
2. Consumer Account No (*Mentioned on the bill*):
3. Consumer Category:
4. Address (Pl give details with Phone No):
5. Complaint Type (*Please tick the applicable*)
 - Quantity
 - Quality
 - Safety
 - Failure of power supply
 - Voltage complaints
 - Problems in metering
 - Billing Problems

Annexure 4

Simulation Exercise: Tariff Determination Process

The objective of this exercise is to provide a basic idea to the trainees about the tariff-making process and role of consumers in protecting their interest. This is divided into two parts, as given below:-

1. Reacting to the to Public Notice

This is the public notice published by Haryana Electricity Regulatory Commission to invite comments on the Annual Revenue Requirements (ARR) of power companies in Haryana (India). Please go through this notice and answer the questions listed at the end of part I.

PUBLIC NOTICE

INVITING OBJECTIONS / SUGGESTIONS ON THE APPLICATIONS FILED BY

HPGCL, HVPNL, UHBVNL AND DHBVNL FOR APPROVAL OF ANNUAL

REVENUE REPORTS FOR FY 2008-09

Haryana Power Generation Company Limited (Generation Company, Bulk Supplier and Trading Licensee in Haryana), Haryana Vidyut Prasaran Nigam Limited (the Transmission licensee in Haryana); Uttar Haryana Bijli Vitran Nigam Limited and Dakshin Haryana Bijli Vitran Nigam Limited (the Distribution and Retail Supply licensees in Haryana) have filed their application for generation tariff, bulk supply tariff, trading margin and Annual Revenue Reports (ARR) for the financial year 2008-09 for their respective businesses. Complete set of respective filings are available for public consultation during office hours on any working day at the Head Quarters of HPGCL, HVPNL and UHBVNL at Shakti Bhawan, Sector – 6, Panchkula and DHBVNL at Vidyut Nagar, Hisar and also at the offices of SE/Operations of HVPNL / UHBVNL / DHBVNL.

A complete set of each of these documents may be obtained on payment of Rs.1000/-, copy of the main ARR without Annexure at Rs. 300/- and copy of the condensed summary at Rs.50/- in cash or through demand draft, from the aforesaid offices. The condensed summary is also available on the web site of the Haryana Power Utilities i.e. www.haryanaelectricity.com and www.dhbn.com.

Written objections/ suggestions/ comments are invited from the public and other organisations on the above filings. All interested parties should submit seven copies of their objections along with supporting material, if any, to the Secretary, Haryana Electricity Regulatory Commission, Bays No. 33-36, Sector 4, Panchkula - 134112 and one copy should be directly submitted to the Managing Director of respective licensee at HPGCL / HVPNL / UHBVNL, Shakti Bhawan, Sector – 6, Panchkula or DHBVNL, Vidyut Nagar, Hisar. All comments should be sent by messenger or through registered post so as to reach before 5 P.M. of 10th February 2008. Any interested person, who wants to be heard in person, should mention so.

Concerned utilities shall submit seven copies of reply to the objections / comments before 5.00 PM of 17th February, 2008 to the Commission and one copy to the objector.

The objectors may submit seven copies of rejoinder, if any, to the reply of the utilities on their objections before 5.00PM of 22nd February, 2008 to the Commission and one copy to the concerned utility. The objections should carry full name and postal address of the person sending the objection and shall be supported by an affidavit as per the Haryana Electricity Regulatory Commission (Conduct of Business) Regulations, 2004.

The submission of objections / reply to the objections / rejoinders and Public Hearing on the ARR of HPGCL, HVPNL, UHBVNL and DHBVNL shall be held before the Haryana Electricity Regulatory Commission as per schedule given hereunder :-

SN.	Licensee	Last date of filing objections	Last date of filing reply to the objections	Last date of filing rejoinder to the reply	Date of Public Hearing	Time	Venue of Public Hearing
1	HPGCL	10.02.2008	17.02.2008	22.02.2008	25.02.2008	11.30 A.M	Court room of Haryana Electricity Regulatory Commission, Bays No. 33-36, Sector 4, Panchkula
2	HVPNL	10.02.2008	17.02.2008	22.02.2008	26.02.2008	11.30 A.M	
3	UHBVNL	10.02.2008	17.02.2008	22.02.2008	27.02.2008	11.30 A.M	
4	DHBVNL	10.02.2008	17.02.2008	22.02.2008	28.02.2008	11.30 A.M	

The objectors and the petitioners may appear in person or through their authorised representative on the appointed date, time and place for making presentation of their case.

Secretary
Haryana Electricity Regulatory Commission

For the Group

- Which of the ARR is most important from consumer point of view for the purpose of making submission? And Why?
- How many days should be available to consumers/CSOs for making comments on the ARR and Tariff filing?
- Is the price fixed for getting a copy of ARR is justified? If not, then what is the possible solution to reduce this burden for consumers?
- What about the cost of participation during public hearings? How this expenditure should be financed so that the wider public interest is protected?

2. Understanding the ARR

The table given below provides information on the energy projections and transmission and distribution losses (T&D losses) for the respective years. It also provides information on the total cost of supplying power including power purchase cost, employee cost, operation and maintenance cost etc.

Table 1: Energy Projections made by DHBVN

	FY 2007-08	FY 2008-09 (Projected-I)	FY 2008-09 (Projected-II)
Energy Input (MU)	12562	13158	13158
Loss (%)	29	26	24
Loss (MU)	3452	3421	?
Energy Sales (MU)	8982	9737	?
Total Cost of Supply (Million Rs.)	25906	29130	29130

For the Group

- What is average cost of supplying power to consumers for the year 2007-08?
- What is the average cost of supplying power if 26% of T & D losses are allowed
- What is average cost of supplying power if 24% of T & D losses are allowed
- What will be the total savings to all the consumers if the whole gain on account of reduction in T&D losses (from 26% to 24%) is transfer to them as a rebate in tariff?

3. Understanding T & D Losses

The given below Table (3) provides information on the energy purchased and energy sold to consumers by a power distribution company.

Table 3: Energy sale and energy purchased (Monthly basis)

Month	Energy Purchased [MU]	Energy Sales [MU]
Jan'06	1004.12	585.72
Feb'06	1041.69	597.83
March'06	943.67	567.98
April'06	914.49	562.26
May'06	881.91	597.96
June'06	987.50	623.66
July'06	908.18	639.64
August'06	895.74	672.00
Sept'06	882.95	680.99
Oct'06	910.87	656.78
Nov'06	1022.42	664.92
Dec'06	1044.33	656.18

For the Group

- On the basis of this information given in Table 3 calculate the month wise percentage distribution losses average distribution losses for the whole year (2006)
- comments on the trend of these losses

Annexure 5

Simulation Exercise: Tariff Regulation: Key Issues

1. Understanding the tariff structure

Table 1 provides information on the existing and the proposed tariff structure.

Table 1: Tariff Structure for various consumer categories (In Rs.)

Category of Consumers	Existing Tariff	Proposed Tariff		
	Energy Charges	Demand Charges	Energy Charges	Demand Charges
Rural Domestic (0-50 Units)	1.55	0.00	1.75	Rs. 20/- per KW
Rural Domestic (51 Units +)	2.20	0.00	2.75	Rs. 20/- per KW
Urban Domestic (0-50 Units)	1.55	0.00	1.75	Rs. 20/- per KW
Urban Domestic (51 Units +)	2.20	0.00	2.75	Rs. 20/- per KW
Non Domestic (0-100 Units)	2.64 + 1.46	0.00	3.04 + 1.46	Rs. 40/- per KW
Non Domestic (101 Units +)	3.04 + 1.46	0.00	3.44 + 2.46	Rs. 40/- per KW
Agricultural Metered – General Category	0.70	0.00	0.95	0
Urban Wells (before 1995)	1.10	0.00	1.65	0
Urban Wells (From 1995)	1.40	0.00	1.65	0
Farmhouse Wells	2.20	0.00	2.75	0
Agriculture – Flat				
General Category	60.00 per HP	0.00	0	Rs. 85/- per HP
Urban Wells (before 1995)	95.00 per HP	0.00	0	Rs. 145/- per HP
Urban Wells (From 1995)	120 per HP	0.00	0	Rs. 145/- per HP
Farmhouse Wells	----	0.00	0	Rs. 145/- per HP
Nursery	1.40	0.00	1.65	0
Poultry – Rural	1.10	0.00	1.65	0
Poultry – Urban	1.40	0.00	1.65	0
Small Industry	2.03 + 1.46	0.00	2.03 + 1.46	Rs. 30 per HP
Medium Industry	2.36 + 1.46	0.00	2.36 + 1.46	Rs. 45 per HP
Large Industry	2.59 + 1.46	0.00	2.59 + 1.46	Rs. 70 per kVA
Public Water works – Small	2.03 + 1.46	0.00	2.03 + 1.46	Rs. 30 per HP

Public Waterworks – Medium	2.36 + 1.46	0.00	2.36 + 1.46	Rs. 45 per HP
Public waterworks – Large	2.59 + 1.46	0.00	2.59 + 1.46	Rs. 70 per kVA
Bulk supply to mixed load	2.36 + 1.46	0.00	2.36 + 1.46	Rs. 45 per HP
Electric Traction	2.59 + 1.46	0.00	2.59 + 1.46	Rs. 70 per kVA
Public Street Lighting (I Lac population)	1.54 + 1.46	0.00	1.54 + 1.46	Rs. 30/- per point
Public Street Lighting (more than I Lac population)	1.84 + 1.46	0.00	1.84 + 1.46	Rs. 45/- per point

For the Group

- What is the justification for charging the demand charges separately from the energy charges?
- Calculate the percentage increase in billed amount (proposed) for the consumption of 100 units (KWH) and connected load 1KW assuming tax and other surcharges as nil for the following categories
 - a. Rural Domestic
 - b. Urban Domestic
 - c. non Domestic
 - d. Agriculture metered (general categories)
- What are the implications of the metered and un-metered supply to agriculture sector on the utility's revenue and efficiency in consumption?

2. Some Issues in the Tariff Application

1. Dakshin Haryana Bijli Vitran Nigam Limited has made the following observations in its ARR petition for the year 2008-09 on the matter pertaining to subsidy to some specific consumer categories.

a). Subsidy to some Consumer Categories

- The State Govt. has decided that electricity tariff applicable to registered *Gaushalas* (A place where cows are kept for non-commercial purpose) should be Rs.2 per unit. The State Govt. would provide an amount of Rs.2000/- per month per registered Gaushala on this account
- As per directives of the State Govt., the tariff of horticulture & fisheries has been revised from existing Rs. 4.28 per unit to Rs. 2/- per unit. It was decided that the difference between the cost of supply to these consumers and the tariff charged would be compensated by the State Govt. in the form of direct subsidy in line with subsidy given to agriculture pump-set consumers.

b). Change in tariff to certain consumer categories:

The following incentives were allowed by the Licensee to the consumers:

- Rebate of 10 paise per unit to women consumers (where domestic connection has been issued in the name of women consumers)

- Charging of domestic tariff instead of non-domestic tariff from Elementary Schools. (It may be noted that non-domestic tariff is about 40% higher than the domestic category.)
- Financial incentive of 5% for rural domestic and rural agriculture pump set consumers who have been regularly paying their bills for last 10 months prior to 17.6.2005.
 - The Hon'ble Commission in its orders dated 14/11/2005 on the ARR of DHBVN for FY 2005-06, under directive No.5, directed the Licensee to seek compensation from the State Govt. for the incentives allowed to the consumers.
 - The matter was taken up with the State Govt. jointly by UHBVN & DHBVN. The State Govt. vide letter dated 31/08/2007 has asked the distribution licensees to approach HERC for allowing this expenditure as a part of ARR. Accordingly the financial impact of these incentives amounting to Rs.8.03 million is being claimed in the ARR.

For the Group:

What objections you must raise, if any in the above matter? Why/Why not?

|

Annexure 6

Simulation Exercise: Understanding Electricity Consumption & Bill

1. Electricity consumption for various uses of electricity

Table 1 represents the capacity and number of various equipments used in a household and with time duration. Read the table carefully and answered the questions.

Table 1: Various Electrical Equipment used by a household
(Electricity tariff Rs. 4 per unit)

Name of the Equipment	Number	Average running hours	Daily Consumption (Kwh)	Monthly Consumption (Kwh)	Total Expenditure (Rs.)	
Bulb (100 W)	5	10				
Bulb (60 W)	5	10				
Tube light (40 W)	5	10				
Fan (50 W)	5	20				
Geyser (2000 W)	1	4				
Air Conditioner (2000 W)	1	6				
Iron (2000 W)	1	1				
Toaster (1000 W)	1	1				
Aggregate Consumption and Expenditure						

On the basis of Information given, please complete the table

2. Understanding various components of electricity bill

The following charges are applicable to the domestic users in Rajasthan

- Demand Charges= Rs 60 per KW
- Energy charges = Rs. 4.00 per unit for the fist 100 units and Rs. 5.00 for every unit above 100 units
- Govt Duty (Tax) = 20 Paise per unit urban and 10 Paise for rural consumers

On the basis of information given below calculate the electricity bill for a rural domestic consumer for two months

Connected Load (Demand) = 2 KW

Units consumed = 180

If a consumer failed to deposit the dues by the due date how much surcharge he would be required to pay assuming 24% per annum rate of interest

3. Checking the accurate functioning of meter

i) Suppose meter -reading is taken every two months. On basis of following information calculate the units consumed by a household.

Old Reading

5	6	8	9	4
1000	100	10	1	1/10

New Reading

5	8	6	4	2
1000	100	10	1	1/10

ii) Suppose on the meter plate it is mentioned “Revolution1800/ KWH”. Then, answer the following questions

- How will you check the accurate functioning of your energy meter?
- If you have connected 1 KW load (say 1000 watt room heater), how many times the wheel should rotate per minute?
- If the same was reported 60 times per minute, comment on the accuracy of the metering
- Please give three important suggestions to ensure accurate metering and billing
- What are various important factors responsible for sudden change in the electricity bill/consumption

Annexure 7

Simulation Exercise: Energy Conservation: Role of Consumer

1. The government of India as well as Rajasthan have 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.

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

2.. Bureau of Energy Efficiency (BEE), (a Govt of India enterprise), 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)
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 Rs. 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 Rs. 10,000 and Rs. 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 remain same Rs. 4 per unit.

3. In a state economy like Rajasthan, 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.

- 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) _____

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

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 Rs. 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.

Annexure 8

Simulation Exercise: Energy Efficiency and Electrical Equipment Rating

Current Appliance Ownership

a	b	c	d	e	f
Sr. No.	Appliance	Number	Rating	Duration of use (hrs/day)	Consumption (dxe)
1	Lights				
	Incandescent bulbs				
	Tube Lights				
	CFLs				
	LEDs				
2	Fan				
3	Refrigerator				
	Single door manual defrost				
	Double door automatic defrost				
4	Air Conditioner/Cooler				
5	Television				
	Colour				
	Black and White				
6	Electric water heater				
				Total Consumption	_____ kWh/day

Tariff

- For consumers using only 1 – Rs.1.50/kWh
- For consumers using only 1, 2 and 5 – Rs.3/kWh
- For consumers using 1, 2, 3, 5 and 6 – Rs.4/kWh
- For consumers using all 6 – Rs.5/kWh

Total amount paid for energy consumed = _____ Rs./year

Energy Efficiency Scenario

- Lights
 - a. Option a – No change possible
 - b. Option b – Appliance can be changed
 - c. Option c – Use of appliance can be stopped/reduced
- i. Which option do you choose? →
 - 1. Current consumption = _____ kWh
 - 2. Reduced consumption = _____ kWh
 - 3. Savings = _____ kWh/year
 - 4. Cost savings = _____ Rs./year
 - 5. Investment = _____ Rs.
 - 6. Simple Payback period = _____ years

- Fan
 - a. Option a – No change possible
 - b. Option b – Appliance can be changed
 - c. Option c – Use of appliance can be stopped/reduced
 - i. Which option do you choose?
 1. Current consumption = _____ kWh
 2. Reduced consumption = _____ kWh
 3. Savings = _____ kWh/year
 4. Cost savings = _____ Rs./year
 5. Investment = _____ Rs.
 6. Simple Payback period = _____ years

- Refrigerator
 - a. Option a – No change possible
 - b. Option b – Appliance can be changed
 - c. Option c – Use of appliance can be stopped/reduced
 - i. Which option do you choose?
 1. Current consumption = _____ kWh
 2. Reduced consumption = _____ kWh
 3. Savings = _____ kWh/year
 4. Cost savings = _____ Rs./year
 5. Investment = _____ Rs.
 6. Simple Payback period = _____ years

- Air Conditioner/Cooler
 - a. Option a – No change possible
 - b. Option b – Appliance can be changed
 - c. Option c – Use of appliance can be stopped/reduced
 - i. Which option do you choose?
 1. Current consumption = _____ kWh
 2. Reduced consumption = _____ kWh
 3. Savings = _____ kWh/year
 4. Cost savings = _____ Rs./year
 5. Investment = _____ Rs.
 6. Simple Payback period = _____ years

- Television
 - a. Option a – No change possible
 - b. Option b – Appliance can be changed
 - c. Option c – Use of appliance can be stopped/reduced
 - i. Which option do you choose?
 1. Current consumption = _____ kWh
 2. Reduced consumption = _____ kWh
 3. Savings = _____ kWh/year
 4. Cost savings = _____ Rs./year
 5. Investment = _____ Rs.
 6. Simple Payback period = _____ years

- Electric Water heater
 - a. Option a – No change possible
 - b. Option b – Appliance can be changed
 - c. Option c – Use of appliance can be stopped/reduced

i. Which option do you choose?

1. Current consumption = _____ kWh
2. Reduced consumption = _____ kWh
3. Savings = _____ kWh/year
4. Cost savings = _____ Rs./year
5. Investment = _____ Rs.
6. Simple Payback period = _____ years

Total savings

- Energy savings = _____ kWh/year
- Cost savings = _____ Rs./year
- Investment = _____ Rs.
- Simple Payback Period = _____ years

What should the role of various ‘stakeholders’ be in promoting DSM?

- (a) Central Government
- (b) State Government
- (c) State Electricity Regulatory Commission
- (d) State Electricity Distribution Company
- (e) Civil Society Organisations
- (f) Consumers

Reference tables

Annexure: Electricity consumption data for some domestic equipment ¹¹				
S.No	Name	Watts ¹¹	Typical number of hours of operation per day	Units consumed in 30 days
1	Air Conditioner 1 Tonne	1300	6	234
2	Air Conditioner 1.5 Tonne	2000	6	360
3	Desert Cooler	200	6	36
4	Electric Iron - big	1000	1	30
5	Fan - Ceiling: usual (36/48 inches span)	50	10	15
6	Fan - Table (12/16 inch span)	40	10	12
7	Geyser (25/35 Litres)	1500	1	45
8	'Zero Watt' bulb-	15	8	3.6
9	Bulb	40	4	4.8
10	Bulb	60	4	7.2
11	Bulb	100	4	12.0
12	CFL	11	4	1.3
13	CFL	15	4	1.8
14	CFL	20	4	2.4
15	Tube light - 2 feet	28	4	3.4
16	Tube light - 4 feet	50	4	6
17	Mixer - big	200	1	6
18	Mixer - small	50	1	1.5
19	Radio/Tape recorder	50	4	6
20	Refrigerator - big (300 Litres)	220	10	66
21	Refrigerator - small (165 litres)	180	10	54
22	TV B/W	25	6	4.5
23	TV Colour 17 inch	100	6	18
24	TV Colour 21 inch	160	6	29
25	Washing Machine	200	1	6
26	Water pump medium (5 hp)	3730	9	1007
27	Water pump small (1 hp)	746	9	201
28	Personal Computer	250	6	45

Energy Efficient Appliances

What rating of CFL gives the same light (lumens) as that of an incandescent bulb?

40 watt incandescent bulb → 11 watt CFL

60 watt incandescent bulb → 16 watt CFL

75 watt incandescent bulb → 20 watt CFL

100 watt incandescent bulb → 30 watt CFL

Cost of CFLs : Rs. 70-150 depending on rating (higher for higher rating)

	Rating (kWh)	Cost (Rs.)
EE fan		
EE TV		
EE Refrigerator		
EE AC		
Solar Water heater		20-25,000