# REVIEW AND RECOMMENDATIONS ELECTRICITY TARIFF FIXATION COMMISSION

Prepared for

His Majesty's Government of Nepal
Ministry of Water Resources
Electricity Development Center

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# Acronyms

| | |
|---|---|
| BPC | Butwal Power Company |
| CWIP | Construction Works in Progress |
| DOE | U S Department of Energy |
| EDC | Electricity Development Center |
| ETFC | Electricity Tariff Fixation Commission |
| HDU | Hydroelectric Development Unit |
| kWh | Kilowatt Hour |
| LRMC | Long Run Marginal Cost |
| MOWR | Ministry of Water Resources |
| MW | Megawatt |
| NEA | Nepal Electricity Authority |
| NFCCI | Nepal Federation of Chambers of Commerce of Industry |
| PPA | Power Purchase Agreement |
| ROA | Return on Assets |
| ROE | Return on Equity |
| ROI | Return on Investment |
| SRMC | Short-Run Marginal Cost |
| WEC | Water and Energy Commission |
| WECS | Water and Energy Commission Secretariat |

# Preface

This report serves to provide an analysis of Nepal's Electricity Tariff Fixation Commission (ETFC) and recommendations for strengthening its overall performance. A review is provided of the ETFC's goals and defining legislation and regulations, and the institutional arrangements that have developed in practice. Recommendations are provided to improve the regulatory and institutional arrangements, based on effective regulatory practices identified in other countries. Recommendations are also provided for a technical training program for ETFC personnel and for development of a data documentation center.

This report was developed in part through consultation with staff from the ETFC and from several other organizations. These persons have either contributed to the creation, development, or operation of the ETFC, or that have dealt with the ETFC in their professional positions. A wide range of opinions were taken regarding current and required powers, structures, and operations of the ETFC. The persons who were consulted during this analysis include, but are not limited to, the following:

- Mr. Shanker Krishna Malla, Chairman, Electricity Tariff Fixation Commission
- Mr. Vijaya Shankar Shrestha, EDC Director General and ETFC Secretary
- Mr. M.D. Pohkrel, Senior Engineer, Electricity Development Center
- Mr. Raj Kumar Bajracharya, ETFC board member and NEA manager
- Mr. Dale Nafzieger, Butwal Power Co. Ltd.
- Mr. Chudamani Raj Singh Malla, Lawyer
- Dr. Manik Ratna Tuladhar, NEA, Chief of the Systems Planning Department
- Mr. Surya Nath Upadhaya, current Secretary, Ministry of Environment and Population, and previous Secretary, Ministry of Water Resources
- Dr. Binayak Bhadra, Principal Advisor to the Prime Minister, Infrastructure Division
- Mr. Sharma, Economist
- Dr. Rokaya, Electrical Engineer

The report has seven sections. Section 1 provides a background. Sections 2 and 3 provide a review of the regulatory and institutional framework, respectively. Section 4 presents operational guidelines for determining tariff rates. Section 5 provides detailed recommendations for improving the performance of the ETFC. Section 6 presents a comparison of the regulatory practices of other countries. Sections 7 and 8 provide recommendations for training programs for ETFC personnel and for creation of a data documentation center, respectively.

# Executive Summary

Prior to 1991, Nepal's economic growth was impeded by several factors, including a lack of natural resources and physical infrastructure, a weak governing system, and high population growth Economic and infrastructure development were also dependent on foreign assistance In 1991, Nepal undertook a program to liberalize many sectors of its economy in order to improve and sustain its development potential The goal of the liberalization program is to encourage growth by increasing the participation and investment of the private sector, and by reducing the economic planning controls of the government These reform measures have helped to produce a high rate of economic growth

Growth remains constrained by several factors, including inadequate infrastructure, especially in electricity supply Economic growth of 6% is expected in 1996,[1] but the demand for electricity is growing at an annual rate of 9 7% [2] Nepal currently has 293 MW of installed electricity generation capacity, mostly in the form of hydropower plants [3] Most of this capacity is controlled by the state monopoly, the Nepal Electricity Authority (NEA) To meet the rapidly growing demand for electricity, Nepal estimates that each year an additional 25-30 MW must be added to installed capacity [4] Most of the existing plant was built from public and foreign assistance funds, but these traditional sources of finance are declining The government does not have sufficient resources to finance all of the investment required in the power sector This is a main reason why much of the liberalization laws concerned improvements in the electricity supply sector The laws establish the fundamental regulatory and promotional framework for improving sector efficiency and attracting the private sector

The Electricity Act (1992) establishes the fundamental regulatory framework for increasing both the efficiency of the sector and the level of private sector participation The Act defines the legal framework for licensing electricity suppliers, and for safety, planning, and inspection The Act also establishes two bodies for regulating and promoting private sector participation in electricity supply The Electricity Tariff Fixation Commission (ETFC) was created to regulate retail tariffs and other charges of licensed suppliers Another body, a Hydro-electric Development Unit (HDU) was created to develop the hydropower sector with private sector participation

The ETFC is charged with establishing tariff rates for electricity sector licensees based on the service they provide Licensees falling under the jurisdiction of the ETFC include those suppliers that are providing more than 1000 kW and who are connected to the national electricity supply grid The Act provides the ETFC with a decision making board and with an inconclusive list of parameters to consider while establishing tariff rates and other charges The Act does not, however, provide any information about the overall economic or sector goals to be achieved in establishing tariffs, such as ensuring the efficient use of resources and the interests of the consumers

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[1] Memorandum of the President of the International Development Agency to the Executive Directors on a Country Assistance Strategy of the World Bank Group for Nepal, April 30 1996 Table Nepal Key Economic Annex 5 Pg 1 of 3

[2] Nepal Electricity Authority A Report of Systems Planning Studies and Investment Program, April 1996 Pg 1

[3] Ibid, Section 3 2 Existing System.

[4] Ibid, Table 2 1 Load Forecast (Peak Load)



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In subsequent developments, the Electricity Development Center (EDC) was established to perform the role of the HDU, and also to perform the fundamental regulatory functions of the entire electricity supply sector, which include licensing, inspecting, planning, and setting standards

The ETFC Regulations (1993/94) expand on the provisions in the Act to define additional regulations regarding the powers, structure, and operations of the ETFC These regulations were first passed in 1993, but amended twice, with the latest revision dated 1994 These additional regulations give the ETFC powers to collect information to assess a tariff rate request, and to consult with those who are impacted by tariff rates revisions The ETFC is responsible for keeping the public informed of rate changes

Institutionally, the ETFC is an autonomous body that communicates with the government through the Ministry of Water Resources (MOWR) It is composed of six members who serve terms of various length Five members are chosen by the government a Chairman, selected from the non-governmental sector, to a three year term, an economist from non-governmental sector, to a three year term, a representative from the MOWR, a representative from among the electricity sector licensees, to a three year term, and a representative from among the consumers, to a three year term. The sixth member is selected by the Nepal Federation of Chambers of Commerce of Industry from among its members

The regulations provide the ETFC with a Secretariat, and name as Secretary the Director General of the EDC Thus, a link between the two related regulatory bodies is established All costs of the ETFC and the Secretariat are funded by the government The government also defines all member remuneration

The regulations also define the procedures for ETFC meetings and for determining tariffs and other charges for licensees They expand on the number of parameters defined in the Act that the ETFC is required to consider in setting rates In addition, the parameters are broken up into three distinct categories (i) factors that must be satisfied for government licensees This requirement states, in part, that tariff rates must be set for government licensees so that the licensee can meet the conditions of any financial covenant it makes with its financial institutions These factors were added into the second revision of the regulations at the suggestion of the World Bank, (ii) factors that must be considered, which include rate of depreciation, reasonable profit, marginal cost, and others, and (iii) factors that may be considered, which include the efficiency of operation of the licensee and social considerations The regulations thus provide a set of guidelines that the ETFC must follow to set rates, but do not define the overall method that must be used

The ETFC was formed in 1994, and evaluated its first tariff rate review in 1996, for the NEA During this case, the ETFC found that the existing regulations were insufficient to allow it to function properly Thus the ETFC adopted a number of institutional arrangements and procedures Structural deficiencies in the regulatory and institutional framework, however, prevented the ETFC from performing an independent analysis of the NEA tariff rate request The ETFC did not have dedicated staff to perform the analysis EDC staff was used to perform what little analysis could be done Also, the ETFC did not have a complete methodology established for evaluating a tariff rate request Lacking a full staff and a comprehensive analysis methodology, the ETFC was unable to adequately evaluate the data and methods used by the NEA to determine its investment plans, financial position, and revenue requirements Since the NEA is a government licensee, the ETFC had to set tariffs that satisfied specific rate of return on assets and self-financing ratios agreed to between the NEA and multilateral development banks Due to the large increase in the system expansion plan, meeting these revenue covenants required a large increase in NEA's tariff rates

The performance of the ETFC during the NEA rate review illustrates many of the deficiencies in the governing regulatory and institutional framework In addition, the framework often differs considerable from the best practices of effective regulatory bodies in other countries To ensure the independent, transparent, and effective operation of the ETFC, the following improvements in the regulatory and institutional framework are recommended These are described in more detail in Section 5

### (a) Recommendations for the Powers and Responsibilities of the ETFC

- The goal or goals to be achieved in establishing tariff rates should be identified in the regulations These should include, as a minimum, the interests of the consumers and the efficient use of resources
- The role of the ETFC in approving tariff rates specified in power purchase agreements (PPAs) between the buyer and purchaser of electricity should be clarified The ETFC should not take part in the determination of tariff rates negotiated for PPAs
- Regulations should clearly state that the ETFC has the power to define its own procedures for setting tariff rates and other charges
- The ETFC should be given additional powers to collect financial and operational information from licensees on a regular basis
- The ETFC should be required by regulation to make available to the public the information it receives from a licensee for a rate review
- The ETFC should be required by regulation to solicit public opinion regarding a tariff rate review
- The ETFC should be required by regulation to provide to the public the reasons for making a decision
- The ETFC should have the power to enforce its decisions

### (b) Recommendations for the Structure of the ETFC

For improving independence

- The institutional location of the ETFC should be clarified The regulations should state that the ETFC must communicate with the government through the MOWR for budgeting and reporting, but should also state that the ETFC does not fall under the jurisdiction of the MOWR.
- A second government body should take part in the selection of ETFC members
- ETFC operations should ultimately be funded by fees assessed to the licensees that fall under its jurisdiction
- The member position of the MOWR representative should be removed
- The ETFC should be permitted to select its own Secretary
- Minimum experience qualifications of ETFC members should be defined in the regulations Each member should have at least 15 years of experience in his field of expertise
- Restrictions on professional experience/opportunities and financial interests of ETFC members should be defined
- A set and limited membership term for each ETFC member should be defined
- The conditions and procedures under which ETFC members can be removed should be defined

For improving efficiency

- The number of ETFC members should be reduced from six to five
- Regulations should specify that each ETFC member has one vote, including the Chairman
- Meeting procedures should be better defined The process of selecting an interim chairman needs to be established, and the quorum requirement needs to be better defined
- The ETFC should have more professional staff

(c) **Recommendations for the Operations of the ETFC**

- Regulations should clearly state the ETFC has the powers to determine its own procedures for evaluating tariff rates
- All factors that the ETFC is required to consider while setting tariff rates must be clarified and revised
- The ETFC should not be bound to set tariff rates that allow a government licensee to meet financial covenants that the ETFC has not approved
- The ETFC should be required to use standard accounting principles
- The number of times that a single licensee can submit an application for a tariff rate review should be limited to once in any twelve month period

# 1 Background

## 1 1 Economic Development Needs and Policy

Nepal's development efforts in recent decades have been constrained by several fundamental factors, including a lack of natural resources, underdeveloped physical infrastructure, high transportation costs due to its geography, a weak administrative and political system, and high population growth. Nepal has been dependent on substantial amounts of foreign aid for development

Political change, historically poor development progress, and a desire to reduce its dependence on foreign aid led Nepal in 1991 to initiate measures to liberalize the economy The reform goals were to spur development by engaging the private sector in the financing and operation of business, and to reduce the government's role in economic planning Major efforts were made in liberalizing industrial and trade policies, and the foreign exchange regime With few exceptions, the industrial licensing system for domestic investment was eliminated, and foreign investment regulations were greatly simplified Efforts were also initiated to privatize state firms

Nepal's economy has benefited from these measures, and has recorded high growth rates since 1991, although much of this growth remains dependent on foreign aid Private sector investment is growing, but substantial investments are needed in physical infrastructure to assist with overall development This is true especially in the electricity sector Only 14% of Nepal's population has access to electricity, most of which is provided by costly hydropower plants that were constructed from public and international assistance funds Electricity demand exceeds supply, resulting in frequent load shedding

Electricity is vital for sustaining growth, so Nepal needs to increase its supply capacity This urgent need is confounded by the high cost of adding additional hydropower plants that can no longer be financed solely with public funds Installing hydropower capacity in Nepal is costly for several reasons The mountainous geography and remote locations of hydropower sites leads to high construction and transportation costs Capital costs involved in the construction of hydropower plants are much greater than those for thermal plants The inability to adequately finance the electricity needs has led Nepal to develop a policy conducive to engaging the involvement of the private sector in developing electricity supply

## 1 2 Electricity Supply and Demand

Nepal's economy is growing rapidly, as are many other Asian economies Leading Asian economies have annual growth rates between 6% and 8% Nepal's economy is expected to grow 6% in 1996 and 5% in 1995[1] This high rate of growth has led to an even higher growth rate in the demand for electricity, now estimated at 9 7% annually[2] Insufficient supply has led to load shedding, which has reduced output and productivity, and to a slowdown in the connection of new customers, which reduces future output and growth The small percentage of the population that enjoys access to electricity is located primarily in the Kathmandu valley and in some other small urban and rural areas High growth in already serviced urban and rural areas, and ambitious goals of expanding rural electrification are the main factors that are driving growth in electricity demand

[1] Memorandum of the President of the International Development Agency to the Executive Directors on a Country Assistance Strategy of the World Bank Group for Nepal April 30 1996 Table Nepal Key Economic Annex 5 Page 1 of 3

[2] Nepal Electricity Authority A Report of Systems Planning Studies and Investment Program, April 1996 Page 1

Nepal has traditionally exploited its vast water resources to provide electricity It has 293 megawatts (MW) of installed capacity, and 250 MW (or 85%) of this is provided by hydroelectric plants located in various regions of the country[3] The remainder is provided by multi-fuel plants A government monopoly, the Nepal Electric Authority (NEA) currently controls most of the energy supply infrastructure Nepal estimates that, to meet its rapidly growing demand, it must add about 25-30 MW of installed capacity annually[4] Nepal has adopted a policy of meeting this supply goal primarily with new hydropower plants, while keeping the use of thermal plants to a minimum. This preference for hydro plants results from several factors, including the risk of interrupted fuel supplies from India, the high cost of imported fuels using scarce foreign currency, and environmental concerns Nepal also envisions earning substantial foreign currency by exporting excess hydropower-generated electricity to northern India, where electricity demand is growing rapidly and outpacing supply

Government resources are insufficient to publicly finance the addition of 25-30 MW of hydropower capacity that is required annually Declining foreign assistance also makes this goal more difficult to reach The only alternative to a sustained supply deficit is to engage the private sector in the financing and operation of electricity supply For these and other reasons, the government included reform of the electricity sector in its overall economic liberalization strategy

## 1 3 Electricity Development Policy and Laws

The government in 1992 established policies and supporting laws to define the country's priorities and goals for the electricity sector, and the tools that will be created to meet those objectives A strong component of this work was to establish a legal and regulatory environment that would improve and encourage private investment in the electricity supply sector

The Hydropower Development Policy (1992) defines Nepal's overall power objectives These include meeting the urban, rural, and industrial energy demand through exploitation of the country's vast hydropower potential The Policy establishes the work required and addresses several investment and financial factors relating to engaging private sector participation These factors include investment avenues, ownership, electricity selling rates, royalties, taxes, foreign exchange, and export provisions

To meet these development objectives, the government established a legal basis for regulating the use and development of water resources and electricity The Water Resources Act (1992) establishes the fundamental regulations for the rational use, conservation, management, and development of water resources, while retaining legal provisions and preventing adverse environmental effects on the water supply

The Electricity Act (1992) establishes the fundamental legal framework for regulating the electricity sector so that the efficiency of the sector will be improved, and that private sector investment will be increased The Act specifies the regulations for the survey, generation, transmission and distribution of electricity It also provides the standards for licensing, inspecting, planning, and safety The Act establishes three important regulatory bodies to help meet these overall development and regulatory goals a Hydro-electricity Development Unit (HDU), a Electricity Tariff Fixation Commission (ETFC) and the Chief Electrical Inspector

[3] Ibid, Section 3 2 Existing System.

[4] Ibid, Table 2 1 Load Forecast (Peak Load)



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In subsequent developments, the government established the Electricity Development Center (EDC) in lieu of the HDU The EDC is charged with carrying out specific regulatory functions for licensing, surveying, inspecting and planning in the electricity sector The EDC also plays the key role of actively encouraging private sector investment in the sector The Electricity Regulations (1993) define provision for licensing the survey, generation, transmission, and distribution of electricity, technical and safety standards and performance measures, and provision for inspection and investigation

The Electricity Tariff Fixation Commission Regulations (1993 and 1994) define the powers, structure, and operations of the ETFC The ETFC has the power to set retail tariffs and other charges for electricity sector licensees so that the needs of electricity suppliers and consumers are balanced ETFC must set tariff rates in a transparent manner, and is to be structured with an independent member board for making decisions The ETFC must take into account a wide array of financial, economic, technical, and social factors while setting these tariff rates

This report provides an in-depth analysis of the ETFC Section 2 provides a review and assessment of the laws and regulations governing the ETFC Section 3 defines the additional institutional arrangements that the ETFC has developed in practice Section 4 provides operational guidelines for determining tariff rates Section 5 provides detailed recommendations on revising the regulatory and institutional framework of the ETFC to improve its effectiveness Section 6 presents a comparison of regulatory practices in other countries Section 7 provides recommendations on a training program for ETFC personnel Finally, Section 8 presents recommendations for developing a data documentation center for the ETFC



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# 2 Legislative and Regulatory Arrangements

To evaluate the legal and regulatory framework of the ETFC, it is useful to first describe the objectives, functions, and tools common to effective electricity regulatory agencies Regulation is usually introduced into an electricity market to ensure that reliable service can be provided in a safe and efficient manner with reasonable and stable prices, with no undue preference for any consumer group

Key functions that an electricity regulatory agency usually performs include

- Issuing licenses for the survey, generation, transmission, and distribution of electricity
- Conducting project reviews and system-wide studies
- Inspecting and monitoring the construction and operation of assets used in the generation, transmission, and distribution of electricity supply
- Developing guidelines for construction and operation of assets, and for safety
- Setting tariffs
- Applying penalties for non-compliance

A regulatory agency that can meet these divergent goals must have certain basic characteristics and tools It must be independent of influence from political and other special interests in order to analyze the sector and to make effective, market based decisions The agency must be able to define its own internal procedures, including determining its own analytical methods The agency must have sufficient professional staff, analytical tools, and budgets so that it can conduct evaluations within reasonable timeframes The operations and methods that the agency adopts must be well-founded and transparent to all parties involved The agency must be fully accountable to the public Finally, the agency must have the capability of enforcing its decisions

With these characteristics, a regulatory agency is better able to determine a price for electricity that is based on a wide range of financial, economic, technical, and social market forces, rather than on political desires It manages the sector using accepted standard practices for licensing, reviewing, monitoring, inspecting, and establishing safety measures These efforts improve overall sector efficiency, and play a major role in providing safe and reliable power from public and private sources required for overall development

## 2 1 Legislation

Nepal's economic liberalization efforts generated a large body of law, much of which covers the electricity sector This analysis will cover those legal provisions that apply to the ETFC and to the setting of tariff rates The main legal provisions are the Electricity Act, the Tariff Fixation Commission Regulations, and the Electricity Regulations, though others are referenced

### 2 1 1 Electricity Act (1992)

The Electricity Act is the primary legislation for liberalizing the electricity sector The overall goal of the Act is to develop the electric power sector by regulating the survey, generation, transmission and distribution of electricity and by standardizing and safeguarding the electricity services The Act defines electricity as electric power generated from water, mineral oil, coal, gas, solar energy, wind energy, atomic energy and any other means



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The Act defines the fundamental regulations for the sector Key among these are

- Licensing A license is required for the survey, generation, transmission, and distribution for anv electricity supply exceeding 1000 kW
- Ownership
- Financial incentives and facilities royalties, taxes, depreciation, foreign exchange
- Import and export requirements
- Environmental controls
- Provisions under which the government will purchase electricity
  - government rights concerning the generation and development of energy and framing rules on specific legal and technical issues
- Creation of a Hydroelectricity Development Unit (HDU), to develop the hydroelectricity sector and to encourage private sector participation
- Creation of a Tariff Fixation Commission (ETFC) to set tariff and other charges for government and other licensees
- Chief Electrical Inspector

The Act establishes two agencies, the HDU and the ETFC, to develop and regulate the electricity supply sector The Act does not specify the creation of a single agency to perform all regulatory functions for the sector In subsequent work, the government created the EDC to regulate all non-tariff related provisions of the sector and to perform the development role defined for the HDU It is common in many countries to have a single agency perform all regulatory functions for governing the electricity sector Nepal's electricity regulatory structure differs from this common form because in Nepal, two agencies perform regulatory functions

### (a) Electricity Development Center

The EDC performs regulatory and sector development functions EDC regulates all non-tariff related components of the sector Key EDC functions include

- Survey and feasibility studies
- Project evaluation and licensing
- Project promotion and monitoring
- Project inspection
- Sector planning (though this role may be revised)

The EDC is also charged with promoting the development of the hydroelectricity sector, and encouraging the financial and managerial participation of the private sector in attaining these development goals To promote this private sector role, the EDC administrates for the electricity sector the government's 'one window' foreign investment policy This policy is defined in the 1992 Foreign Investment and One Window Policy Act The Act defines investment avenues, profit repatriation provisions, and facilities and concessions It also establishes a one-window policy for approving and making arrangements for foreign investment The EDC is thus a regulatory and private sector promotion agency The responsibility of setting tariffs, however, lies with the ETFC

### (b) Electricity Tariff Fixation Commission

Section 17 of the Act creates the ETFC Sections 17 and 18 define the fundamental regulations for the ETFC These include

- To fix electricity tariff and other charges for government and other electricity sector licensees
- To establish a member board of at least five persons to decide on tariff rate requests Members are to be representatives from the following groups (i) the governmental sector, (ii) economists, (iv) electricity supply sector, (vi) consumers
- To fix tariffs on the basis of an inconclusive list of financial, economic, technical, and social factors These include the "rate of depreciation, reasonable profit, mode of operation of the plant, changes in the consumer price index, and royalties, etc "
- To ask for and receive relevant information or documents from any relevant company, person, institution or corporate body as is necessary for the ETFC to perform its functions
- To set different tariff rates for different types of consumers
- To establish its own internal working procedures

(c) **Comments on the Act and the ETFC**

'Other charges' are not defined in the Act They are defined in the Electricity Regulations, which are reviewed later

The regulations require the ETFC set tariffs for government or other licensees Special provisions have been made for licensees in which the government holds an ownership share of more than 50%

ETFC defines tariff rates for government licensees and other licensees who (a) are connected to the national grid and (b) provide service to a group of customers, but the tariff applies only to the service provided to those customers

The ETFC does not set tariffs for the following groups
- Non-licensed electricity suppliers (those involving up to 1000 kW)
- A government or other licensee that sells its power in bulk to another government or other licensee, whether or not this is done through the national grid These tariff rates for the bulk sale of power are defined in the Purchase Power Agreement that is conducted between the two licensees
- Government and other licensees who are not connected to the national grid These licensees determine their own tariff rates, provided that the rates are set so that all investments made in electricity generation, transmission, or distribution is recuperated over 25 years through deduction of depreciation costs and an earned dividend of 25% on share capital

Only those licensees that are connected to the national grid fall under the jurisdiction of the ETFC It is not clear that HMG/N has defined the 'national grid ' This point needs to be clarified, because only those licensees connected to the grid fall under the jurisdiction of the ETFC

The Act does not readily identify the exact mission and responsibilities of the ETFC, such as setting tariffs to ensure the efficient use of resources or to satisfy the interests of the consumer The Act defines that the ETFC fix tariffs based on an inconclusive number of factors The Act does not state the general goals that are to be attained when setting tariff rates (e g , to promote efficiency, to promote competition, to balance the interests of licensees and consumers, to electrify rural areas, etc ) Several financial factors are identified, but not defined Reasonable profit, mode of operation, and other factors are not explained The Act does not state that the ETFC should adhere to standard accounting principles while setting tariffs The Act also allows the ETFC to define its own internal working procedures It is not clear whether or not this means developing its own methodology to evaluate tariff rates

The Act defines only the fundamental requirements of the ETFC Under the Act, the government has the rights to define regulations for the electricity sector The detailed powers, structure, and operations of the ETFC are further defined in the Electricity Tariff Fixation Regulations This set of regulations is reviewed in the next section

# 2 2 Regulation

## 2 2 1 Electricity Tariff Fixation Regulations (1993 and 1994)

The Electricity Tariff Fixation Regulations define the additional regulations concerning the powers, structures, and operations of the ETFC The Regulations were first passed in 1993, but have since been revised twice The original set was developed by HMG/N The first revision was developed by HMG/N to address the status of the NEA and the Butwal Power Company (BPC) At the time that the original Regulations were passed, the NEA and BPC were not licensed, and so their tariff rates did not fall under the jurisdiction of the ETFC Revision I of the Regulations allowed that the tariff rates revisions for NEA and BPC need not be passed until the two utilities were licensed one year later

Revision 2 was created to add provisions that were recommended by multilateral development banks These provisions included a requirement that financial covenants agreed to between government licensees and their financial institutions must be satisfied with an appropriate tariff rate The provisions also include a special tariff rate provision relating to changes in fuel costs The full text of the Regulations (1994) is provided in Appendix A

The regulations can be organized into the following four groups, which are reviewed and commented on below

- Powers and Responsibilities
  - fixing tariffs and other charges for electricity sector licensees
  - calling expert witnesses
  - obtaining data relating to tariff request
  - notifying the public of established tariff rates
- Structures
  - bureaucratic organization
  - members selection, experience, and tenure
- Secretariat and Secretary
  - budget and salaries
- Operations
  - meetings
  - internal procedure determination
  - tariff rate evaluation process
  - financial, economic, technical, and social factors
  - information gathering
  - timeframes



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- Government Powers and Responsibilities
  - member selection
  - budget and salaries
  - financial support

### (a) Powers and Responsibilities

The regulations provide the ETFC with the following powers and responsibilities

- To fix and review tariffs and other charges for government or other electricity sector licensees, based on the service provided to customers
- To obtain the use of any person necessary in order to perform its functions
- To require any person, company, or other organization to provide any information required for evaluation of a tariff rate evaluation
- To define its own internal procedures and the right to form its own subcommittees, and to define the functions, duties, and rights of them
- To notify the public of tariff rates and other charges that it determines

### (b) Comments on ETFC Powers and Responsibilities

The regulations require the ETFC to set and review existing tariffs, but the overall goal to be met in setting tariffs remains undefined Such goal might include economic efficiency and the interests of the consumers They also do not require that the licensees provide to the ETFC periodic financial and technical information pertaining to their operations, or that the licensees account under a certain system. The regulations are not clear about whether or not the ETFC has the power to determine for itself how tariff rates will be evaluated and set The regulations require the ETFC to inform the public about approved tariffs, but not about how the tariffs are determined The ETFC does not have the power to apply penalties for non-compliance or to otherwise enforce its decisions

### (c) Structures

The regulations define the organizational and internal structures of the ETFC These include the following

- The ETFC must maintain "liaison" with the government through the MOWR.
- The ETFC is made up of a six-member board as shown in Figure 1 below
  - -- a Chairman, who presides over the ETFC, appointed by HMG/N from the non-governmental sector
  - -- a MOWR representative, appointed from itself
  - -- an economist, appointed by HMG/N from the non-governmental sector
  - -- an electricity sector licensee representative, appointed by HMG/N
  - -- a Nepal Federation of Chambers of Commerce of Industry (NFCCI) representative, appoint from itself
  - -- a consumer representative, appointed by HMG/N
- The Secretary is the Director General of the EDC
- The Chairman, economist, and the representatives from among the licensees and consumers each serve three year, renewable terms
- HMG/N funds all ETFC operations
- HMG/N defines all remuneration for all full-time and part-time ETFC members



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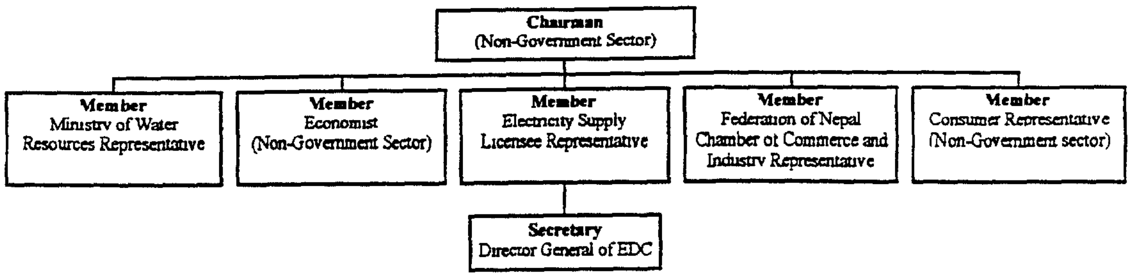
Figure 1 ETFC - Current Organization




(d) **Comments on ETFC Structures**

The regulations do not state the bureaucratic location of the ETFC It is not clear whether or not liaison means that the ETFC is under the jurisdiction of the MOWR. The government has too strong a role in establishing the makeup of the ETFC and in funding ETFC operations The regulations do not define experience qualifications or restrictions for potential members (Restrictions often include a requirement that a person has not worked in a specific political or industry capacity for a certain period of time prior to his appointment, and that the person will not attain such a position for a certain period of time after completing his membership term )

The tenure of the MOWR and NFCCI members are not defined Regulations do not define conditions under which members can be removed, and do not define the process for removing members The role of the EDC Director General as the ETFC Secretary is not consistent with the independence of the ETFC, as the EDC is responsible for increasing the private sector participation in the sector

(e) **Operations**

The regulations define several operational aspects of the ETFC These include the following

- The Chairman defines the times and venue of ETFC meetings
- In the absence of the Chairman, the members will select another member to serve as the Chairman
- The quorum requirement is three-fourths of the members
- A decision requires a majority opinion
- Invited experts in the electricity sector may attend meetings as observers
- The ETFC can hold discussions with any person to gain information while evaluating and setting tariff rates and other charges
- The ETFC can define its own internal procedures
- The ETFC is directed to consider, to various degrees, several financial, economic, technical, and social factors when setting tariff rates for a licensee
  -- Factors that *must be satisfied*
    - all financial covenants that apply to government licensees
    - tariffs for government licensees must be increased to reflect changes in the price of fuel by a formula defined by the ETFC

- -- Factors that *must be considered*
    - rate of depreciation
    - reasonable profit
    - mode of operation of the plant
    - changes in the consumer price index
    - royalties
    - government polices for developing the electricity sector
    - marginal cost
    - exchange rate of convertible currencies
    - fuel cost
- -- Factors that *may be considered*
    - different types of consumers
    - social liabilities
    - cross subsidies
    - demand side management potential
    - organizational efficiency of the licensee

- Licensees must submit an application that indicates the current and proposed tariff rates, and that includes all financial and technical information to substantiate the request
- Within 35 days of receipt of a request for a tariff rate review, the ETFC can set a time limit for the licensee to submit any required information to evaluate the tariff
- The ETFC must decide on a rate request within 60 days from the date on which the ETFC has received all data requested from the licensee
- The ETFC defines the date on which revised tariff and other charges will commence
- The ETFC must inform the public of tariffs and other charges that it determines

### (f) Comments on ETFC Operations

A majority opinion is required to make decisions, but the ETFC has an even number of members The regulations do not define which members will vote, nor how many votes each member has The regulations do not define a maximum time period allowed between ETFC meetings The ETFC is not required to take opinions from the public while evaluating a rate case

The ETFC is required to set tariffs that satisfy financial covenants of government licensees, but has no role to play in the development and approval of those covenants The regulations do not limit the number of times a licensee can request a rate review There is no statement that the licensee must supply detailed financial and technical data in a format defined by the ETFC Finally, the ETFC is not required to present to the public the reasons or methods by which a decision was taken

### (g) Government Powers and Responsibilities

- HMG/N appoints five of six ETFC members
- HMG/N is not required to provide the reasons for which a member is removed
- HMG/N may change the Secretary of the ETFC
- HMG/N proscribes salaries and facilities for the ETFC
- HMG/N funds all ETFC operations

(h) **Comments on Government Powers and Responsibilities**
The Government plays an extremely large role developing the composition of the ETFC as well as funding its operations This arrangement represents a conflict of interest, and is not consistent with the desired political independence of the ETFC

## 2 2 2 Electricity Regulations (1993)

The Electricity Regulations (1993) define provisions for licensing the survey, generation, transmission, and distribution of electricity, for technical and safety standards and performance measures, and for inspection and investigation. Much of this work is under the preview of the EDC But there are several provision in these regulations that apply to the fixing of tariff and other changes

The important points of the Electricity Regulations that relate to the ETFC and tariff analysis include the following

- A customer is required to pay the electricity charge and other fees for enjoying access to electricity as determined by the ETFC
- The licensee has the authority to fix a period for payment Customers who pay before the period must be given a rebate, while those who pay afterwards are to be assessed an extra charge
- 'Other charges' include the following
  - installing electricity lines
  - transferring, modifying, and testing meters
  - reconnecting disconnected lines
  - issuing customers' monthly charge 'cards' (billing)
- Consumers are required to have a power factor between 0 8 units lagging and unity
- A licensee can require a consumer to install appropriate equipment if the consumer's power factor does not fall with the acceptable range
- Licensees are required to submit to the EDC an annual account of income and expenses for the generation, transmission of electricity
- Licensees are required to submit to the EDC an annual report of their activities in the generation, transmission, and distribution of electricity

(a) **Comments on the Electricity Regulations**
The Electricity Act directs the ETFC to fix tariff and 'other charges,' but it does not identify these charges The Electricity Regulations define some of the 'other charges' as the costs for connecting and measuring service and for billing These are charges that would normally be determined internally by the licensee However, the Electricity Regulations require that the ETFC set these charges

The ETFC has not established a comprehensive set of performance requirements for evaluating a utility The Electricity Regulations define a technical performance requirement for the power factor of customers The licensee has the authority to require the customer to improve its efficiency, thus improving the licensee's ability to undertake demand side management actions

The EDC has the power to require licensees to provide annual data on their financial and operational positions The ETFC is not granted with such authority although this financial and operational data is critical to evaluating a licensee's costs of providing service

## 2 3 Assessment of the Legal and Regulatory Framework

The laws and regulations establish a tariff fixation commission that has many of the basic characteristics and tools of an effective regulatory body that were described in Section 2  As described in the comments above, however, the regulatory framework is unsatisfactory  A number of important and often simple regulations are unclear  or missing altogether  The regulations do not define the overall goals to be met by setting tariff rates  The ETFC has the power to set tariffs, but is constrained by being forced to accept financial factors that are beyond its control, such as the financial covenants of government licensees  It does not have the authority to require that licensees provide data in a particular format on a regular basis  The ETFC also has no enforcement capabilities

Structurally, the ETFC is not independent of political influence  Its institutional location is not clear  The professional capabilities of its members are not guaranteed  The ETFC Secretariat  has operated without dedicated staff, though a limited staff plan has recently been approved

Operationally, regulations do not address basic facets of meeting and decision procedures  They also do not provide the ETFC with a uniform set of guidelines or restrictions while setting tariffs  The ETFC is given a wide range of factors to consider, but there is no indication of the objectives to be met by establishing the tariff  The ETFC also is not fully accountable to the public

Many of these shortcomings are addressed in the institutional development of the ETFC  The ETFC has power to define internal procedures, and some of these have evolved to address the problems identified above with the regulations  Considering effective practices found in other countries, however, the regulations governing the ETFC need to be revised, and additional regulations need to be added  Recommendations on the revisions and additions are provided in Section 5  The institutional arrangements of the ETFC are described  in the next section

# 3 Institutional Framework

The Electricity Act and Electricity Tariff Fixation Commission Regulations define the fundamental powers, structures, operations of the ETFC These regulations are required but insufficient for the full operation of the ETFC

The ETFC is new and undergoing development It was created in 1992, but was formed in 1994 The ETFC conducted its first tariff rate request in 1996, for the NEA Much of its institutional framework was established during the evaluation of this rate case The ETFC is in the process of conducting its second rate review, for BPC Existing internal procedures have been refined and new ones have been developed during this current activity

This section provides a review and comment of the institutional framework concerning the ETFC powers, structures, and operations This review addresses most of the factors identified under the comments of Section 2, and the presentation follows closely the outline established in that section The discussion references much work performed for the NEA case Recommendations for improving the institutional framework are provided in Section 5

## 3 1 Power and Responsibilities

### 3 1 1 Public Notification

The ETFC is required to notify the public of the tariff rates that it sets or revises, but is not required to make available to the public the procedures and data used for a tariff review, or to justify the reasons by which a decision is made

In practice, the ETFC has provided some of this information After approving the NEA request, the ETFC published the schedules of approved tariff rates in newspapers, along with a very brief explanation of why the tariff increases were approved The ETFC also held a press conference to answer questions from the public about the rate case and about the basis by which the tariff rates were analyzed The ETFC also provided to the public a *post-facto* report to substantiate in more detail the reasons for which the tariff rate was approved

## 3 2 Structures

### 3 2 1 Institutional Organization

Regulations require the ETFC to maintain "liaison" with the government through the MOWR. The meaning of liaison is not clear As shown in Figure 2 below, the ETFC is not located within the MOWR and thus does not fall under the jurisdiction of the MOWR. The ETFC is autonomous organization, but it does maintain communications with the government through the MOWR. This communication involves budget requests and other reporting requirements



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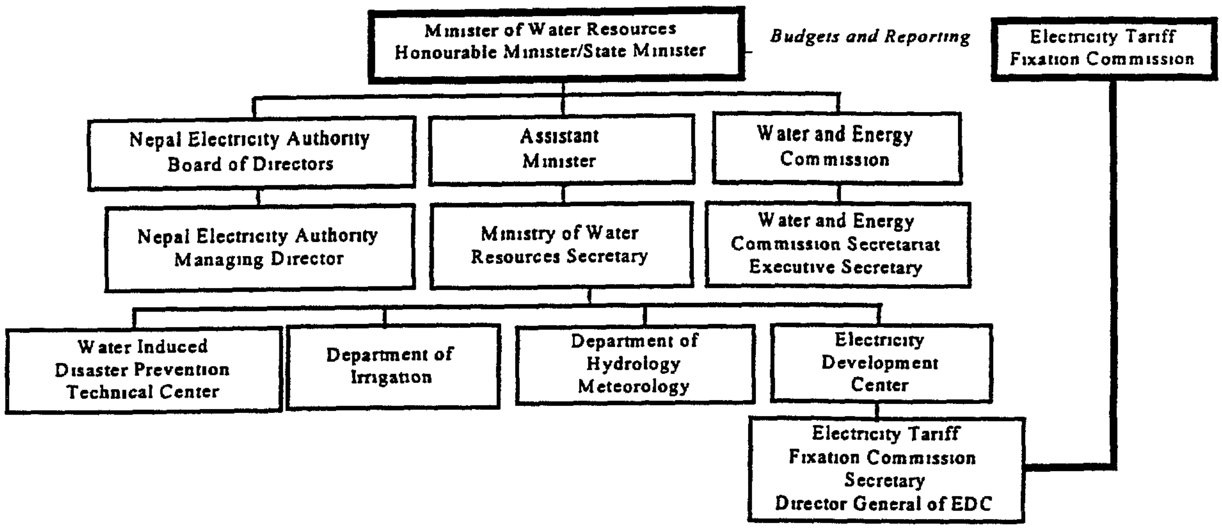
Figure 2 ETFC - Current Institutional Location




ETFC is sometimes perceived to be a part of the MOWR and not an autonomous body This perception may be due to a poor understanding of the ETFC, but also to the fact that the EDC Director General, who is under the MOWR, is the Secretary of the ETFC Since the exact location of the ETFC is not clear, the regulations should be clarified to reflect the proper arrangement

Discussions also assessed the role of the Director General of the EDC as the Secretary of the ETFC This arrangement is defined in the regulations There is a wide divergence of opinion as to whether of not the EDC Director General should be the Secretary Since the EDC is charged with promoting the private sector and is located within the MOWR, a potential conflict of interest arises On the other hand, there is a preference for retaining the link between the EDC and ETFC, due in part because both agencies perform regulatory functions, and because the ETFC can rely heavily on the existing technical capabilities and knowledge in the EDC To maintain a high degree of independence, however, most regulatory bodies are allowed to select their own Secretary, though the number of potential candidates may be limited by basic minimum qualifications These qualifications might include being a civil servant of a specific experience level

## 3 2 2 Member Selection, Experience, and Tenure

The ETFC regulations identify the organizations that select members, but do not define the operational requirements of the selection process The regulations do not contain any experience qualifications or restrictions for potential members, so an adequate screening system is lacking Regulations also do not define the tenure requirement for the MOR and NFCCI representatives Finally, the regulations do not provide for a staggering of terms of ETFC members

ETFC members were first selected in 1994 The following paragraphs define how the members were selected, what their qualifications were at the time of appointment, and what their effective tenures have been

(a) **Chairman**
HMG/N is required to select the Chairman In practice, the MOWR nominates one or two candidates from the non-governmental sector, and the Cabinet makes the final appointment The present Chairman was selected in 1994 and has served since He was selected from the non-governmental sector, and was retired prior to being appointed His experience includes Secretary posts in a ministry and the National Planning Commission, as well as over 25 years in the public electricity sector

(b) **Economist**
HMG/N is required to select the economist In practice, the MOWR nominates one or two candidates from the non-governmental sector, and the Cabinet makes the final appointment The present economist was elected in 1994, and has served since Prior to his appointment, this economist had substantial experience in agricultural economics, but little knowledge of electricity sector structure or economics

(c) **MOWR Representative**
The regulations require the MOWR to select its own representative The MOWR Secretariat makes this selection The MOWR representative has been changed twice since 1994 The first representative was the Director of Planning After the government changed in 1995, the Ministry changed its representative This person now holds a special advisor position in the MOWR. Prior to his appointment, he was working as a senior officer on special duty at the MOWR. He had also previously served as Managing Director of the NEA

(d) **Electricity Licensee Representative**
The regulations require HMG/N to select this member In practice, the MOWR selects a single electricity licensee, which then appoints a person from its organization to serve as the ETFC representative The MOWR first appointed the NEA as the licensee The NEA selected a Director from the NEA Managing Director Secretariat as its representative The same person had held this membership post since 1994

(e) **Nepal Federation of Chambers of Commerce of Industry Representative**
Regulations allow the NFCCI to select its own representative The NFCCI appoints the Director of Industry group as its ETFC representative This Director post is appointed each year during the NFCCI annual meetings Since 1994, the NFCCI industry group director, and thus its ETFC representative, has been changed three times

(f) **Consumer Representative**
The HMG/N is required to select the consumer representative In practice, the MOWR nominates one or two candidates, and the Cabinet makes the final appointment The present consumer representative was appointed in 1994 and has served since He is not the director or representative of any particular consumer group

The Chairman serves full-time The other members serve only when meetings are held

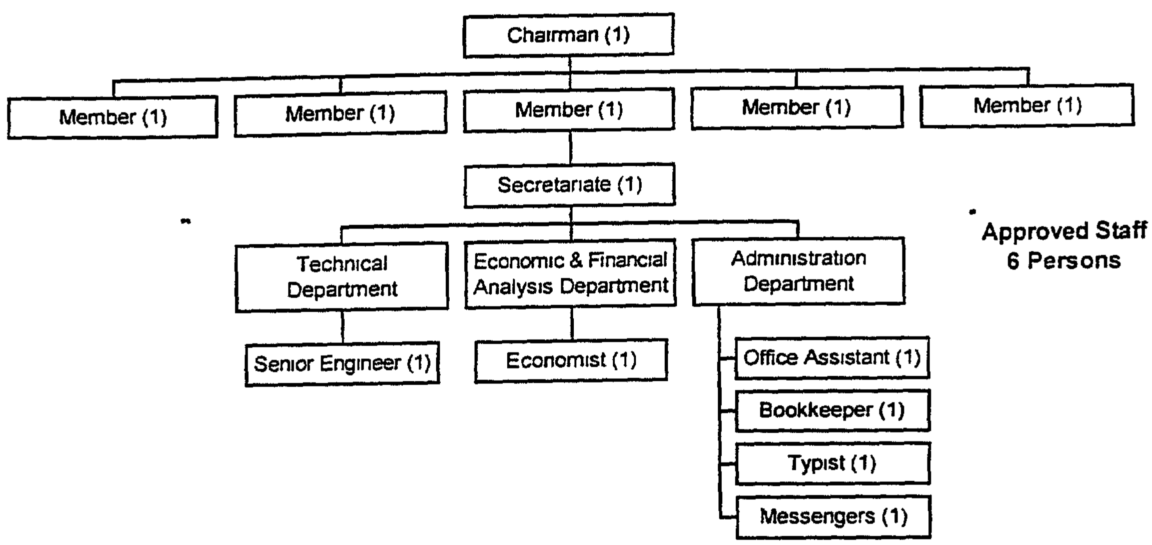
The regulations do not require that any of the members meet specific qualification requirements to be nominated or appointed as a ETFC member The groups responsible for selecting members also do not have internal procedures for establishing minimum experience qualifications for potential members A commonly held assessment is that since each member of the board represents a group that has a strong interest in the final decisions of the ETFC, each group will appoint the best person possible. In this way, it is felt, only top level, experienced representatives will be appointed.

### 3.2.3 Staffing

The ETFC requires professional technical and administrative staff to operate effectively. The regulations, however, do not define any staff requirements, except for the members and the Secretary. The regulations permit the ETFC to "deploy any member, staff, or expert" to any place as required to perform its functions. Whether or not these must be ETFC personnel is not clear.

From the time of its formation in 1994, ETFC has used staff from the EDC to conduct review and analysis of information provided for tariff rate cases. The ETFC has used outside consultants to perform analysis and studies of rate cases and of the ETFC itself. The ETFC finally proposed a 10 person staff plan, which included only three professionals, to the government in early 1996. A reduced 6 person staff plan was approved by the Ministry of General Administration in late July. This plan, as shown in Figure 3, provides the ETFC with just two professional technical staff, one engineer and one economist.

Figure 3 ETFC - Approved Staff Plan



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This core staff plan is likely to be insufficient  The ETFC currently evaluates tariff rate requests from only two licensees, the NEA and BPC  According to regulations, the ETFC should spend at most 95 days to evaluate a case  This now leaves the ETFC with six months of potential downtime  However, the staff will require substantial training and must develop a broad range of internal capabilities, including considerable analytical capabilities to evaluate and set tariff rate schedules  This preparatory work is likely to fill any downtime

The ETFC is a new and understaffed organization, and thus could benefit well from existing technical and financial expertise, especially from the EDC and other departments within the MOWR. The nature of the government institutions, however, makes it difficult to use other government resources and encourages the ETFC to use much more costly consultants  Government workers are appraised based on the task they perform under their direct management  Work done for an outside agency, such as the ETFC, will usually not be taken into account during an employee's performance appraisal  There is thus a strong bias against the ETFC's use of government personnel

## 3 2 4 Budgeting and Salaries

### (a) Budgeting

Regulations require the HMG/N to fund all ETFC operations  The ETFC develops its budget and submits it to the government, via the MOWR, for approval  The MOWR has no jurisdiction regarding the ETFC budget. Since the ETFC has been without staff (a staff plan was only recently approved), the budget has been used to pay the salary of the full-time Chairman, the remuneration provided to other members for attending meetings, and consultants  Since the ETFC has not fully established its working procedures and needs, its budget development process is weak

This budget arrangement is likely to hamper the overall performance and independence of the ETFC  In many other regulatory arrangements, the regulatory body is funded by user fees, for several reasons  First, since the actual workload of the regulatory body is not known, budgets are hard to define  The ETFC may perform no reviews in one year, but might then receive three requests in the following year  Under a user-fee system, the licensee requesting the review would provide to the ETFC the funds that are required to immediately begin the review process  In the current arrangement, if ETFC has used its budget and the NEA approaches it with a request to review tariff rates, the ETFC is not likely have the funds to perform the evaluation within the 95 day period allowed. The ETFC could obtain these funds through a supplemental budget request, but this would take a long time and it may not be approved

In addition, if the regulator's budget is tied to the government budget, then the funding level, and thus regulatory performance, may rise and fall with varying economic growth and government policy  A regulator must have adequate budget to perform effective analysis at all times

Finally, the user-fee arrangement allows the funding to remain internal to the sector, and keeps the influence of the government to a minimum

### (b) Salaries

Discussion identified that an important operational problem of the ETFC is the low compensation paid to non-government sector members for attending meetings  Only the Chairman serves in a full-time capacity  The MOWR and electricity licensee representatives receive normal salaries when



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attending meetings But the other members may have to forego salaries that they could be earning in their current positions whenever they take time out to attend ETFC meetings To attract more professional members to the ETFC this compensation problem needs to be addressed

## 3 3 Operations

### 3 3 1 Decision Making

The ETFC Chairman by regulation manages all meetings If the Chairman cannot attend, another member is to be selected to act as the chairman The ETFC has no internal procedures for establishing an interim meeting chairman in the event that the regular Chairman cannot attend This problem has not developed during the few meetings that the ETFC has held, but the potential for it remains

A decision by the ETFC requires a majority vote of the members But, the regulations do not indicate which members have a vote, nor do they state how many votes each member has In practice, each member can exercise one vote, but the Chairman votes only to break a tie vote

In the normal course of operation of a regulatory body, decisions are made only after all available information is obtained and reviewed This includes information from the licensee requesting the tariff review, and from the consumers concerning the impact of the tariff rates When this course of action is not a regulation, it is adopted institutionally so that the best decision can be made and so that the process remains open and transparent The ETFC is allowed, but not required, to meet with other persons as necessary to evaluate a rate case

The NEA rate case involved the following activities ETFC involved in the discussion the active participation by the NEA Managing Director and his team of experts, the Director General of the EDC, and the professional staff comprising the ETFC Secretariat ETFC's financial, technical, and operational constraints left it heavily dependent on the data and analysis provided by the NEA

The decision making process adopted by the ETFC seems to have operated in this way First, an initial approval was made of the NEA's request for a percentage increase in the average tariff rate that would generate the cash flow required to finance NEA's investment program ETFC's role in this analysis was minimal due to a lack of resources ETFC then suggested modification of proposed tariff rates for some of the consumer groups, especially those who were quite vocal at hearings Finally, after approving the request, ETFC established some financial, technical, and organizational performance targets that NEA has to achieve in the future The NEA was also required to provide to the ETFC on a regular basis the information regarding its progress in meeting those performance levels However, the law gives the ETFC no provisions for penalizing the NEA for not meeting the targets

### 3 3 2 Meeting Frequency

By regulation, the Chairman determines the dates of ETFC meetings The regulations do not specify requirements on how often the ETFC must meet In practice, the ETFC meets at least once every three months This long period allowed between meetings most likely reflects a low work load During rate case evaluations, meetings take place on an as needed basis as defined by the Chairman During its evaluation of the NEA tariff request, the ETFC held at least eight meetings

### 3 3 3 Meeting Openness

Regulations allow the ETFC to invite electricity sector experts to attend meetings as observers In practice, experts and the Secretary have attended meetings

As described above in Section 3 3 1, the ETFC is not required to hold public meeting during evaluation of a rate case One meeting was held during evaluation of the NEA request The meeting was open to the public The ETFC acted more or less as an observer while the NEA answered questions about the tariff rates and while consumer groups voiced their opinions

### 3 3 4 Tariff Rate Analysis

**(a) General Methodology**

Regulations require the ETFC to take several factors into account while setting tariffs and other charges for electricity sector licensees These factors can be divided into three groups as defined above in section 2 2 1

- Those that must be satisfied
- Those that must be considered
- Those that may be considered The Act and ETFC Regulations do not readily define a goal that is to be attained while setting tariffs in the electricity sector

The regulations allow the ETFC to determine its own internal procedures, and this right is interpreted to include the ability to establish its own methodology for setting tariff rates During its operations, however, the ETFC has not adequately defined a comprehensive goal or approach for setting tariff rates This is due primarily to the lack of staff and to the requirement that the ETFC set rates so that financial covenants of government licensee are satisfied This can be illustrated through a review of the process followed in the NEA tariff rate case

The NEA provided a large amount of technical information to the ETFC in 1996 to support its request for a substantial increase in its tariff rates Information included such things as load forecasts, least cost expansion plans, detailed financial analysis, and other cost data Because the ETFC did not have sufficient staff or a comprehensive analysis methodology to evaluate the merit of the NEA request, the ETFC was heavily dependent on the data, methods, assumptions, and goals established by the NEA The ETFC had little independent information to evaluate the case NEA's request largely reflected high tariffs required for meeting financial covenants imposed on it by the multilateral development banks The ETFC must set tariffs for the NEA so that these financial covenants are satisfied, and it did so

Through the previous experience with NEA and the current work with BPC, the ETFC is developing some basic goals to meet for setting tariff rates, and is evaluating different methods to identify true costs of supply These goals primarily focus on setting rates that provide economic efficiency and competitive prices The ETFC has also begun to examine efficiency factors for cost containment The NEA increase was approved under the condition that operational costs would remain within strict bounds ETFC personnel have met with the current licensees to discuss methodologies that may be considered for setting or revising tariff rate schedules The ETFC has informed them of the general types of technical and financial data that will be requested for future rate cases

### (b) Information Gathering

The ETFC is given powers to obtain information required to perform analysis In practice, the ETFC has used this power to request detailed financial and technical data from licensees, especially with BPC The ETFC has found that this process does not work well The BPC has informed the ETFC that much of the data is not readily available in the format that the ETFC requires This process hinders the effectiveness of the ETFC and slows the evaluation process ETFC needs to better define and impose these information reporting requirements onto licensees Licensees need to be informed in advance what is required and the format in which it is to be provided

### (c) Timeframes

The regulations require the ETFC to meet several time constraints while evaluating a tariff The ETFC must decide within 35 days of receiving an application whether or not additional information is required. It can set a time limit on the licensee to provide the requested data Upon receipt of all information requested, the ETFC has 60 days to decide on the case In practice, the ETFC has found it difficult to obtain the data it has requested

# 4 Operational Guidelines for Establishing Competitive Pricing of Electricity

The regulations governing the ETFC define several factors that must be considered while setting tariff rates, but do not define the overall goals to be attained, such as promoting economic efficiency The institutional framework that has been developed also does not identify an overall goal or comprehensive analysis methodology for setting tariffs

These facts were reflected recently when the ETFC undertook evaluation of the NEA request for a substantial increase in its tariff rates The ETFC was heavily dependent on the data and approach provided by the NEA New and understaffed, the ETFC had insufficient capability and experience to examine in detail the overall merit of the request, but approved it anyway, although it applied several performance factor requirements onto the NEA Through both this episode and its current evaluation of a tariff rate request from the BPC, the ETFC has begun to identify some general goals and analysis methods for establishing tariff rates

There is no standard approach for evaluating and setting a utility's tariff rates Each utility is unique Each operates in a different financial, economic, and technical environment Each generally provides service to a unique set of customers in unique social conditions It is this variability that tends to discourage the comparison of tariff rates across countries All of these factors, including overall development goals, must be addressed in establishing a tariff rate that will help to provide safe and adequate service at just and reasonable rates, without any undue preference for any consumer

It is difficult to establish a single methodology that can incorporate all relevant inputs This is why utility regulations usually will not specify particulars about how tariffs will be determined Instead the regulations usually require the licensees to adhere to the methods defined by the regulator The regulator is required to justify to the public the methods it adopts

This section provides some operational guidelines to assist the ETFC in identifying methods for establishing competitive prices of electricity The body of law that led to the development of the ETFC was aimed at liberalizing the economy and increasing the participation of the private sector Meeting these goals generally requires that prices are determined by competitive market forces Market pricing is thus the focus of this section

The intent of the following discussion is not to recommend one approach over another, but to identify and comment on the methods that are commonly used in the industry Key objectives of electricity pricing for a competitive market are defined first The methods used for identifying and allocating costs are then reviewed

## 4 1 Key Objectives

A tariff must be designed to meet some of the main objectives of an electricity pricing system in a market where private sector participation is desired Key objectives include

- Encouraging enough private sector investment to supply the electricity service capacity and quality demanded by the market
- Permitting the licensee to capture a revenue stream that is sufficient to cover capital and operating costs, and that allows the licensee to fund a portion of the future investments that must be made in order to continue providing a specified level and quality of service, including reserves
- Promoting efficient operation of generation, transmission, and distribution assets



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- Promoting efficient use of natural resources and preventing environmental damage
- Maintaining competitive and stable energy prices for consumers, taking into consideration the affordability of electricity for consumers, especially in rural areas

The diverse structure of energy markets often leads to a number of different approaches for developing an appropriate tariff rate structure Depending on the approach selected, the ETFC must have a comprehensive methodology and the institutional capabilities to determine appropriate tariff rates

# 4 2 Tariff Rate Determination Methodologies

## 4 2 1 Overall Approach

Electricity tariff rates are set in market-based economies so that a supplier has the opportunity to recover the full operating and capital cost of providing adequate and reliable service to its customer base This full cost includes

- Expenditure on the generation, transmission, distribution, administration, and management of supply assets
- Debt service
- Financial margins needed to self-finance a portion of future investment required to continue providing adequate and reliable service

Efficient markets require that a consumer's tariff reflect the cost of supplying a prescribed amount of service to him. Identifying these costs for each consumer is difficult Instead, several methods are used to determine collective operating and capital costs, which are then used to identify a supplier's revenue requirement A tariff rate structure is then applied to the suppliers' consumer base The tariffs should reflect as accurately as possible the cost of service provided, and should provide the supplier an opportunity, but not a guarantee, to recover his full costs

These full costs are driven by a number of factors Key among these are

- Regulatory requirements imposed on the supplier in Nepal these include, among other things, self-financing and return on asset levels for government licensees
- Consumption patterns
- Supply technologies
- Economic and financial environment
- Management efficiency of the business financial, technical, and organizational efficiency
- Demand side management potential
- Social needs

An effective approach to setting tariff rates requires an in-depth, integrated analysis of each of the factors that affect the overall full costs of operation and capital This section first reviews commonly used methods to determine costs Some measures include both operating and capital costs, while others may focus on one or the other A review of efficiency factors is then provided because these factors help to identify whether or not costs are optimized Finally, a review of tariff structures commonly used for allocating costs is provided

### 4 2 2 Cost Measures

Several methods are used to measure capital and operating costs Common methods include marginal cost, return on investment (ROI), avoided cost (AC), and market pricing (pooling) These are described below

(a) **Marginal Cost**

Marginal cost measures the value of the resources required to generate an additional unit of output In the electricity sector marginal cost is often defined as the extra cost required to produce one additional kWh of electricity Short-run marginal cost is measured under the assumption that certain assets are fixed. For a generator, the fixed asset may be installed capacity Thus, short-run marginal cost (SRMC) reflects the cost of variable inputs, but not of fixed assets Chief among these variable inputs is fuel cost, but include operation and maintenance costs as well SRMC is thus useful in determining operational cost of generation on a daily basis It is not a forward looking approach, since it characterizes the system at a particular point in time To define longer term cost of a system expansion, SRMC is not adequate

Long-run marginal cost (LRMC) takes the cost of these fixed assets (e g , plant and equipment) into account in determining the cost to generate one additional unit of output LRMC is a forward looking approach that is useful for determining true costs of supply over a long-term investment period

Application of the LRMC method involves three steps First, the costs and operating characteristics of different types of supply technologies are determined Second, these technologies are applied to a particular consumption pattern Analytical optimization tools are then used to determine which sequence of capacity additions would allow the expanded system to service a consumption pattern at the least cost This cost is often computed in terms of net present value Finally, this cost is annuitized over the lifetime of the planned investment

The marginal cost approach suggests that certain tariff rates be applied for certain consumption patterns First, energy used during peak demand periods should cost more that energy used during non-peak periods Second, for systems with a hydropower component that has little storage capacity, energy used during the dry season should cost more than energy used during the wet season Third, the energy provided at lower voltages should cost more

Energy demand loads vary during the day, so not all supply capacity is needed at all times of the day Capacity is generally employed on the basis of marginal cost Generation capacity that is employed to meet peak demand levels generally has higher overall costs For example, hydropower might be used to supply non-peak loads But to meet peak loads, it may be necessary to use thermal generation capacity, such as a gas turbine Compared to a hydro plant, a gas turbine has lower construction costs but much higher operating and fuel expenses, and a higher overall cost So the marginal cost of meeting peak demand is greater than that of meeting non-peak demand Thus, a higher tariff should be applied to peak demand users This approach has the benefit of reducing peak demand, which reduces the capacity needed to supply the system, which in turn leads to lower overall costs and tariff rates for consumers

Electricity is transmitted at high voltages, but most consumers require electricity to be delivered at lower voltage levels to operate appliances Stepping down the voltages requires expensive equipment, which increases the cost of meeting the supply Thus, the lower the voltage required, the higher the energy cost should be

The LRMC approach is very complex and sensitive to minor variations in projections for key variables such as demand levels, relative fuel costs, relative capital costs, inflation, and interest rates Also, a number of programs are in use for determining LRMC Extensive knowledge and training in the use of these tools are required to select and operate the one appropriate for a country's particular situation

### (b) Return on Investment

The practice of setting tariff rate schedules using the return on investment (ROI) methodology has been used in markets where there is a component of private sector participation in the generation, transmission, and distribution of electricity The ROI method is used to determine the cost of capital invested either as assets or equity The return is usually specified on a rate basis By multiplying the rate times the investment base, a capital cost is determined Operational costs are added to this to provide a revenue requirement

The ROI method differs from LRMC in that for ROI analysis, the total value of assets or equity is the key component, while for LRMC, the total systems operating cost is the key measure

- **Return on Assets (ROA)**

  The ROA measures the effectiveness of assets in generating revenue It is determined by dividing net income by the total value of appropriate assets Multi-lateral development banks that make loans to utilities often require those utilities to earn a specified rate of ROA

  The key to the ROI calculation is the definition of the asset, or rate, base Regulators often differ on what should be included in the rate base Three factors must be considered First, a regulator must define which assets can be included Usually, the rate base will include only those assets that are currently used to provide service to customers Many regulators thus do not include construction-works-in-progress (CWIP) assets in the total rate base, since these assets are not yet involved in providing electricity to customers These construction assets are added to the rate base when they begin providing service This rate base definition poses a problem because a utility must pay the costs of constructing assets before they begin earning revenue This concept is important and worth explaining further

  There is no specific methodology used in utility regulation for determining the composition of the rate base For various economic, and sometimes political, reasons, the regulatory bodies of each country and state have a different opinion of what should be included in the rate base To establish what an appropriate base should be, it is necessary to determine the overall effects of different base constructions on utilities and consumers The regulator is required to establish a tariff rate system that allows a utility to meet its financial revenue requirements so that full costs can be covered. The needs of the customers must also be taken into account A financial analysis must examine the impact on both groups, but the analysis needs to examine *overall* costs, not just those for the next year

Consider for example the exclusion of CWIP assets from the rate base  Suppose a utility needs to build a thermal plant to maintain the level and quality of service provided to its customer base  Since the CWIP assets are not included in the rate base, the utility cannot request a rate hike that would provide a stream of funds to help pay for constructing the plant  It can only request a rate hike for the plant only when it begins providing service  The utility must still build the plant, however, and thus will probably finance its construction with a mixture of internal funds and borrowed funds  The utility pays off part of the costs of construction during construction, and capitalizes the rest  This capitalization of construction costs increases the overall cost of the plant. Thus, when the thermal plant is included in the asset base, the overall cost of it will be greater than if the asset had been included in the rate base all along  Thus, by not including the CWIP assets in the rate base, the consumers end up paying a higher tariff in the end. However, had the CWIP been added to the rate base in the beginning, consumers would have been paying an increased tariff throughout the construction phase  Several factors influence the magnitude of these cost affects, and these vary greatly between countries  This is why a detailed financial analysis of various rate base constructions is required

Once the assets to be included in the rate base are identified, the regulatory must define the accounting base of assets  Asset values are usually based on either a historical or revalued basis  Revalued bases are often used in developing countries to take account of inflation and foreign exchange losses, and help to obtain a better match between actual and accounting costs

Finally, the year(s) from which the asset(s) value is taken must be defined  A common approach is to take the average asset value over a two or three year period, so as to reduce the variability of the measure

After the rate base is adequately defined, the next step is to identify an appropriate rate of return. There is not single approach to determining this rate for a utility  Often, the rate is set to approximate the utility's cost of capital  This is because the assets were obtained through funds that were borrowed and equity provided by shareholders  But determining a cost of capital is also difficult, especially in developing countries with limited debt and equity markets  Multi-lateral development banks usually specify rates from 4% to 6%, but the rate must be determined for each individual circumstance

- **Return on Equity (ROE)**

  The rate of ROE is defined as net income divided by  that portion of a utility's investment provided by the utility's shareholders through the purchase of stock and retained earnings  In market situations in which private developers are engaged in electricity generation, transmission, and distribution, it is important that the tariff rate structures applied to these projects allow the investors to earn a competitive rate of return on their investment  These equity rates of return, however, are hard to identify  The return should reflect the return earned on a comparable commercial business in a similar economic and financial environment  But in countries were the electricity sector is opening up but still dominated by a large monopoly, there is no comparable business

Several techniques are commonly used to determine the equity cost of capital  Key methods include

- **Discounted Cash Flow Analysis** In this model, the investor determines his required return by calculating the present value the current cash return expected from both dividends and the expected appreciation of the equity

- **Risk Premium Approach** This approach assumes that a return is a summation of three rates First is a risk free rate (such as would apply to a U S Treasury security) Second is the rate of inflation expected over the investment horizon Third is the equity risk premium This premium reflects a cost in additional to what would be paid on normal debt, because debt holders are paid off before equity holders Thus, uncertainties in the economic, financial, and regulatory environment of a utility signals more risk to an equity stakeholder This risk is often difficult to define in developing countries where economic situations change rapidly and where laws and regulations are inadequate

- **Capital Asset Pricing Model** This is also a risk premium model This theory states that the expected rate of return on an asset, or equity stake, is determined by a risk free rate of return plus a risk premium which is proportional to the systematic risk of a security In Nepal, there is no market for utility equity, so determining this systematic risk is difficult An example of determining an equity return in Nepal's electricity sector is provided in Appendix B

Each of these equity return determination models is difficult to perform due to a lack of substantial financial data, even in advanced capital markets It is evident, however, that the return required for equity investors is much above that required for standard debt This is especially true in Nepal were the risk associated with investing in the electricity sector is substantial If a developing country intends to engage the private sector in the supply of electricity, then tariff rates will have to reflect the higher return on equity required in order to gain the investment needed

### (c) Avoided Cost

The avoided cost of a utility is simply the cost that the utility avoids by buying the electricity capacity it needs from a supplier instead of constructing and operating the assets necessary to produce the electricity itself

In the U S , the concern over how regulatory commissions define the rate base for determining rates of return has led many utilities to increase their power purchases from independent suppliers This has occurred because utilities are increasingly unsure whether or not certain operational costs or asset acquisitions made will be included in their rate base In addition, U S legislation may require a certain utility to purchase power from specified producers (qualifying facilities) who can provide the power at less than the utility's avoided cost

Avoided cost calculations include both capital and operating costs, making it similar to the LRMC method The avoided cost method, however, is based on the utility's current configuration, which may or may not be an optimal configuration for minimizing costs A utility determines it own avoided cost, taking into consideration all construction, fuel, operating, debt, and other costs that are avoided Regulatory agencies have the right to review and revise these cost estimates The avoided cost usually has an energy and capacity component The energy component reflects operating costs, and is determined by a short-run avoided cost method The capacity component represents capital costs, and is determined with a long-run avoided cost technique There is no standard model for determining these short- and long-run costs

(d) **Market Simulation (Pooling)**

Several countries, such as Argentina and Britain, utilize a market simulation, or pooling, system that sets tariffs using market forces and thus increases the overall efficiency of the sector In a pooling system, private sector generators sell their electricity to a central dispatcher, who then transmits the electricity along to distributors To serve demand at a specific time of day, the dispatcher buys all the electricity it requires on the basis of the marginal cost that exists in the system at the time All plants that are providing energy to the central dispatcher are paid the same price, the marginal cost Additional funds, such as capacity prices, are also paid in order to keep the generation potential available to the market Thus suppliers can make their own judgment about investment based on the market price of electricity

The system may operate as follows the day before it will purchase electricity, the central dispatcher will take bids from generating units to provide a certain amount of electricity during each half-hour period of the day Usually, the central dispatcher will select units on the order of increasing short-run or marginal generation costs, using only high cost units when absolutely necessary Thus, suppose that during a mid-morning hour the dispatcher is meeting all load demand using all available hydropower Further suppose that among these hydropower suppliers, the maximum marginal cost is \$0 005/kWh. All hydropower plants supplying energy to the dispatcher during the time period would then earn \$0 005 for each kWh supplied

Later in the afternoon the demand increases beyond the supply capability of hydropower sources To meet this increased load demand, the dispatcher purchases energy from the next lowest marginal cost producer Suppose this is a diesel turbine plant with a marginal cost of, say, \$0 03/kWh Then all units providing energy to the dispatcher at this time are paid \$0 03/kWh, the marginal cost of the system. The more efficient the hydropower plants are, the lower their marginal costs, and the higher their profits when the thermal-fired plants come into the system

The pooling scheme requires substantial market size and diversity of electricity generation, and thus is not readily feasible for setting tariffs in countries in which private sector involvement is limited

## 4 2 3 Efficiency Factors

A regulator interested in establishing efficiency in the electricity supply sector must evaluate the overall management efficiency of the supply assets The full costs defined by the supplier may not be optimal costs A regulator must investigate the nature behind these costs and determine where efficiency improvements can lead to lower capital and operating costs These lower costs translate to lower revenue requirements, and thus to lower tariffs

Electricity regulators can use a wide range of measures to assess the management performance of suppliers There is no single set of performance measures that can be applied to every case The ETFC needs to establish for the electricity sector a set of performance measures and values that it can use to assess a supplier's efficiency Appendix C provides a World Bank checklist of financial, technical, and performance levels that apply to the energy sector

### (a) Financial Performance

A key component of the tariff rate analysis is the ability to identify acceptable financial performance of a utility There are numerous methods the analyzing this financial performance A component common to many of these approaches is an analysis of financial ratios, which often reflect performance in liquidity, productivity, profitability, and leverage management The ratios by themselves are not useful, unless compared to ratios of the industry as a whole (Ratios for the same industry across different countries will usually vary, due to laws and to a host of other financial, economic, and technical factors )

The need for this detailed financial data is the main reason why regulators require utilities to provide on a regular basis and in a standard format the financial data from which ratios can be determined Appendix D provides a list the financial reporting requirements (balance sheet, income statement, and cash flow statement) of investor owned utilities in the U S

Basic financial ratios are identified in most financial texts Key among them include

- Liquidity
  - current (current assets/current liabilities)
  - current assets/total assets
  - net working capital/total assets
- Productivity
  - average collection period (accounts receivable/(sales/360))
  - fixed asset turnover (sales/net fixed assets)
  - number of employees per unit of revenue
  - number of employees per unit of operating expenses
- Profitability
  - return on assets (net income before taxes and extra items/total assets)
  - return on equity (net income before taxes and extra items/total shareholder equity)
  - revenue/total assets
  - cost of revenue/total revenue
- Leverage
  - debt (total debt/total assets)
  - total debt/total equity

Each industry also has its own characteristic set of ratios Numerous energy sector ratios are commonly used for utility performance analysis Appendix E provides a list of the common performance ratios determined by the U S Department of Energy for investor-owned utilities in the U S

Key among productivity and profitability factors include

- Productivity
  - total utility plant per unit of revenue
  - total electric utility plant as a percentage of total assets
  - operating expenses per kWh sold
  - operating expenses per customer

- Profitability
  - net income as a percentage of electricity utility revenues
  - average revenue per kWh
  - average revenue per customer

Ratio analysis is necessary but not sufficient to perform a full financial analysis, but it does help to identify performance levels and also trends in important financial accounts

### (b) Technical Performance

A regulatory body must also determine the technical performance of a firm, because the inefficient use of assets also contributes to overall costs, hence tariff rates A utility may also set its tariff rates so as to ensure a level of technical performance on a consumer Technical performance measures are industry specific Like financial ratios, these measures are most useful when compared to industry standards The ETFC is only beginning to develop a comprehensive set of the technical performance measures

Common technical performance measures include

- **Systems Losses** Acceptable loss factors can generally be quantified for a given system configuration. Performance can be identified by assessing actual losses against the acceptable standards It is important to note that in many countries substantial investment may be required to reduce these losses In these cases, the trend in the loss levels also needs to be considered

- **Load Factors** Electricity supply assets are not in full use at all times, so the actual load they carry varies with time Effective performance requires that the load factors be high and stable High load factors indicate that the demand is being met with little excess generation This often occurs during peak-demand and dry-season demand periods But the load factor also need to be stable, because bringing some generation equipment on- and off-line is often time consuming and costly

- **Capacity Margins** to provide adequate service, a supply system usually includes excess capacity, which can be used, for example, when a generation asset fails or is taken off-line for maintenance The capacity usually may be idle, and thus not generating revenue Tariff rates often include an extra component to provide for the excess capacity

- **Power Factors of Consumers** Declining power factors represent declining efficiency The Electricity Regulations require a licensee to require its consumers to maintain a power factor within a specified range 0 8 units lagging, and 1 unit leading

### (c) Organizational Performance

Organizational performance is difficult to quantify, but it must be taken into consideration in assessing the full cost of supply since these factors affect those full costs Important factors to consider include

- Level of autonomy this may include information on the clarity of the suppliers' objectives, its power to make independent decisions, and its control over staffing and salaries
- Top management this may include corporate objectives and planning, internal performance indicators, budgetary procedures, and management accountability

- Human resources, manpower planning and incentive measures this may include performance based incentives, salary levels in relation to other suppliers, fringe benefits, training resources and level of expertise

## 4 2 4 Tariff Rate Structures

The revenue requirement that is identified for a supplier is obtained through application of a suitable tariff rate schedule onto the consumer base Use of the tariff provides an opportunity, not a guarantee, for a supplier to capture a revenue stream

In general, the tariff rate applied to a consumer should reflect the cost of providing the service to the consumer This is not always the case, though A supplier may apply some tariffs on the basis of cost, and some on the basis of other goals, such as supplying electricity to rural areas where customers could not be expected to pay a market price A supplier can use a number of tariff rate designs to achieve overall financial, technical, and social goals, though each design has its advantages and drawbacks This section describes some of these basic designs

### (a) Flat Rate Tariff

In this design, customers are charged a fixed rate per kWh of consumption This design is usually used for low demand customers With a demand-limited flat rate, a load limit device is used to assure that a specified maximum load is not exceeded In a stepped flat rate design, the rate goes up as more energy is consumed

### (b) Block Rate Tariff

In this design, the tariff depends on electricity demand There are two types of block rates, increasing and decreasing With an increasing block rate design, the rate increases as the block demand increases This design encourages conservation and leads to reduced peak loads, which reduces the need for addition of expensive generation capacity With a decreasing block rate design, the rate decreases as the block energy demand rises This method can be used to encourage consumption It might be used by a hydropower supply in the wet season when considerable excess capacity is available

### (c) Two-Part Tariff

This design attempts to better reflect the price of electricity with its supply cost The tariff has two parts, a maximum demand charge and energy charge As the maximum demand level rises, the tariff rises The customer is encouraged to reduce his maximum demand and increase his energy demand This helps to reduce the peak load level, while increasing the load factor of the system The drawback to the design is the high cost of metering required It is viable only when a load is large enough to justify the metering cost

### (d) Time-Related Tariff

This design attaches higher tariffs to customers who require electricity at peak periods (or dry season periods) when the cost of supply is high, and lower rates to those users who require electricity at non-peak (wet season) periods when the cost of supply is low This is explained above under marginal cost pricing This design helps to reduce peak loads while improving the load factor of the system. Use of the system requires that demand can be displaced to different time periods This is often difficult in many developing countries

(e) **Market Rate Tariffs**
Some countries have electricity supply systems in which the price of electricity is determined by the market This tariff determination measure was discussed above under market pricing (pooling)

(f) **Ability-to-Pay Tariff**
This design is used to price electricity on a consumer's actual ability-to-pay It is used as the basis for setting tariff rates, and is used by the BPC to provide electricity to poor rural consumers under its rural electrification program

(g) **Special Tariffs**
Special tariffs can be used to supply incentives or disincentives for consumption, and also for managing the impact of fluctuations in world fuel prices An interruptible rate system provides lower rates to those consumers who are willing to shed some or all of their demand during peak demand periods A rate design that incorporates a power factor penalty is used to increase the tariff paid by consumers with low power factors

Fuel adjustment tariff designs are used to help a utility manage the impact of wide fluctuations in the price of electricity generation fuels A rapid and large increase in fuel cost might prevent the utility from obtaining the revenues required to cover the full costs of supply Because the tariff rate review and approval process is long, a quick rise in fuel prices cannot be matched with a quick rise in the tariff rates A fuel adjustment tariff rate is used to manage these price fluctuations Regulations require the ETFC to define a special fuel cost tariff for all government licensees

The tariff adjustment required for a rise in fuel prices depends mainly on the fuel type and the amount of thermal generation in the system The adjustment is calculated based on the change in the total revenue requirement resulting from unit change of the price of fuel used The final tariff will define an amount by which the cost per kWh consumed will go up or down with an increase or decrease in the unit price The adjustment should be made for both increases and decreases in fuel prices

## 4 3 Summary

An electricity supplier must be able to obtain enough revenue through a tariff on customers to meet the full costs of supply, debt service, and a portion of future investment needs Consumers require that electricity be supplied as efficiently as possible so that the revenue requirements of suppliers and thus tariffs are kept to a minimum There is no single method for determining the costs of providing electricity that can be applied in every tariff rate case Each utility is unique and operates in a unique environment The regulator will likely take several approaches to identify costs, and to establish efficiency guidelines which if met with help reduce the overall capital and operating cost of supply A suitable tariff can then be applied so that the revenue requirement of the supplier is met Appendix F contains a document that provides an overview of the tariff rate analysis process

# 5 Recommended Measures to Ensure Performance of the Tariff Fixation Commission

The Electricity Act, ETFC Regulation (1994), and the Electricity Regulations provide the regulatory framework for establishing the powers, structures, and operations of the ETFC The institutional framework of the ETFC created through initial operation has also provided a number of procedures to be followed for establishing tariff rates and other charges

The regulatory and institutional framework is inadequate to allow the ETFC to perform the functions of an independent, transparent, and effective regulatory body To assure performance of the ETFC in a manner consistent with best practices of regulatory bodies in other countries, existing regulations should be revised and other regulations should be added

This section provides recommendations for changes in the regulatory and institutional framework of the ETFC that will enhance its performance It is understood that the ETFC is a new and developing organization Many of the actions that the ETFC should be required to perform are already established in internal procedures, but should have their basis in regulations These recommendations are built upon the comments to the existing framework provided in Sections 2 and 3 The outline of this section follows that used in those sections

## 5 1 Power and Responsibilities

### 5 1 1 Powers

The regulatory framework does not define the goals that should be attained in establishing tariff rates In countries where regulation is added to improve the performance of the sector and to increase the level or private sector participation, the goals often involve, at a minimum, the efficient use of assets and the interests of the consumers In addition to a lack of properly defined goals, the regulations do not provide the ETFC with all of the powers that are required for it to perform effectively as a regulatory body Some of the powers also need to be clarified In addition to being revised to add new powers for the ETFC, the regulations need to include provisions for permitting the public with access to information regarding both rate cases and how and why its decisions were made This will increase the overall transparency and public acceptance of the ETFC

**(a) Recommendations for Powers**

- The Electricity Act should state the overall goal or goals to be achieved for the setting of tariffs and other charges At a minimum these goals should include the efficient use of resources, and the interests of the consumers
- The regulations should define more clearly the licensees and actions that fall under the jurisdiction of the ETFC Specifically, the regulations should define that ETFC does not approve the tariff rates specified in the PPAs negotiated between licensees The ETFC should not be able to set the PPA tariff rates and then set the retail tariff rates for a licensee's consumer base, since this represents a conflict of interest The rate determined in the PPAs should be a product of negotiations of the licensees, which can then be considered by the ETFC as a cost element of the licensee

- The ETFC should be provided by regulation with the power to define its own procedures for setting tariff rates and other charges
- The ETFC should be provided by regulation with the power to request and obtain, on a periodic basis as defined by the ETFC, data from licensees concerning their financial conditions and their operations regarding the generation, transmission, and distribution of electricity supply The ETFC should be given the power to stipulate the form and methods by which this data is provided, since much of the data that the ETFC would find useful is lacking from normal audited financial statements The EDC is given this power in the Electricity Regulations
- The ETFC should be provided by regulation with the power to enforce its decisions This could be accomplished through applying fines for non-compliance

### 5 1 2 Responsibilities

The ETFC is required to notify the public of rate changes To insure the transparency of its operations, the ETFC should also allow public access to the data, or a reasonable subset of the data, provided by a licensee regarding a pending rate review In this way the public can perform its own evaluation of the data and then petition the ETFC during a rate case review This does not mean that the ETFC will provide the data to the public, but only that if the public so desires it will have access to the data The ETFC should also be required to take information from the public regarding rate review In addition, the ETFC should make available to the public the reasons why a decision was taken, along with substantiating data

#### (a) Recommendations for Responsibilities

- The ETFC should be required by regulation to provide public access to the information it receives from a licensee regarding a rate review This could be accomplished by adding a provision to the application form which requires the licensee to provide, with the application materials, a fact sheet for the public that summarizes the reasons and a substantiating data regarding the request
- The ETFC should be required by regulation to make available to the public the reasons for making a decision
- The ETFC should be required to solicit opinions from the public regarding a rate case evaluation This information can be obtained either through a public hearing or by written accounts

## 5 2 Structures

### 5 2 1 Organization

#### (a) Institutional Location

A discussed in Section 3 2 1, the ETFC is required to maintain liaison with the government through the MOWR In practice, the ETFC communicates budget and other request information to the government via MOWR But a common perception persists that the ETFC is actually located under the jurisdiction of the MOWR This confusion can be cleared up through a proper declaration in the regulations



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- **Recommendation for Institutional Location** Regulations should be revised to clarify that the ETFC is an autonomous body that communications with the government through the MOWR, and that the MOWR has no jurisdiction over the ETFC

(b) **Internal**

Another influential factor relating to independence of the ETFC is the role of the Secretary, which by regulation is the Director General of the EDC The EDC has broad powers for regulating the electricity sector, but a key mission of the EDC is to also to promote private sector involvement This promotional role is at odds with the independence of the ETFC, and so, the Secretary as currently prescribed may be perceived as adversely influencing ETFC operations This is especially true presently since the ETFC members, except the Chairman, are not full-staff, which allows the Secretary to have broad influence

On the other hand, since the ETFC is small and understaffed, and since the regulatory functions of the ETFC and the EDC are related, there may be some benefits to the current Secretary designation However, the ultimate goal should be an ETFC that is able to select its own Secretary

- **Recommendation for Internal Structure** Regulations should allow the ETFC to select its own Secretary The regulations may also include provisions on certain qualifications for the Secretary post, such as, for example, a requirement that nominees be civil servants It is also permissible to allow another government body to suggest potential Secretaries, but the regulations should clearly state the ETFC will make the final appointment

## 5 2 2 Member Structure, Selection, Experience, and Tenure

The following recommendations are made concerning the number of members, the methods by which the members are screened and selected, experience qualifications and restrictions, and the tenure of the members that are selected

(a) **Structure**

The ETFC has six members Each member has one vote except the Chairman who normally has no vote but who is allowed to vote to break a tie Regulatory commissions are usually structured with three or five members, all of whom have one vote Based on these common practices, the ETFC should be restructured

One of the ETFC's member positions should be eliminated The MOWR representative post is the best candidate from removal for several reasons First, the MOWR Minister is also the Chairman of the NEA This represents a very important conflict of interest Second, the MOWR already play a large role in determining five of the six ETFC members (see Section 3 2 2)

- **Recommendations for Member Structure** The size of the ETFC should be reduced from six to five members The Chairman should be given a single vote, and the MOWR representative position should be removed from the current member configuration defined in the ETFC Regulations

(b) **Selection**

The government plays a strong role in determining the member composition of the ETFC, which reduces the independence of the ETFC A strong argument can be made for the role in the government in the selection process, but the government has too much power to compose the ETFC membership in the current system

- **Recommendation for Member Selection** A second government body should be required by regulation to assist HMG/N with the screening, selecting, or appointment of ETFC members, in order to enhance the independence of the ETFC The second body could be a selection committee that identifies a set of potential candidates HMG/N could then choose from among them to make final appointments to the ETFC

(c) **Experience Requirements**

The regulations provide no minimum experience requirements for members To conduct effective regulatory work, the members should be well-qualified professionals Although the current ETFC members seem highly qualified, there is no guarantee that well-experienced persons will be appointed to the ETFC in the future The potential for this is even greater in the present system where the government plays a strong role in selecting members

- **Recommendation for Member Experience Requirements** Regulations should establish minimum experience qualifications for ETFC members The qualifications may be defined by professional or educational experience or a combination of both Minimum professional experience should be at least 15 years Minimum education requirements may include a graduate level qualification

(d) **Experience Restrictions**

The members selected to any regulatory body should not have a vested financial or professional interest that would be affected by the decisions taken by the body For this reason, restrictions on the preappointment experience are often applied to potential candidates In addition, members are often restricted from seeking specific positions following the completion of their term In this way, decisions of the regulatory body are more likely to be based on the merit of the case, rather than on outside financial or professional interests of the members

Preappoint restrictions often prohibit the selection of persons who are presently engaged as a member of Parliament, who are prominent political party figures, or who have a direct or indirect financial interest in any licensee which falls under the jurisdiction of the regulator To be appointed, such persons would have to resign from their positions or terminate their financial interests Post-membership restrictions often prohibit a member from working professionally in certain positions for a set time period, usually one or two years

- **Recommendations for Member Experience Restrictions** Regulations should define certain restrictions on the professional and financial status of potential ETFC members Professional restrictions should include provisions that persons who, by their current political of professional positions, have a vested political or professional interest in the potential decisions of the ETFC, should be required to step down from their political of professional position prior to becoming members In addition, potential members should be required to end any financial arrangements that exist which might influence ETFC decisions

Restrictions should be defined by regulation for the post-membership professional opportunities of appointed members Members should be prohibited from professional office, employment, or consultancy in the electricity supply sector for one year after the end of their membership term

(e) **Membership Tenure**
All ETFC members serve three-year, renewable terms except the MOWR and NFCCI representatives, who serve terms of various lengths Common regulatory practice places a limit on the term that a single member can serve This is primarily to reduce the possibility of a member to establish undue influence over the workings of the commission or the sector The role of the MOWR and the NFCCI poses a problem The MOWR representative is likely to change upon a change in governments, so a set term for this position would be difficult to obtain This is another reason to remove the MOWR post from the ETFC Top positions in the NFCCI also undergo change on an annual basis, but the effectiveness of the ETFC will be hampered by frequent member turnover

In addition, terms for members are usually staggered so that the composition of the board will not change too drastically in a short period of time

There are no regulations regarding the removal of members Such provisions are a normal component of regulatory law

- **Recommendations for the Terms and Removal Conditions of Members** Regulations should define a set term for each ETFC member Term lengths often vary between two and five years A maximum length of service by a member should be defined A three or four year term is recommended Maximum lengths of service vary from a single to three or four normal terms A maximum term of two normal terms is recommended

  Member terms should be staggered by regulation An example would be to appoint two members the first year, two members the second year, and one member in the third year

  The conditions under which members can be removed should be established in the regulations The procedures to be followed for removing members also should be established in the regulations

## 5 2 3 Staffing

The ETFC has conducted most analysis to date using professional staff from the EDC A ETFC staff plan was approved in June 1996 that provides the ETFC will just two professionals to review tariff rate cases The ETFC has the power to use consultants to perform professional analysis, but to be effective, the ETFC requires more dedicated staff The addition of staff is unlikely to occur in the near term, since a staff plan was just approved. In lieu of a lack of staff, the ETFC should be able to utilize the services of the EDC, which has a sizable pool of professional financial and technical staff

(a) **Recommendation for Staffing**
The ETFC should have at least two full-time professional engineers, and two full-time financial analysts



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## 5 2 4 Budgeting and Salaries

### (a) Budgeting

The ETFC is fully financed by government funds In effective practice, regulatory bodies are funded by fees and costs charged to licensees for the service provided to them, which normally includes licensing and tariff rate reviews As discussed in Section 3 2 4, budgets are made independent of the government to increase independence, to disassociate regulatory performance with government budget variations, and to assure timely completion of rate evaluations The ultimate budget goal of the ETFC should be complete funding through user fees At a minimum presently, the ETFC should be funded by a blend of licensee funds and government funds, with a trend towards increasing the proportion of the licensee contribution

To perform the level of analysis required, the staff will require significant amounts of training in financial and technical analysis The staff must have the capability to evaluate the large amount of complex data that will accompany a rate case The staff will also have to perform their own analysis and apply appropriate tariff rates This training requirement may add significantly to budget costs Discussions with the NEA indicated that ETFC personnel could participate in the financial and technical training courses carried out at NEA to perform systems planning studies This assistance will benefit the ETFC, but is likely to be insufficient

- **Recommendations for Budgeting** ETFC should ultimately be funded completely through fees charged to licensee who request tariff rate increase As an interim arrangement, the ETFC should be funded with both government and licensee-contributed funds These funds do not necessarily be paid to the ETFC They can be paid to the government, which can then funnel them to the ETFC budget

  The ETFC should allocate a sizable portion of it budget for training in financial and technical analysis related to setting tariff rates This budget cost should be incorporated into the fees that are paid by the licensees

### (b) Salaries

Effective regulatory operation generally requires that members are well-experienced professionals who have demonstrated their capabilities in the public and private sectors Persons with these accomplishments are usually well compensated for their professional capabilities and time Attracting their time and service in other capacities requires that, in part, compensation be adequate Discussion of the ETFC revealed that the compensation paid to members, except the Chairman, for attending meetings was insufficient. To ensure that professional will continue to serve on the ETFC, the compensation paid to members should be increased

- **Recommendation for Compensation** The compensation paid to ETFC members, except the Chairman, for attending meetings should be increased

# 5 3 Operations

## 5 3 1 Decision Making

Regulations defining the procedures to follow during meetings need to be revised The process for selecting an interim chairman is not defined, nor is the voting power of each member In practice, each member has one vote, except the Chairman who normally does not vote The Chairman votes only to break a tie

The quorum requirement is oddly defined as three-fourths of the members The requirement should be defined as a whole number, and should be one less than the total number of members

The process by which the ETFC takes information from consumers also requires revision Regulations do not require the ETFC to solicit opinions from consumers who will be affected by a tariff rate increase

Although the ETFC has in practice done so, the regulations should spell out the requirement, so as to make the process more transparent

**(a) Recommendations for Decision-Making**

- The procedures for identifying an interim chairman needs to be defined in the regulations This can be done by establishing the most senior of the attending members as the interim chairman The seniority measures can be age or years of experience, though the latter is hard to define
- Regulations should state that each member has one vote
- The quorum requirement should be defined as four persons in the case that the ETFC has five members, or five persons if the ETFC has six members
- In the case that the recommendation to reduce the number of members from six to five is not implemented, the regulations should state that the Chairman of the ETFC shall not vote unless to break a tie vote
- The ETFC should be required by regulation to solicit opinions from the public regarding rate cases This solicitation can be accomplished either through public hearings, which would be open to all people, or through written responses, which is likely to provide more informed input

## 5 3 2 Meeting Frequency

The ETFC should meet on a regular basis whether or not a specific tariff rate case in being reviewed Members should remain informed on a regular basis of the financial and operational activities of licensees in the sector

**(a) Recommendation Meeting Frequency**

The maximum time period between ETFC meetings should by regulation be two months

## 5 3 3 Tariff Rate Analysis

The regulations provide the ETFC with no overall goal to meet in setting tariff rates The Electricity Act allows the ETFC to establish it own procedures, and this has been interpreted to include defining methods for establishing tariff rates The Act defines a number of factors that must be considered by



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the ETFC in any rate request The regulations add to this list of factors, and include a special requirement that financial covenants of government licensee be satisfied through sufficient tariff rates

These regulations should be modified to clearly state the role and fundamental operating parameters of the ETFC Some of these were identified in Section 5 1 1 above In addition the those, the following recommendations are provided

### (a) Recommendations for Tariff Rate Analysis Requirements

The ETFC should not be required to set tariff rates so that financial covenants of licensee are met, unless the ETFC takes a part in approving those covenants The multiple factors that the ETFC must take into consideration in the Act and in the regulations should be removed and replaced with the general goals that are to be achieved in setting tariff rates As described above in Recommendation 5 1 1, these goals should include as a minimum, efficient use of resources and the interests of the consumers Beyond this, the ETFC should determine its own analysis methodology The ETFC should be required by regulation to use standard accounting principles

### (b) General Methodology

The general means by which the ETFC should conduct an analysis are not defined in the regulations, and should not be But, the regulations are not clear on whether or not the ETFC has the powers to determine its own methods for performing tariff rate reviews

- **Recommendations for the Tariff Rate Analysis Methodology** Regulations should state that the ETFC has the power to determine it own methods to analyze tariff rates The regulations should not state in detail how the ETFC should evaluate rates

### (c) Information Gathering

The ETFC appears to have sufficient power to obtain the information it requires to evaluate a rate case However, as discussed above in Section 5 1 1, the ETFC should have the power to require licensee to provide annual data on financial and operational indicators

# 6 Comparison of Regulatory Policies in Other Countries

The regulatory and institutional recommendations provided in Section 5 were identified, in part, by comparison with regulatory practices carried out in other countries This section provides information on some of the structures and operations of these regulatory bodies An attempt was made to include information from a wide range of countries and states, with a focus on Asia There are not, however, a large number of Asian countries that have or plan to set up independent regulatory commissions for the electricity sector Among the large Asian countries besides Nepal, only some states in India have begun establishing such regulatory framework, particularly Uttar Pradesh and Orissa Thus, the focus of this section is on countries that have, or are far in establishing, an effective regulatory framework The countries and states include Uttar Pradesh, Orissa, the United States, Costa Rica, Jamaica The data show that there is a wide variation in the methods used to select members, the number and experience requirements of members, tenures, budgets, and tariff analysis methods To provide a comparison of how some large Asian countries go about establishing tariff rates in unregulated environments, additional information is provided for Indonesia, Malaysia, Thailand, and Pakistan

The following points should be kept in mind Most of these regulatory bodies perform more functions than setting tariff rates The U S case is for the wholesale of power between utilities Uttar Pradesh, Orissa, Costa Rica, and Jamaica are all undergoing reform, to establish market pricing and to attract private sector investment in electricity supply Cost Rica also is heavily dependent on hydropower

The information referred to above has been included in the following tables

- Table 1 Selection of a Commission Secretary
- Table 2 Number of Members
- Table 3 Selection and Restriction Measures for Members
- Table 4 Experience Requirements for Members
- Table 5 Tenure of Members
- Table 6 Budgets
- Table 7 Decision Timeframes
- Table 8 Tariff Rate Determination Criteria

## Table 1

## Selection of a Commission Secretary

| Country or State | Current Procedures | Comments |
|---|---|---|
| Uttar Pradesh<br>▸ Electricity Regulatory Commission | The Commission has full authority to appoint whomever it wants as its Secretary The Commission is required to define by regulations how the Secretary is to be selected in consultation with state government | Although the government has a potential role to play in establishing the regulations which define how the Secretariat will be selected the Commission appears to have sufficient powers for selecting its own Secretary |
| United States<br>▸ Federal Energy Regulatory Agency (FERC) | The President designates the Chair who also serves as the Commission s administrative head | The President has a strong role in identifying the Secretary |
| Costa Rica<br>▸ Regulatory Authority for Public Service (ARSEP) | The Board of Directors elects a Secretary from among its members The Secretary serves for a renewable two-year term | This selection process reflects a high degree of political independence |
| Jamaica<br>▸ Office of Utility Regulation (OUR) | | |

**Sources**
Uttar Pradesh State Electricity Reform Bill, 1996
World Bank Staff Appraisal Report, India, Orissa Power Sector Restructuring Project April 1996
World Bank Reforms and Private Participation in the Power Sector of Selected Latin American and Caribbean and Industrialized Countries, Vol II, March 1994
World Bank Staff Appraisal Report, Jamaica, Energy Sector Deregulation and Privatization Project June 1992
U S Federal Energy Regulatory Commission, Annual Report, 1995
Independent Private Power Quarterly Second Quarter, 1996



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# Table 2

## Number of Members

| Country or State | Current Procedures | Comments |
|---|---|---|
| Uttar Pradesh<br>▸ Electricity Regulatory Commission (ERU) | The Commission is comprised of three members | |
| Orissa | Under new power sector reform implemented with the World Bank the Commission will have three members | |
| United States<br>▸ Federal Energy Regulatory Commission (FERC) | The Commission is composed of five members | |
| Costa Rica<br>▸ Regulatory Authority for Public Service (ARSEP) | The Board of Directors is comprised of five members | |

**Sources** Ibid

## Table 3

## Selection and Restriction Measures for Members

| Country or State | Current Procedures | Comments |
|---|---|---|
| Uttar Pradesh<br>▸ Electricity Regulatory Commission (ERU) | The state government has created a regulatory commission to manage all regulatory aspects of the electricity sector not just for tariff rate fixing The Commission members are selected as follows The U P government establishes as often as is required a Selection Committee of five government persons The Committee identifies two potential candidates for each member post of the Commission The state government then appoints from the potential candidates the members of the Committee<br><br>Potential members may not be a member of Parliament state legislature local authorities may not have a post in a political party and may not have an financial or other interest directly or indirectly, with any private company of other undertaking with any business with certain levels of involvement in the electricity supply sector<br><br>A member may seek election to Parliament state legislature of local bodies for a period of two years after completing his term | The U P Commission is ultimately appointed by the government, but an additional body the Selection Committee has the role of selecting candidates The Committee members are also government persons but the addition level of bureaucracy may limit of direct influence of the government<br><br>Membership criteria is severely restricted Current Parliamentarians and legislators are not eligible neither are person with a direct financial or influential position regarding firms with the sector Post-member positions are also restricted These factors may serve to limit the quality of potential members but also serve to improve the independent nature of the Commission membership |
| Orissa India<br>▸ Regulatory Commission | | |
| United States<br>▸ Federal Energy Regulatory Commission (FERC) | The President appoints the members of the Commission and the Senate approves their nomination<br><br>No more than three members may belong to a single political party | The U S system provides for two of the three branches of the federal government to play a role in developing the composition of the Commission This is a key component of helping to establish political independence |
| Costa Rica<br>▸ Regulatory Authority for Public Service (ARSEP) | The Legislative Assembly creates a commission to screen potential candidates for ARSEP s Board of Directors From these finalists must gain approval of two-thirds of the members of the Assembly The Assembly designates one of these members as the General Regulatory who serves as President of the Board | |
| Jamaica<br>▸ Office of Utility Regulation | Members to the OUR are nominated by the Executive branch and approved by the Parliament | |

**Sources** Ibid

## Table 4

## Experience Requirements for Members

| Country or State | Current Procedures | Comments |
|---|---|---|
| Uttar Pradesh<br>▸ Electricity Regulatory Commission (ERU) | Potential members of the Commission are required to have demonstrated capacity in dealing with problems relating to engineering economics commerce accountancy law or administration Specific requirements for each post are as follows<br>▸ at least one member of the Commission shall have a graduate engineering qualification with at least 25 years experience in generation transmission or supply of electricity<br>▸ at least one member shall have graduate qualification and have 25 years of relevant experience of any of the disciplines of economics commerce accountancy law or administration | These regulations help to ensure that the members of the Commission are professional with substantial demonstrated experience in their particular fields The major requirement to be met is the 25 year threshold of experience This high level may serve to eliminate potentially effective industry personnel |
| Costa Rica<br>▸ Regulatory Authority for Public Service (ARSEP) | Potential Board members are to be selected based on their recognized professional experience and achievements in the area of regulated public service | |

**Sources** Ibid

# Table 5

## Tenure of Members

| Country or State | Current Procedures | Comments |
| --- | --- | --- |
| Uttar Pradesh<br>▸ Electricity Regulatory Commission (ERU) | Commission members are appointed for a single five-year term The state government may remove a member only in specified circumstance which related to job performance breaking the law violating membership restriction and others Removal requires a lengthy legal process which the requires the full participation of the High Court of Judicature and the state Governor | Members are entitled to a long but single term This permits members enough time to add considerable expertise to the Commissions operations but not so much time that a member could develop strong political ties Employment limitations also help to reduce the development political connections<br><br>Members of the Commission can be removed only for specific reasons and only after charges have been well substantiated in a court of law This process makes it very difficult for the government to remove a member of the Commission |
| Orissa<br>▸ Regulatory Commission | The terms for the three members of the Commission are fixed | |
| United States<br>▸ Federal Energy Regulatory Commission (FERC) | Members serve a 4 year term but can be nominated for additional terms The terms also are staggered | This term structure is sufficient to allow member to perform effectively but not enough to develop a strong power base The staggered terms are important to moderate change in the composition of the Commission which might disrupt the Commission s performance as well as reduce its institutional memory |
| Costa Rica<br>▸ Regulatory Authority for Public Service (ARSEP) | Each members elected to the Board of Directors serves a single five -year term | |

**Sources** Ibid

# Table 6

## Budgets

| Country or State | Current Procedures | Comments |
|---|---|---|
| Uttar Pradesh<br>▸ Electricity Regulatory Commission (ERU) | | |
| Orissa | The Commission s operating expenses will be financed by a consolidated fund in Orissa s budget These funds will be recovered through license and other fees | |
| United States<br>▸ Federal Energy Regulatory Commission (FERC) | The FERC is funded by costs and fees charged to licensees | |
| Costa Rica<br>▸ Regulatory Authority for Public Service (ARSEP) | ARSEP s operations are funded by a combination of government funds and from costs and fees charged to licensee | |
| Jamaica<br>▸ Office of Utility Regulation (OUR) | OUR s budget is funded from fees collected from regulated entities on an equitable basis | |

**Sources** Ibid

## Table 7

## Decision Timeframes

| Country or State | Current Procedures | Comments |
|---|---|---|
| Uttar Pradesh<br>▸ Electricity Regulatory Commission (ERU) | The Commission is required to render a decision on a tariff request within 90 days of the date on which the licensee provide all the required information to the Commission | This is a fairly long time frame to analyze the tariff rate request, since information gathering and review can take up to one two months |

**Sources** Ibid

# Table 8

## Tariff Rate Determination Criteria

| Country or State | Current Procedures | Comments |
|---|---|---|
| Uttar Pradesh<br>▸ Electricity Regulatory Commission (ERU) | The Commission is required to use the factors specified in the Sixth Schedule of the Electricity (Supply) Act 1948 while determining the revenues and tariffs of a licensee Beyond these requirements the Commission has considerable discretion in defining the methodology by which revenues and tariff may be determined<br><br>Under the Act tariffs are based on a cost-of-service basis and are subject to basic performance standards The financial viability of the utility is ensured to the extend that their tariff revenues cover operational costs including debt service Under the Act the State Electricity Boards are required to operate in the most efficient and economical manner and mandates that they adjust their tariffs to achieve a minimum return after interest of 3% on net fixed assets in operation<br><br>The Commission is required to use standard financial principle and to consider factors that will encourage efficiency economic use of resources good performance optimum investments performance of license conditions and other matters as the Commission deems appropriate | The Commission is required to provide a tariff structure that provides a specific return on net fixed assets in operation |
| Orissa | The new legislation allows the new Commission to revise the procedures that are used to set the tariff rates and other charges defined in the Sixth Act of the 1948 Electricity Act The pass-through of costs will not be automatic and rates on the capital base will not be guaranteed at a prescribed level but will be linked to performance standards defined in licenses The reference rate will be tied at a variable rate determined by the Reserve Bank of India The proposed key financial covenants will be set accordingly with a rate of return of capital base of the RBI rate plus 5% Demand side effects will also be taken into account but not emphasized initially | The regulations allow the Commission to define its own methods for assessing tariff rate structures but must allow the licensee to meet certain minimum financial needs However, the licensee s efficiency is encouraged by the Commission s use of performance criteria |
| United States<br>▸ Federal Energy Regulatory Commission (FERC) | The Commission uses various measures to help determine tariff rates but in general the cost-of-service basis is used In some cases the Commission allows the rate to be market determined This occurs in instances where the seller is not in a monopoly of market driver position | |



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| Country or State | Current Procedures | Comments |
|---|---|---|
| Costa Rica<br>▸ Regulatory Authority for Public Service (ARSEP) | ARSEP will use actual cost-of-service principles to establish tariff rates These principles are issued by decree For monopolies benchmark regulation is used to adjust these costs according to an efficient enterprise model of similar size and service characteristics Specified costs of administration fines non-relevant investments, and excessive costs are excluded from the tariff rate consideration | |
| Jamaica<br>▸ Office of Utility Regulation (OUR) | The pricing system is intended in the long-term to set tariffs to match the long- run marginal costs Rate structures specify rate of return on investments Rate structures incorporate on- and off-peak and voltage level charges The OUR will set economic criteria for wholesale power sales and purchases Performance criteria are incorporated into rata assessment<br><br>A special fuel charge formula is included in the tariff rate structures for non-residential customers A special tariff is incorporated to address exchange rate fluctuation which affect the price of imported fuel and equipment | |
| Malaysia<br>▸ Electricity Supply Board (ESB) | There is almost no regulatory restrain on the monopoly utility which can raise or lower rates at will The tariff rates of power purchase agreements are approved by the ESB which is a division of the Ministry of Energy Telecommunications, and Posts Reasonable rates of return are defined as between 15% and 20% | No independent regulatory authority |
| Thailand<br>National Energy Planning Office (NEPO) | NEPO approves all tariff rates Prices from private producers must be less than the generating cost of the state monopoly utility Plans include introduction of time-of-day rates to reduce growth in the peak load | No independent regulatory authority |
| Indonesia<br>▸ Ministry of Mines and Energy (MOME) | Regulation of the private sector electricity market is nearly non-existent. Purchase power agreements are approved by the Minister of the MOME Retail tariffs are set by the president of the republic after considering a proposal submitted by the MOME | No independent regulatory authority |
| Pakistan<br>▸ Private Power and Infrastructure Board (PPIB) | PPIB sets all tariff rates in purchase power agreements Tariffs include a capacity charge (to cover debt service fixed and maintenance costs insurance and an 18% return on equity) and an energy cost In the future the National Electric Power Regulatory Authority (NEPRA) perform the regulatory functions for the sector | No independent regulatory authority although one is in the planning stages |

**Sources** Ibid

# 7 Training

The result of the review and analysis of the ETFC indicate the ETFC is a new and well understaffed organization that is not presently able to satisfactorily fulfill its regulatory obligations A staff plan was approved for the ETFC in late June, but included just two professional staff As the work load of the ETFC increases, an increase in professional staff levels, or the heavy use of outside consultants, is envisioned

The ETFC staff will most likely require a significant level of training in order to perform its functions Two types of training activities should take place, one for understanding regulatory process and the other for developing skills in financial, economic, and technical analysis

## 7 1 Regulatory

Regulatory practices vary from place to place Each regulator is unique, though effective ones are guided by a common body of laws and skills This analysis has shown that to ensure effective performance of the ETFC, several revisions and additions to the regulations are required The ETFC members and staff would benefit from training in the practices of regulation in competitive markets There are a number of countries that have or are currently installing effective regulatory regimes Most of these have charges beyond just fixing tariff rates An explanation of the structures and experiences of these regulatory bodies would benefit the current ETFC members, and would allow them to identify beneficial regulatory level changes and institutional procedures

Such training can take place in two ways, one through site visits by the ETFC members to other countries, and through domestic sessions with regulatory agency personnel or consultants Site visits to other Asian nations is preferred, but unfortunately, there are few countries in Asia that have installed regulatory bodies such as the ETFC and EDC Those who have include only Uttar Pradesh and Orissa states in India, though Pakistan is currently planning development of a regulatory authority Beyond the region, developing countries currently establishing regulatory agencies include Costa Rica and Jamaica Costa Rica is a particularly attractive case since it, like Nepal, depends predominantly on hydropower for electricity generation

Additionally, site visits to industrialized countries would prove useful Most beneficial would be visits to the U S FERC, and to U S state regulatory agencies Site visits to at least three states should be included to give the ETFC members an idea of how the regulatory structures can vary considerably from state to state

Finally, site visits could be made to countries which employ a regulatory regime for a market pricing, or pooling, system These countries include Britain, Argentina, and Chile These site visits are not likely to prove immediately useful to ETFC members since a pooling system structure is not possible in Nepal now, not is it envisioned in the medium-term

## 7 2 Economic, Financial, and Technical

The training requirements will depend on the nature of the analysis that needs to be done, and the existing capabilities of the professional staff The ETFC has not yet defined a comprehensive methodology to determine tariff rates for licensees Based on the results of this analysis, the professional staff or consultants must have the capability of assessing the wide range of financial, economic, technical, organization, and social factors that affect costs and revenue requirements for suppliers and hence tariff rates This section concentrates on the training required to perform appropriate economic and financial

The ETFC professional staff should have the capability to analyze or produce the following economic and financial data for an electricity licensee

- Load demand forecasts
- Investment planning
- Financial statements balance sheet, income, and cash-flow
- Financial ratios liquidity, performance, profitability, leverage
- Financial covenants
- Asset profile rate base determination
- Full cost data marginal, return on investment, avoided cost, market pricing
- Tariff analysis

Of these factors, the ones that require substantial training include load forecasting and investment planning, rate base determination, cost analysis, and tariff rate scheduling

Load demand forecasts are extremely difficult to define, so it is not expected that the ETFC staff will take a role in developing them The staff should be able to analyze in detail the economic and assumptions that form inputs to the models used to develop the forecast ETFC staff should be trained on how these models work in general, what inputs are required, and what the limitations of the model are

In addition, ETFC professional staff need to develop an understanding of the models used to produce investment plans Least-cost generation expansion plan models are the most widely used models for defining optimal investment plans for an electricity system A number of these plans exist, though some are more applicable than others to certain electricity market configurations ETFC staff need to understand the inputs and limitations of these various models

There are several options in which ETFC personnel could be trained in the general use and limitations of the demand load forecast and investment analysis model These types of models are used currently by the NEA Discussions with the NEA Systems Planning Department suggested the ETFC personnel could obtain training in conjunction with the NEA The Systems Planning Department has developed plans to train its own personnel in the use of these models The professional staff of the ETFC are welcome to participate in these training sessions

The ETFC staff could also be trained in the use of these models through seminars conducted by domestic electricity sector personnel, or by professional consultants from neighboring countries Many of these models are now PC-based, which would permit hands on experience, a necessary component for this type of training

Determination of the rate base is a critical element to defining a supplier's revenue requirement The ETFC staff requires training in this subject in order to identify an appropriate rate base The simplest way to accomplish this task is to conduct local seminars with specialist experienced in establishing rate bases Specialists should be selected from countries that have regulatory frameworks and as well as initial and well-established experience with establishing rate bases Particular candidate countries or states would include Uttar Pradesh, Orissa, Coast Rica, Jamaica, and United States

Financial cost and tariff rate application are critical skills that the ETFC personnel must be able to perform Adequate training in these topics requires a combination of seminar training where hands on experience can be obtained though the intensive use of microcomputers, and also site visits to regulatory bodies in various countries

# 8 Data Documentation Center

To evaluate a tariff rate case for a licensee, the ETFC must analyze and evaluate a large amount of economic, financial, technical, and social data Most of this information will come from the licensee, but data will also be supplied by other groups, particularly consumers, regarding the basis and impact of a tariff rate change The ETFC must be capability of judging in an independent manner the information it receives from various sources This was proven to be the case during ETFC review and approval of the 1996 NEA tariff rate increase

The integrity of the data must first be determined Next, the applicability of the models that are used to perform analysis must be assessed The validity of assumptions and input data to the models must be then considered Finally, the output of the models, the cost and efficiency data, must be evaluated As argued in Section 4, this evaluation would take place by comparing the current results to accepted standard criteria developed over time by the ETFC

The ETFC has not developed a comprehensive methodology to examine tariff rate requests, nor has it developed a set of standard criteria against which to compare the cost and performance data of a licensee A tool that would help the ETFC to perform this type of analysis in a effective, transparent, and timely manner is to develop a documentation center that would contain a wide variety of literature and data relevant to the ETFC goals and tasks

The data documentation center would contain both theoretical data and practical data that applies to the analysis needs of the ETFC

Key among these would include

- Cost and efficiency data from licensees over a long period of time This will help the ETFC to examine the assumptions and inputs of models, and result over time This would allow the ETFC to identify changes in an analysis methodology The efficiency data would help the ETFC identify licensee and industry trends in financial, technical, and economic data
- Tariff rate data ETFC should have detailed documentation on the past level and structure of tariff rates for each electricity licensee This will help the ETFC spot trends in tariff rates
- Technical and cost data on different electricity generation, transmission, distribution technologies These data are key inputs for least cost expansion plan models ETFC needs to have a comprehensive set of the data to determine the integrity of the data provided the investment programs and costs of the licensees
- Economic data Economic factors such as growth, inflation, and interest rates have a direct impact of the financial performance of a utility and on investment programs The ETFC should have a data base of this type of broad macroeconomic information for Nepal and India Since the ETFC is involved in setting tariff rates in rural areas, it may also require to have on hand a wide range of rural microeconomic data

The data documentation center would not be limited to containing only data obtained from licensees It would also contain documents of regulatory experience of developing and developed countries that would allow the ETFC to better refine its procedures based on best practices

The ETFC has already begun the request a wide range of financial and technical data from multilateral development banks The following documents and books are recommended for the data documentation center



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- Munasinghe, Mohan, Electric Power Economics, IRPC, 1992
- World Bank, Reforms and Private Participation in the Power Sector of Selected Latin American and Caribbean and Industrialized Countries, Vol II, March 1994
- Nevitt, Peter and Frank Fabottzi, Project Financing, Sixth Edition, Euromoney Publications, 1995
- Menke, Christop and P Gregory Fazzari, Improving Electric Power Utility Efficiency, Issues and Recommendations, Technical Paper No 243, World Bank, 1994
- Cordukes, Peter A Submission and Evaluation of Proposals for Private Power Generation Projects in Developing Countries, Discussion Paper, World Bank 1994
- Review of Institutional and Regulatory Arrangements for Private Investment in Nepal's Power Sector, Acres International, for USAID Private Electricity Project, September, 1995
- World Bank, Staff Appraisal Report, Jamaica, Energy Sector Deregulation and Privatization Project, June 1992
- World Bank Staff Appraisal Report, India, Orissa Power Sector Restructuring Project, April 1996
- Ishiguro, Masayasu and Takamasa Akiyama, Energy Demand in Five Major Asian Developing Countries Structures and Prospects, Discussion Paper, World Bank, 1995
- International Private Power Quarterly, McGraw Hill

# Appendices

**(Appendices A, C, D, E and F have been copied from existing documents)**

# Appendix A

# ETFC Regulations (1993)



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Unofficial Translation
26 September 1993

# ELECTRICITY TARIFF FIXATION REGULATION, 2050

n exercise of the power conferred by Section 40 of Electricity Act, 2049, His Majesty's Government has made the following rules

## Chapter-1

## Preliminary

### Short Title and Commencement

(1) This regulation may be called "Electricity Tariff Fixation Regulation, 2050 "

(2) This regulation shall come into force immediately

### Definition

Unless the subject or the context otherwise requires, in this regulation -

(a) "Act" means Electricity Act, 2049

(b) "Commission" means Commission constituted pursuant to Rule 3

( , "Tariff" means the fee charged to the consumer for the electricity services rendered to them by the licensee

(d) "Chairman" means the chairman of the Commission

(e) "Member" means member of the Commission and the term also denotes the chairman of the Commission

(f) "Secretary" means the secretary of the Commission

## Chapter - 2
## Electricity Tariff Fixation Commission

### Formation of the Electricity Tariff Fixation Commission

(1) Electricity Tariff Fixation Commission having the following chairman and members shall be constituted for the provision of sub-section (1) of Section 17 of the Act to fix electricity tariff and other charges of the electricity supplied and distributed by the licensee or His Majesty's Government

| | | |
|---|---|---|
| (a) | Person prescribed by His Majesty's Government from non-governmental sector | - Chairman |
| (b) | Representative, Ministry of Water Resources | - Member |
| (c) | Economist, as prescribed by His Majesty's Government from non-governmental sector | - Member |
| (d) | Person as prescribed by His Majesty's Government among the licensee of the electricity generation, transmission or distribution or his representative | - Member |

(e) Representative, Federation of Nepal Chamber of Commerce and Industry - Member

(f) Person as prescribed by His Majesty's Government from among the consumers - Member

(2) The Director General of the Electricity Development Centre shall be the Secretary of the Commission and the Electricity Development Centre shall work as the Secretariat of the Commission

(3) The Commission may invite the concerning experts in the field of electricity to take part as an observer in its meeting

(4 The tenure of the Chairman and member pursuant to Clause (c), (d) and (f) of Sub-Rule (1) of the Commission shall be of three years and the tenure may be extended for one more period to the chairman and members who have completed their tenure

(5) His Majesty's Government may change or reorganize the Commission pursuant to sub-rule (2) by publishing a notification in the Nepal Gazette

Function, Duties and Rights of the Commission

(1) Except otherwise stipulated in the Act, the Commission shall have the following function, duties and rights

(a) To fix electricity tariff and other charges pursuant to sub-section (1) of Section 17 of the Act

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(b) To review tariff rates and other charges charged to the consumers against the services rendered to them through the generation, transmission or distribution of the electricity by the licensee

(c) The Commission in connection of its work may deploy any member, staff or expert to any place in the Kingdom of Nepal as it deems necessary

(2) The Commission may constitute a committee or sub-committee in coordination with its members to submit a study report on any subject related to its jurisdiction The function, duties, rights and procedures of such committee shall be as prescribed by the Commission

5 Meeting Procedures of the Commission

The meeting procedure of the Commission shall be as follows

(1) The meeting of the Commission shall be held on the time, date and venue as prescribed by the Chairman

(2) The Chairman of the Commission shall preside over the meeting and in the absence of the chairman, a member chosen by the members present in the meeting from among themselves shall preside over the meeting

(3) The presence of three fourth members from among the total member of the Commission shall be the quorum

(4) The opinion of the majority of the members present at the meeting shall prevail for decision of the Commission

(5) The decision of the Commission shall be written by the Secretary in the minute book with the signature of the members present in the meeting

(6) The decision of the Commission shall be certified by the Secretary

(7) The other necessary procedures of the meeting of the Commission shall be as prescribed by the Commission itself

Chapter-3

## Procedures Relating to Fixation of Tariff and Other Charges

### Fixation of Tariff and Other Charges

(1) The Commission, pursuant to sub-section (3) of Section 17 of the Act, shall fix the electricity tariff and other charges on the basis of the rate of depreciation, reasonable profit, mode of the operation of the plant, changes in consumer's price index, royalty and the policy adopted by His Majesty's Government in relation to development of electricity etc The marginal cost of the electricity generation, the exchange rate of convertible foreign currency and cost of the fuel also shall be taken as basis while fixing tariff in this way

(2) While determining electricity tariff rate and other charges pursuant to sub-rule (1) the Commission may fix the tariff rate and other charges having attention over types of consumers , social liability, cross subsidies and including potential for demand side management

(3) While fixing or reviewing electricity tariff rate and other charges pursuant to sub-section (1) and (2), the commission may give attention also over the organizational efficiency of the licensee

7 <u>Application to be Submitted for the Fixation of the Electricity Tariff and Other Charges</u>

The licensee, for distribution of electricity, shall submit an application to the Commission in the format as prescribed in Schedule-1, stating the following particulars for the fixation of the electricity tariff rate and other charges to be levied on the consumers for the electricity services rendered to them

(a) The basis for the fixation for the proposed new tariff, (to be attached along with the financial and technical report and other documents to justify those basis)

(b) If the tariff rate is to be changed, the basis for such changes, (to be attached along with the financial and technical report and other documents to justify those reasons)

(c) An index of rates, clearly stating the present tariff rate, the proposed tariff rate, (The index shall show the existing and proposed tariff for each class of consumer along with the propo ed percentage increase)

(d) Other relevant matters like the financial covenants on which the licensee has expressed consent with financial institutions

The Commission, on the receipt of an application submitted by the applicant for the fixation of tariff and other charges pursuant to Rule 7, shall examine the application as to whether or not a necessary documents, particulars, or reports have been submitted with the application

2) While examining the application pursuant to sub-rule (1), if the applicant has not submitted any document, particulars or reports, the Commission shall issue a notification by prescribing the reasonable period to the concerned applicant within 35 days from the date of the registration of the application, to submit such document, particulars or report

3) The date of the submission of the document, particulars or reports as demanded within the period as prescribed in the notice issued pursuant to sub-rule (2) shall be deemed to be the date of the submission the application

Tariff and Other Charges to be Fixed

After receipt of an application pursuant to Rule 7, the Commission, after examining the application pursuant to Rule 8, shall fix the electricity tariff and other charges within 60 days from the date of submission of application in accordance with the proposal of the applicant, or if deems necessary make amendment thereto

While fixing tariff and other charges pursuant to sub-rule (1) the date of the commencement of the fixed or changed rate shall be prescribed

(3) If the Commission, after examining the application pursuant to Rule 8, deems it unnecessary to change tariff and other charges proposed by the applicant, it shall notify the concerned applicant of such matter within sixty days from the date of the submission of the application

Notice to be Published

The fixed tariff rate and other charges as determined by the Commission pursuant to Rule 9 shall be published in a notification for the general public

Chapter - 4
Miscellaneous

Suggestions may be Taken

While determining tariff rate and other charges pursuant to the Act and this regulation, the Commission may do discussion with any person, as it deems appropriate

To Cooperate

Governmental or non-governmental institution and individual shall have to cooperate in the functioning of the Commission

Financial Arrangement

(1) His Majesty's Government shall make available the necessary funds to the Commission for its functioning

(2) The Commission, for its functioning may expend necessary amount received pursuant to sub-rule (1)

ilities

The remuneration and other facilities for the members of the Commission shall be as prescribed by the government

Liaison with His Majesty's Government

While keeping liaison with His Majesty's Government the Commission shall do so through the Ministry of Water Resources

# Appendix B

## Calculating Return on Investment with the Capital Asset Pricing Model



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# Appendix B Example Application of the Capital Asset Pricing Model

The Capital Asset Pricing Model (CAPM) is commonly used to develop an estimate for an expected return of an equity investment This brief example demonstrates the methodology underlying the CAPM theory in the context of the electricity sector in Nepal The CAPM model is best used in countries that have well developed capital markets, because the model examines risk levels and the variations in the value of an asset to the variation of the value of *all* assets in a market By making certain assumptions, however, the model can be used to determine equity returns in countries without advanced capital markets by referencing the data to another market that does have a well developed capital market Since Nepal does not have a well developed capital market, the analysis can be performed by reference to data taken from the U S market To simplify the analysis, all calculations are performed in U S dollars

## Definitions

1 The rate of equity return, $r_e$, for an electricity suppliers is defined as,

$r_e$ = a risk free return rate for the country + a reference market variability return rate

$= rf_{Nepal} + \beta(r_{market} - rf_{market})$

where $rf_{Nepal}$ = the 'risk free' return in Nepal,

$\beta$ = the measure of the volatility in the value of an asset compared to the volatility of the capital market as a whole,

$r_{market}$ = reference, or U S , market return rate,

$rf_{market}$ = reference, or U S, market risk free return rate

2 The risk free rate in Nepal, rfNepal is computed as follows

$rf_{Nepal}$ = Reference market risk return less a Nepal risk premium
= U S risk free rate, measured from 30 year bonds - Nepal risk premium

The return on 30 year U S Treasury bonds is about 6 8% Since Nepal's long-term bond rates are not available, a bond rate from India can be applied In August 1996, the Industrial Finance Corporation of India Limited long-term bond rate was 16 25%

$rf_{Nepal}$ = 16 25% - 6 8% = 9 45%

3 The $\beta$ is a measure of the variability in the value of an asset compared to the variability of the market as a whole It is measured empirically from market data It is not possible to obtain $\beta$ values for suppliers in Nepal, but it is possible to use $\beta$s from the reference U S market Taking an average of the following $\beta$ values,

The Southern Company, Georgia 0 62
Consolidated Edison, New York = 0 70

Pacific Gas & Electric, California 0 75

$\beta = \beta_{US\ market} = 0\ 69$

4 The term, $r_{market} - rf_{market}$ represents the difference between the long term equity returns and the risk free rate This varies over time, but the long-term value in the measure has been empirically determined as about 8 5% in the U S market measured over several decades

$r_{market} - rf_{market} = 8\ 0\%$

difference with the risk-free rate, empirically evaluated to be 8 5% on average

5 Therefore,

$r_e = rf_{Nepal} + \beta(r_{market} - rf_{market})$

$= 16\ 25\% + 0\ 69(8\ 5\%) = 21\ 12\%$

# Appendix C

# World Bank Utility Efficiency Checklist

**Policy Guidelines for Improving the Efficiency of Electric Power Utilities**

# Checklist

| *Level of autonomy* | *Performance rating scale* | | | | |
|---|---|---|---|---|---|
| | *Good* (Yes) | <<<< | *Medium* (Partly) | >>>> | *Bad* (No) |
| **Qualitative indicators** | | | | | |
| 1 Does the utility have clear and consistent objectives? | | | | | |
| a Are the long-term corporate objectives clearly established? | | | | | |
| b Are they likely to ensure adequate operational and financial performance? | | | | | |
| c Has management sufficient autonomy to operate the utility according to corporate objectives? | | | | | |
| 2 Are daily operations of the utility insulated from external political pressure? | | | | | |
| 3 Has management the right to hire and fire employees and to negotiate conditions of employment? | | | | | |
| 4 Does the utility control its employees' salaries? | | | | | |
| 5 Has the utility the right to adjust tariffs according to costs to produce sufficient revenues? | | | | | |
| 6 Does the utility have timely access to sufficient foreign exchange? | | | | | |

| Top management | Performance rating scale | | | | |
|---|---|---|---|---|---|
| | Good (Yes) | <<<< | Medium (Partly) | >>>> | Bad (No) |
| **Qualitative indicators** | | | | | |
| 1 Is there a department in charge of corporate planning? | | | | | |
| 2 Are there appropriate and consistent annual operating objectives? | | | | | |
| 3 Is there an appropriate management information and reporting system? | | | | | |
| 4 Is there a system of appropriate performance indicators to measure achievement of objectives? | | | | | |
| 5 Are operational and performance reports processed and analyzed properly? | | | | | |
| 6 Are there clear communication channels between upper and lower management levels? | | | | | |
| 7 Are budgetary procedures and corporate planning coordinated properly? | | | | | |
| 8 Is there continuous and adequate monitoring of ongoing projects? | | | | | |
| 9 Are there action plans to remedy shortcomings? | | | | | |
| 10 Is management held accountable for its performance? | | | | | |

| *Human resources: Manpower planning and incentive measures* | *Performance rating scale* | | | | |
|---|---|---|---|---|---|
| | *Good* (Yes) | <<<< | *Medium* (Partly) | >>>> | *Bad* (No) |
| **Qualitative indicators**<br>1 Is there a system of performance-based incentives in place? | | | | | |
| If yes, is this system in line with the social environment? | | | | | |
| 2 Is the remuneration commensurate with that in other sectors of the economy? | | | | | |
| If no, do the fringe benefits (housing, family contributions, etc ) make up for the difference? | | | | | |
| 3 Is the utility's training program judged to be adequate? | | | | | |
| The assessment could be based on the following factors<br>a Are sufficient resources devoted to training? | | | | | |
| b Is the time spent on training measures adequate? | | | | | |
| c Is the training structured? | | | | | |
| d Are there qualified and motivated trainers? | | | | | |
| e Are there adequate incentives for staff to participate in training measures? | | | | | |

| Human resources: Manpower planning and incentive measures | | Performance rating scale | | | | | Target value |
|---|---|---|---|---|---|---|---|
| | | Good (Yes) | <<<< | Medium (Partly) | >>>> | Bad (No) | |
| **Quantitative indicators** | | | | | | | |
| 1 | Turnover of manpower per year as a percentage of average work force | | | | | | < 10% |
| 2 | Rate of absenteeism | | | | | | |
| 3 | Staff vacancies by employee classification (in particular with regard to skilled jobs) | | | | | | |
| 4 | Comparative salary and compensation levels | | | | | | |
| 5 | Share of unskilled workers in the total work force | | | | | | ≤ 30% |
| 6 | Training costs by employees and by qualification level | | | | | | |
| 7 | Number of employees per megawatt-hour sold | | | | | | |

| Commercial operation and accounting | Performance rating scale | | | | | Target value |
|---|---|---|---|---|---|---|
| | Good (Yes) | <<<< | Medium (Partly) | >>>> | Bad (No) | |
| **Qualitative indicators** | | | | | | |
| 1 Overdue accounts | | | | | | |
| a Are surcharges applied for overdue accounts? | | | | | | |
| b Is there a firm and enforced disconnection policy in place for nonpayment? | | | | | | |
| c Are there extra fees for reconnection? | | | | | | |
| **Quantitative indicators** | | | | | | |
| 1 Outstanding accounts receivable (in months of billing) | | | | | | |
| a Private customers | | | | | | ≤ 3 months |
| b Government and government-owned customers | | | | | | < 2 months |
| 2 Accounts receivable older than three months of total accounts receivable | | | | | | ≤ 20% |
| 3 Bad debts (unpaid energy) as a percentage of accounts receivable | | | | | | ≤ 10% |
| 4 Billing lag | | | | | | ≤ 30 days |
| 5 Variance between planned budget and actual expenditures | | | | | | |
| 6 Number of customers per utility employee | | | | | | |
| 7 Salaries per utility employee | | | | | | |
| 8 Lags in providing service connection | | | | | | |

| Financial performance | Performance rating scale | | | | | Target value |
|---|---|---|---|---|---|---|
| | Good (Yes) | <<<< | Medium (Partly) | >>>> | Bad (No) | |
| **Quantitative indicators** | | | | | | |
| 1 Rate of return on revalued net fixed assets (after consideration of exchange rate fluctuations) | | | | | | ≥ 8% |
| 2 Average revenues from electricity sales | | | | | | ≥ LRMC |
| 3 Debt service coverage of net revenues | | | | | | ≥ 1 5 |
| 4 Cash generation as percentage of investment expenditures (self-funding ratio) | | | | | | ≥ 30% |
| 5 Debt-equity ratio | | | | | | ≤ 2 5 |

| Technical performance and maintenance | Performance rating scale | | | | | Target value |
|---|---|---|---|---|---|---|
| | Good (Yes) | <<<< | Medium (Partly) | >>>> | Bad (No) | |
| **Qualitative indicators** | | | | | | |
| 1 Are there appropriate procedures to check the quality of fuel and lubricants? | | | | | | |
| 2 Is maintenance performed according to set schedules? | | | | | | |
| 3 Is dispatch performance optimized? | | | | | | |
| **Quantitative indicators** | | | | | | |
| 1 Reliability of power system<br>a equivalent forced outage rate | | | | | | |
| b spinning reserve | | | | | | |
| 2 System unserved energy | | | | | | ≤1% |
| 3 Reserve margin (available capacity/peak demand) | | | | | | ≤1 25 |
| 4 Planned outage rate | | | | | | |
| 5 Time availability of plant per year (hours per year/8760) | | | | | | ≥75% |
| 6 Fuel and lube oil consumption of thermal plants compared to manufacturer's standard | | | | | | ≤110% |
| 7 System fuel cost | | | | | | |

(**Quantitative indicators** *continued on next page*)

| Technical performance and maintenance | Performance rating scale | | | | | Target value |
|---|---|---|---|---|---|---|
| | Good (Yes) | <<<< | Medium (Partly) | >>>> | Bad (No) | |
| **Quantitative indicators** *(continued from previous page)* | | | | | | |
| 8 System cost of energy delivered | | | | | | |
| 9 Staff years per MWh generated | | | | | | |
| 10 System load factor | | | | | | 0 45-0 75 |
| 11 System losses (transmission, distribution) | | | | | | ≤20% |
| 12 Technical system losses (if grid configuration allows) | | | | | | ≤15% |
| 13 Station service and own use (kilowatt-hours used per kilowatt-hour generated) | | | | | | ≤5% |
| 14 Nontechnical losses | | | | | | |
| 15 Thermal (diesel) generation cost in US$ per kilowatt-hour | | | | | | |
| 16 Lifetime of diesel engines (in hours) | | | | | | ≥75,000 |

| Supply and materials management (Inventory control, stores control, purchasing, and transportation) | Performance rating scale | | | | | Target value |
|---|---|---|---|---|---|---|
| | Good (Yes) | <<<< | Medium (Partly) | >>>> | Bad (No) | |
| **Qualitative indicators** | | | | | | |
| 1 Are there appropriate inventory control and order policies? | | | | | | |
| 2 Is there a reliable fuel supply? | | | | | | |
| **Quantitative indicators** | | | | | | |
| 1 Percentage of inventory scrapped | | | | | | |
| 2 Percentage of inventory stolen | | | | | | |
| 3 Procurement procedures | | | | | | |
| a Average time from placing of order to receipt of material | | | | | | |
| 4 Inventory turnover in months | | | | | | |





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# Appendix D

# Financial Reporting Requirements of U.S Investor-Owned Utilities



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## Table 6 Composite Statement of Income and Retained Earnings for Major U S Investor-Owned Electric Utilities, 1990-1994
(Thousand Dollars)

| Item | 1994 | 1993 | 1992 | 1991 | 1990 |
|---|---|---|---|---|---|
| Electric Utility Operating Income | | | | | |
| Electric Operating Revenues | 179 307 260 | 176 354,365 | 169 488 035 | 166 803 843 | 157 278 537 |
| Electric Operating Expenses | | | | | |
| Operation Expense | 93 107 998 | 91 328 230 | 87,272 134 | 85 933 743 | 81 086 488 |
| Maintenance Expense | 12 021 790 | 12 446 914 | 12,194 805 | 12 024 427 | 11 779 489 |
| Depreciation Expense | 17 514 951 | 16 622 229 | 15 984 394 | 15 494 155 | 14 536 599 |
| Amortization | 1 164 071 | 1 476 507 | 1 107 359 | 633 021 | 351 985 |
| Regulatory Debits | 1 143 617 | 676 510 | 0 | 0 | 0 |
| (less) Regulatory Credits | 409 755 | 245 036 | 0 | 0 | 0 |
| Taxes Other Than Income Taxes | 13 275 354 | 13 040 400 | 12,760 152 | 12 270 379 | 11 433 264 |
| Federal Income Taxes | 8,286 595 | 7 145 892 | 6 135 824 | 6 570 371 | 6 155 755 |
| Other Income Taxes | 1 338 974 | 1 151 008 | 1 061 858 | 1 120 150 | 991 104 |
| Provision for Deferred Income Taxes | 10 458 805 | 11 166 834 | 9 912 989 | 9 821 725 | 7 813 656 |
| (less) Provision for Deferred Income Taxes (credit) | 8 625 212 | 8 173 691 | 6 895 654 | 7 527 049 | 5 958 279 |
| Investment Tax Credit Adjustments (net) | -556 001 | -492 992 | -510 596 | -381 016 | -253 564 |
| (less) Gains from Disposition of Utility Plant | 34 562 | 27,216 | 15 621 | 12 727 | 36 630 |
| Losses from Disposition of Utility Plant | 5 862 | 4 417 | 1 449 | 812 | 766 |
| (less) Gains from Disposition of Allowances | 27 754 | 2,036 | 0 | 0 | 0 |
| Losses from Disposition of Allowances | 0 | 43 | 0 | 0 | 0 |
| **Total Electric Operating Expenses** | **148 662,734** | **146 118,013** | **139 009 093** | **135 947 991** | **127 900 634** |
| **Net Electric Utility Operating Income** | **30 644,526** | **30,236,352** | **30,478,942** | **30,855 852** | **29,377,903** |
| Gas Utility Operating Income | | | | | |
| Gas Operating Revenues | 16 221 506 | 16 686 912 | 15 422,461 | 15 024 851 | 15 084 445 |
| Gas Operating Expenses | | | | | |
| Operation Expense | 11 848 961 | 12 321 927 | 11 371,265 | 11 216 882 | 11 512 974 |
| Maintenance Expense | 504 383 | 483 081 | 483 542 | 523 408 | 444 644 |
| Depreciation Expense | 934 987 | 889 131 | 851 510 | 801 189 | 744 752 |
| Amortization | 53 807 | 34 448 | 59 162 | 36 280 | 40 210 |
| Regulatory Debits | 40 198 | -23 | 0 | 0 | 0 |
| (less) Regulatory Credits | 20 544 | 1 069 | 0 | 0 | 0 |
| Taxes Other Than Income Taxes | 1 023,206 | 1 005 117 | 966 090 | 910 945 | 872 954 |
| Federal Income Taxes | 408 939 | 211 404 | 251 825 | 253 451 | 372 002 |
| Other Income Taxes | 56 137 | 40 129 | 46 069 | 68 497 | 73 243 |
| Provision for Deferred Income Taxes | 540 285 | 709 122 | 558 532 | 462 229 | 311 133 |
| (less) Provision for Deferred Income Taxes (credit) | 496 858 | 442 119 | 430 003 | 428 692 | 411 252 |
| Investment Tax Credit Adjustments (net) | -14 886 | -15 347 | -14 312 | -3 923 | 6 743 |
| (less) Gains from Disposition of Utility Plant | 848 | 1,243 | 539 | 507 | 905 |
| Losses from Disposition of Utility Plant | 70 | 0 | 0 | -129 | 1 |
| (less) Gains from Disposition of Allowances | 0 | 0 | 0 | 0 | 0 |
| Losses from Disposition of Allowances | 0 | 0 | 0 | 0 | 0 |
| **Total Gas Operating Expenses** | **14,877,836** | **15,234,557** | **14,143,139** | **13 839,631** | **13,966,498** |
| **Net Gas Utility Operating Income** | **1,343,670** | **1,452,354** | **1,279,322** | **1,185,220** | **1,117,947** |
| Other Utility Operating Income | | | | | |
| Other Utility Operating Revenues | 752 734 | 596 567 | 582,962 | 622 033 | 636 973 |
| Other Utility Operating Expenses | | | | | |
| Operation Expense | 433 810 | 404 151 | 379,239 | 419 110 | 443 634 |
| Maintenance Expense | 74 991 | 55 875 | 49 055 | 57 307 | 64 325 |
| Depreciation Expense | 64 600 | 33 895 | 32,197 | 31 081 | 32 179 |
| Amortization | 461 | 403 | 274 | 255 | 252 |
| Regulatory Debits | 72 | 1 657 | 0 | 0 | 0 |
| (less) Regulatory Credits | 176 | 2 186 | 0 | 0 | 0 |
| Taxes Other Than Income Taxes | 68,287 | 60 750 | 60 981 | 63 182 | 64 208 |
| Federal Income Taxes | 12,901 | 9 439 | 7 791 | -10 491 | -9 995 |
| Other Income Taxes | 2,062 | 1 324 | 889 | 729 | 662 |
| Provision for Deferred Income Taxes | 26 363 | 11 738 | 14 547 | 42 900 | 41 460 |

See endnotes at end of this table

## Table 6 Composite Statement of Income and Retained Earnings for Major U S Investor-Owned Electric Utilities, 1990-1994 (Continued)
(Thousand Dollars)

| Item | 1994 | 1993 | 1992 | 1991 | 1990 |
|---|---|---|---|---|---|
| (less) Provision for Deferred Income Taxes (credit) | 15 582 | 19 354 | 13 197 | 28 525 | 31 981 |
| Investment Tax Credit Adjustments (net) | -934 | -1 852 | -1 434 | -1 164 | -507 |
| (less) Gains from Disposition of Utility Plant | 271 | 361 | 145 | 37 | 1 |
| Losses from Disposition of Utility Plant | 0 | 0 | 0 | 0 | 0 |
| (less) Gains from Disposition of Allowances | 0 | 0 | 0 | 0 | 0 |
| Losses from Disposition of Allowances | 0 | 97 | 0 | 0 | 0 |
| **Total Other Utility Operating Expenses** | **666 584** | **555,577** | **530 197** | **574 348** | **604,237** |
| **Net Other Utility Operating Income** | **86 150** | **40,990** | **52,765** | **47 687** | **32 736** |
| Total Utility Operating Income | | | | | |
| Total Utility Operating Revenues | 196 281 500 | 193 637 843 | 185 493 458 | 182 450 728 | 172 999 954 |
| Utility Operating Expenses | | | | | |
| Operation Expense | 105 390 769 | 104 054 308 | 99 022 638 | 97 569 735 | 93 043 096 |
| Maintenance Expense | 12 601 163 | 12 985 870 | 12 727 401 | 12 605 143 | 12 288 458 |
| Depreciation Expense | 18 514 539 | 17 545 254 | 16 868 101 | 16 326 426 | 15 313 530 |
| Amortization | 1 218 339 | 1 511 358 | 1 166 794 | 669 556 | 392 447 |
| Regulatory Debits | 1 183 887 | 678 144 | 0 | 0 | 0 |
| (less) Regulatory Credits | 430 475 | 248 291 | 0 | 0 | 0 |
| Taxes Other Than Income Taxes | 14 366 847 | 14 106 267 | 13 787 223 | 13 244 505 | 12 370 426 |
| Federal Income Taxes | 8 708 435 | 7 366 734 | 6 395 440 | 6 813 331 | 6 517 762 |
| Other Income Taxes | 1 397 172 | 1 192 462 | 1 108 816 | 1 189 375 | 1 065 010 |
| Provision for Deferred Income Taxes | 11 023 453 | 11 887 694 | 10 486 068 | 10 326 854 | 8 166 249 |
| (less) Provision for Deferred Income Taxes (credit) | 9 137 651 | 8 635 165 | 7 338 854 | 7 984 266 | 6 401 511 |
| Investment Tax Credit Adjustments (net) | -571 821 | -510 191 | -526 342 | -386 102 | -247 328 |
| (less) Gains from Disposition of Utility Plant | 35 681 | 28 819 | 16 304 | 13 271 | 37 536 |
| Losses from Disposition of Utility Plant | 5 932 | 4 417 | 1 449 | 683 | 766 |
| (less) Gains from Disposition of Allowances | 27 754 | 2 036 | 0 | 0 | 0 |
| Losses from Disposition of Allowances | 0 | 140 | 0 | 0 | 0 |
| **Total Utility Operating Expenses** | **164,207,153** | **161,908,147** | **153 682 429** | **150 361 969** | **142 471,369** |
| **Net Utility Operating Income** | **32 074 346** | **31,729 696** | **31 811,029** | **32,088 758** | **30,528 585** |
| Other Income and Deductions | | | | | |
| Other Income | | | | | |
| Nonutility Operating Income | 11 293 | -6 186 | 14 431 | 2 955 | -10 348 |
| Equity in Earnings of Subsidiary Companies | 852 677 | 795 444 | [1] -19 161 | 813 875 | 360 611 |
| Interest and Dividend Income | 711 062 | 748 052 | 883 419 | 1 058 368 | 1 116 789 |
| Allowance for Other Funds Used During Construction | 402 569 | 591 445 | 611 514 | 706 102 | 1 080 217 |
| Miscellaneous Nonoperating Income | 708 095 | 578 310 | 1,248 421 | 1 094 726 | 1 278 994 |
| Gain on Disposition of Property | 107 653 | 128 220 | 120 752 | 239 936 | 258 374 |
| **Total Other Income** | **2,793,350** | **2,835,284** | **2,859,377** | **3,915 963** | **4,084,637** |
| Other Income Deductions | | | | | |
| Loss on Disposition of Property | 13 628 | 29 170 | 27 819 | 63 137 | 59 848 |
| Miscellaneous Amortization | 28 369 | 30 845 | 33 672 | 67 526 | 26 362 |
| Miscellaneous Income Deductions | 1 419 328 | 2 548 451 | 1 488 302 | 4 114 554 | 2 557 378 |
| **Total Other Income Deductions** | **1,461 325** | **2,608,466** | **1,549 793** | **4 245,217** | **2,643 589** |
| Taxes on Other Income and Deductions | | | | | |
| Taxes Other Than Income Taxes | 23 294 | 26 044 | 30 501 | 9 358 | 36 797 |
| Federal Income Taxes | -384 395 | -441 420 | -239 227 | -31 841 | -310 347 |
| Other Income Taxes | -49 683 | -48 838 | -39 345 | 3 615 | -38 471 |
| Provision for Deferred Income Taxes | 577 949 | 545 762 | 458 156 | 491 421 | 833 319 |
| (less) Provision for Deferred Income Taxes (credit) | 518 483 | 1 052 376 | 485 782 | 1 211 410 | 732 446 |
| Investment Tax Credit Adjustments (net) | -80 296 | -89 168 | -38 985 | 960 | -90 884 |
| (less) Investment Tax Credit | 45 914 | 59 585 | 64 779 | 114 684 | 87 417 |
| **Total Taxes on Other Income and Deductions** | **-477 529** | **-1,119,581** | **-379 461** | **-852,579** | **-389 448** |
| **Net Other Income and Deductions** | **1 809 553** | **1,346,398** | **1 689 045** | **523 325** | **1 830 496** |

See endnotes at end of this table

## Table 6 Composite Statement of Income and Retained Earnings for Major U S Investor-Owned Electric Utilities, 1990-1994 (Continued)

(Thousand Dollars)

| Item | 1994 | 1993 | 1992 | 1991 | 1990 |
|---|---|---|---|---|---|
| Interest Charges | | | | | |
| Interest on Long term Debt | 12 784 021 | 13 476 875 | 14 203 575 | 14 725 810 | 14 815 559 |
| Amortization of Debt Discount and Expenses | 282 459 | 271 365 | 200 441 | 165 026 | 166 843 |
| Amortization of Loss on Reaquired Debt | 397 578 | 433 901 | 293 376 | 219 870 | 222 364 |
| (less) Amortization of Premium on Debt (credit) .. .. | 4 669 | 5 706 | 4 716 | 6 852 | 6 386 |
| (less) Amortization of Gain on Reacquired Debt (credit) .. | 8 322 | 10 804 | 15 021 | 16 620 | 19 388 |
| Interest on Debt to Associated Companies | 85 788 | 72 670 | 65 837 | 68 166 | 102 369 |
| Other Interest Expense | 1 045 575 | 1 017 208 | 1 038 029 | 1 216 372 | 1,268 498 |
| (less) Allowance for Borrowed Funds Used During Construction (credit) .. .. | 420 828 | 555 021 | 558 348 | 635 525 | 814 229 |
| **Net Interest Charges** | **14 161 602** | **14 700 488** | **15,223,174** | **15,736,248** | **15,735 630** |
| **Income Before Extraordinary Items** .. | **19 722,298** | **18 375 606** | **18,276,900** | **16 875 836** | **16,623 451** |
| Extraordinary Items | | | | | |
| Extraordinary Income .. | 363 807 | 251 350 | 189 556 | 164 901 | 654 477 |
| (less) Extraordinary Deductions .. | 181 875 | 690 386 | 38 931 | 10 986 | 285 619 |
| **Net Extraordinary Items** | **181,932** | **-439 037** | **150,625** | **153,915** | **368 858** |
| (less) Federal and Other Income Taxes .. | 16 644 | 45 372 | 43 081 | 80 086 | 95 143 |
| **Extraordinary Items After Taxes** .. | **165,288** | **-484,409** | **107,544** | **73 829** | **273 715** |
| **Net Income** ... .. .. | **19 887,586** | **17 891 198** | **18 384,444** | **16 949,664** | **16,897 166** |
| **Unappropriated Retained Earnings** | | | | | |
| **Retained Earnings - Beginning of Year** .. | **49 693 373** | **49 622 118** | **47,529,076** | **48,721,079** | **47,645,278** |
| Balance Transferred from Income | 19 101 771 | 17 149 500 | 18 496 049 | 16 175 033 | 16 552 936 |
| Credits to Retained Earnings | 33 528 | 44 112 | 457 488 | 149 300 | 28 747 |
| (less) Debits to Retained Earnings | 184 277 | 326 958 | 301 908 | 322 254 | 299 515 |
| (less) Appropriations of Retained Earnings | 336 847 | 324 325 | 45 795 | 9 039 | 22 902 |
| (less) Dividends Declared Preferred Stock | 1 581 940 | 1 765 286 | 2 039 449 | 1 945 213 | 2 025 157 |
| (less) Dividends Declared Common Stock ... | 15 875 659 | 15 334 377 | 14 897 608 | 14 427 570 | 14 189 677 |
| Unappropriated Undistributed Subsidiary Earnings .. | 459 036 | 474 743 | 334 854 | 534 985 | 271 693 |
| **Retained Earnings End of Year** .. ... | **51,308,985** | **49,539 527** | **49,532,707** | **48,876,322** | **47,961,404** |
| Appropriated Retained Earnings | 343 329 | 287 483 | 65 035 | 33 924 | 51 274 |
| Appropriated Retained Earnings Amortization Reserve Federal | 104 490 | 91 278 | 115 601 | 65 022 | 57 541 |
| **Total Retained Earnings** | **51,756,805** | **49 918 289** | **49,713,342** | **48 975,268** | **48,070,218** |

[1] PacifiCorp took a $587 9 million loss in this account.

Note Totals may not equal sum of components because of independent rounding Detailed data are provided in Table 37 Due to its emergence from bankruptcy the 1991 financial statements for the Public Service Company of New Hampshire are from May 16 through December 31 Excluded are the independent power producers and cooperatives jurisdictional to the Federal Energy Regulatory Commission

Source Federal Energy Regulatory Commission FERC Form 1 Annual Report of Major Electric Utilities Licensees and Others

## Table 8 Composite Balance Sheet for Major U S Investor-Owned Electric Utilities on December 31, 1990-1994
(Thousand Dollars)

| Item | 1994 | 1993 | 1992 | 1991 | 1990 |
|---|---|---|---|---|---|
| Electric Utility Plant | | | | | |
| Electric Utility Plant | 535 928 383 | 519,207 367 | 498 118 599 | 479 822 229 | 458 081 342 |
| Electric Construction Work in Progress | 17 148 353 | 18 048 849 | 20 648,234 | 18 077 211 | 22 558 726 |
| **Total Electric Utility Plant** | **553,076 736** | **537,256,216** | **518,766 833** | **497 899,439** | **480 640 068** |
| (less) Electric Utility Accumulated Provision for Depreciation Amortization and Depletion | 186 140,318 | 173 426,756 | 160 466 573 | 148 288 414 | 135 727 298 |
| **Net Electric Utility Plant (less nuclear fuel)** | **366,936,417** | **363,829,459** | **358,300,259** | **349,611,025** | **344,912,770** |
| Nuclear Fuel | 18 967 463 | 19 964 587 | 19 795 166 | 19 481 957 | 19 525 373 |
| (less) Accumulated Provision for Amortization of Nuclear Fuel Assemblies | 13,310 585 | 14 000 409 | 12,958 447 | 12 570 312 | 11 713 335 |
| **Net Nuclear Fuel** | **5 656 878** | **5,964,178** | **6 836,719** | **6 911 645** | **7 812,038** |
| Other Utility Plant | 37 080 440 | 34 868 785 | 31 623,922 | 29 881 239 | 27 634 678 |
| Other Utility Construction Work in Progress | 1 556 749 | 1 528 064 | 1 764 010 | 1 166 878 | 900 955 |
| **Total Other Utility Plant** | **38,637,189** | **36,396,849** | **33,387 933** | **31,048 118** | **28,535 632** |
| (less) Other Utility Accumulated Provision for Depreciation Amortization and Depletion | 13 418,230 | 12,381,243 | 11 660 173 | 10 799 084 | 9 950 377 |
| **Net Other Utility Plant** | **25,218 959** | **24,035,606** | **21 727,759** | **20,249 033** | **18,585,255** |
| All Utility Plant | 591 976 286 | 574 040 739 | 549 537 687 | 529 185 424 | 505 241 391 |
| All Utility Plant Construction Work in Progress | 18 705 102 | 19 576 912 | 22 412,245 | 19 244 089 | 23 459 682 |
| **Total All Utility Plant** | **610 681,388** | **593,617,651** | **571 949 932** | **548,429,513** | **528 701,074** |
| (less) All Utility Plant Accumulated Provision for Depreciation Amortization and Depletion | 212 869 134 | 199 788 408 | 185 085 193 | 171 657 810 | 157 391 010 |
| **Net All Utility Plant** | **397,812,254** | **393 829,243** | **386,864,738** | **376,771,703** | **371,310,063** |
| Other Property and Investments | | | | | |
| Nonutility Property (less Accumulated Provision for Depreciation and Amortization) | 795 445 | 774 390 | 848 973 | 838 351 | 895 511 |
| Investments in Associated Companies | 417 350 | 378 129 | 371 319 | 364 032 | 256 278 |
| Investments in Subsidiary Companies | 12,900 177 | 10 911 871 | 10,237 686 | 10 485 648 | 10 983 115 |
| Noncurrent Portion of Allowances | 89 315 | 5,341 | 0 | 0 | 0 |
| Other Investments | 929 004 | 854 724 | 1 171 397 | 1 384 478 | 2 219 681 |
| Special Funds | 8 348 069 | 7 139,240 | 5 416 600 | 4 312 905 | 3 349 345 |
| **Total Other Property and Investments** | **23,479 360** | **20 063,695** | **18,045 977** | **17 385,415** | **17,703,929** |
| Current and Accrued Assets | | | | | |
| Cash | 352 269 | 257 703 | 142 995 | 300 414 | 389 681 |
| Special Deposits | 357 697 | 886 144 | 1 181 027 | 661 730 | 479 786 |
| Working Funds | 141 887 | 148 959 | 150 496 | 151 209 | 128 179 |
| Temporary Cash Investments | 2 135 482 | 2 969,252 | 2,766 245 | 3 235 856 | 2 785 227 |
| Notes and Accounts Receivable (net) | 13 542 373 | 14 132,955 | 13,246 558 | 13 584 473 | 12 820 405 |
| Receivables from Associated Companies | 3 030 948 | 2,541 000 | 2 697 124 | 3 364 053 | 2 750 693 |
| Materials and Supplies | 12 580 545 | 12 400 777 | 12,772 374 | 12 591 442 | 12 729 310 |
| Allowances | 16 765 | 49 791 | 0 | 0 | 0 |
| Prepayments | 2,114 323 | 2 034 415 | 1 882 827 | 1 795 368 | 1 836 597 |
| Miscellaneous Current and Accrued Assets | 6 990 688 | 6 988 994 | 8 608 225 | 7 673 239 | 7 614 782 |
| **Total Current and Accrued Assets** | **41,262,977** | **42,409 989** | **43,447,871** | **43,357 785** | **41 534,662** |
| Deferred Debits | | | | | |
| Unamortized Debt Expense | 1 681 882 | 1 736 788 | 1 520 930 | 1 240 157 | 1 078 859 |
| Extraordinary Property Losses | 384 825 | 473 777 | 540,243 | 619 681 | 523 373 |
| Unrecovered Plant and Regulatory Study Costs | 5 631 903 | 6 039,300 | 6 025 486 | 5 595 665 | 6 755 844 |
| Other Regulatory Assets | 66 299 007 | 62 599,339 | 0 | 0 | 0 |
| Preliminary Survey and Investigation Charges | 243 894 | 341 450 | 526 699 | 346 025 | 330 731 |
| Clearing Accounts | 74 673 | 50 858 | 64 017 | 65 107 | 59 028 |
| Deferred Losses from Disposition of Utility Plant | 1 373 | 14 | 104 | 51 | 58 |
| Research Development and Demonstration Expenditures | 19,272 | 32,151 | 33,215 | 29 093 | 100 007 |
| Unamortized Loss on Reacquired Debt | 5 305 022 | 5 390 000 | 3 680 515 | 2 730 346 | 2 549 286 |
| Accumulated Deferred Income Taxes | 22 519 377 | 21,271 956 | 12,580 405 | 11 808 867 | 11 095 917 |
| Other Deferred Debits | 9 795 852 | 12,402,721 | 33 022,261 | 27 589 927 | 24 829 271 |
| **Total Deferred Debits** | **111,957 082** | **110 338,355** | **57 993 875** | **50 024 920** | **47 322,374** |
| **Total Assets and Other Debits** | **574,511 673** | **566,641,282** | **506,352,461** | **487 539 823** | **477 871 029** |

See endnotes at end of this table.

## Table 8 Composite Balance Sheet for Major U S Investor-Owned Electric Utilities on December 31, 1990-1994 (Continued)
(Thousand Dollars)

| Item | 1994 | 1993 | 1992 | 1991 | 1990 |
|---|---|---|---|---|---|
| Proprietary Capital | | | | | |
| Common Stock Issued | 62 388 946 | 61 819 455 | 60 558 037 | 58 385 073 | 57 572 561 |
| Preferred Stock Issued | 24 859 833 | 25 304 294 | 25 539 216 | 25 262 285 | 25 621 039 |
| Capital Stock Subscribed Liability and Premium | 28 602 066 | 27 824 695 | 27 086 581 | 27 414 820 | 25 901 794 |
| Other Paid in Capital | 20 278 770 | 19 372 894 | 17 625 935 | 15 494 385 | 14 607 306 |
| Installments Received on Capital Stock | 931 | 1 484 | 2 305 | 570 | 559 |
| (less) Discount on Capital Stock | 17 229 | 18 001 | 24 604 | 19 049 | 19 016 |
| (less) Capital Stock Expense | 781 944 | 786 145 | 719 733 | 678 403 | 670 363 |
| Retained Earnings | 51 756 805 | 49 918 289 | 49 713 342 | 48 975 268 | 48 070 218 |
| Unappropriated Undistributed Subsidiary Earnings | 3 203 923 | 2 907 770 | 2 669 611 | 2 972 866 | 2 851 357 |
| (less) Reacquired Capital Stock | 949 442 | 743 546 | 564 824 | 874 226 | 890 335 |
| **Total Proprietary Capital** | **189 342,657** | **185 601 191** | **181 885 866** | **176 933 589** | **173 045 121** |
| Long term Debt | | | | | |
| Bonds (less reacquired) | 133 646 979 | 133 714 004 | 136 133 712 | 136 058 890 | 133 010 294 |
| Advances from Associated Companies | 686 088 | 536 305 | 548 561 | 445 543 | 214 341 |
| Unamortized Premium on Long-term Debt | 15 724 | 22 280 | 46 491 | 53 999 | 61 572 |
| (less) Unamortized Discount on Long term Debt | 1 106 467 | 1 129 039 | 987 974 | 884 560 | 961 193 |
| Other Long term Debt | 42 139 755 | 41 710 532 | 38 400 107 | 36 220 943 | 35 613 070 |
| **Total Long term Debt** | **175 382,079** | **174 854,082** | **174 140,896** | **171 894 816** | **167,938 084** |
| **Total Capitalization** | **364,724 736** | **360 455 273** | **356,026,762** | **348,828,405** | **340,983,205** |
| Other Noncurrent Liabilities | | | | | |
| Obligations under Capital Lease-Noncurrent | 4 346 416 | 5 230 797 | 5 393 792 | 4 170 145 | 4 579 164 |
| Accumulated Provision for Property Insurance | 251 566 | 244 916 | 233 072 | 252 996 | 202 481 |
| Accumulated Provision for Injuries and Damages | 928 391 | 799 576 | 685 191 | 613 927 | 595 042 |
| Accumulated Provision for Pensions and Benefits | 3 668 723 | 2 743 711 | 659 144 | 721 105 | 415 906 |
| Accumulated Miscellaneous Operating Provisions | 4 015 579 | 2 200 417 | 1 253 718 | 772 114 | 1 013 242 |
| Accumulated Provision for Rate Refunds | 241 961 | 258 886 | 402 964 | 400 906 | 419 037 |
| **Total Other Noncurrent Liabilities** | **13 452,636** | **11,478,303** | **8 627 882** | **6 931,193** | **7,224 872** |
| Current and Accrued Liabilities | | | | | |
| Notes Payable | 10 448 573 | 9 210 845 | 8 791 477 | 6 986 960 | 7 874 293 |
| Accounts Payable | 11 847 771 | 12 257 380 | 11 795 427 | 11 578 318 | 11 588 838 |
| Payables to Associated Companies | 3 646 853 | 3 035 913 | 2 610 634 | 2 760 441 | 2 687 649 |
| Taxes Accrued | 5 435 082 | 5 946 812 | 6 086 245 | 6 433 936 | 5 899 923 |
| Interest Accrued | 3 631 747 | 3 712 418 | 3 877 290 | 3 994 972 | 4 289 053 |
| Dividends Declared | 1 622 337 | 1 688 550 | 1 710 670 | 1 684 612 | 1 636 364 |
| Tax Collections Payable | 478 620 | 411 270 | 419 364 | 449 749 | 430 137 |
| Other Current and Accrued Liabilities | 10 924 076 | 12 615 789 | 10 266 493 | 9 468 448 | 9 877 186 |
| **Total Current and Accrued Liabilities** | **48 035,058** | **48,878,976** | **45 557,601** | **43 357 436** | **44,283,442** |
| Deferred Credits | | | | | |
| Customer Advances for Construction | 1 010 701 | 898 035 | 852 203 | 876 448 | 878 773 |
| Accumulated Deferred Investment Tax Credits | 12 784 415 | 13 428 995 | 14 046 840 | 14 689 786 | 15 290 316 |
| Deferred Gains from Disposition of Utility Plant | 105 740 | 115 226 | 124 914 | 136 559 | 126 317 |
| Other Regulatory Liabilities | 14 724 037 | 15 055 876 | 0 | 0 | 0 |
| Unamortized Gain on Reacquired Debt | 64 107 | 354 401 | 65 287 | 79 989 | 112 983 |
| Accumulated Deferred Income Taxes | 107 054 667 | 104 964 188 | 65 020 984 | 59 188 298 | 56 529 757 |
| Other Deferred Credits | 12 555 575 | 11 012 011 | 16 029 988 | 13 451 709 | 12 441 363 |
| **Total Deferred Credits** | **148 299,243** | **145,828,731** | **96 140 215** | **88 422 789** | **85,379,510** |
| **Total Liabilities and Other Credits** | **574 511,673** | **566,641 282** | **506,352 461** | **487 539,823** | **477,871 029** |

Note Totals may not equal sum of components because of independent rounding Detailed data are provided in Table 38 Due to its emergence from bankruptcy the 1991 financial statements for the Public Service Company of New Hampshire are from May 16 through December 31 Excluded are the independent power producers and cooperatives jurisdictional to the Federal Energy Regulatory Commission
Source Federal Energy Regulatory Commission FERC Form 1 Annual Report of Major Electric Utilities Licensees and Others

## Table 10 Composite Statement of Cash Flows for Major U S Investor-Owned Electric Utilities, 1990-1994
(Thousand Dollars)

| Item | 1994 | 1993 | 1992 | 1991 | 1990 |
|---|---|---|---|---|---|
| Net Cash Flow from Operating Activities | | | | | |
| Net Income | 19 887 586 | 17 891 198 | 18 384 444 | 16 949 664 | 16 897 166 |
| Noncash Charges (Credits) to Income | | | | | |
| Depreciation and Depletion | 19 166 228 | 18 152 500 | 17 287 954 | 16 627 291 | 15 703 285 |
| Amortization | 3 033 108 | 4 008 085 | 3 101 445 | 2 903 398 | 2 675 767 |
| Deferred Income Taxes (Net) | 1 699 382 | 7 349 017 | 3 187 533 | 1 593 662 | 2 015 341 |
| Investment Tax Credit Adjustment (Net) | -685 879 | -605 675 | -640,291 | -506 968 | -367 051 |
| Net (Increase) Decrease in Receivables | 277 393 | -1 079 853 | -15 780 | -1 105 083 | 486 765 |
| Net (Increase) Decrease in Inventory | -305 984 | 1 401 039 | -206 887 | 199 712 | -1 927 882 |
| Net (Increase) Decrease in Allowance Inv | -30 325 | 28 742 | 0 | 0 | 0 |
| Net Inc (Dec) in Payables & Accrued Exp | -355 517 | 562 568 | 475,262 | 791 196 | 232 423 |
| Net (Increase) Decrease in Other Reg Assets | 140 943 | -18 599 894 | 0 | 0 | 0 |
| Net Increase (Decrease) in Other Reg Liab | -572 923 | 6 604 174 | 0 | 0 | 0 |
| Less Allow Other Funds Used Construction | 422 134 | 535 554 | 598 480 | 697 358 | 1 058 676 |
| Less Undistributed Earnings Sub Co | 486 892 | 554 208 | -203 807 | 470 266 | 309 099 |
| Other | 1 338 157 | 9 303 938 | -1 473 888 | 3 633 293 | 772 870 |
| **Net Cash Provided by (Used In) Operating Activities** | **42,683,142** | **43 926,077** | **39,705,119** | **39 918 543** | **35,120,910** |
| Cash Flows from Investment Activities | | | | | |
| Construction & Acquisition of Plant (Inc Land) | | | | | |
| Gross Additions to Utility Plant (Less Nuclear Fuel) | -24 746 005 | -25 534 859 | -24 458,296 | -23 548 092 | -23 251 081 |
| Gross Additions to Nuclear Fuel | -1 452 492 | -1 577 102 | -1 562,933 | -1 433 636 | -1 467 132 |
| Gross Additions to Common Utility Plant | -606 191 | -797 758 | -918 358 | -972 538 | -822 419 |
| Gross Additions to Nonutility Plant | -103 132 | -101 256 | -47 700 | -49 304 | -61 117 |
| Less Allow Other Funds Used Construction | 345 167 | -474 222 | -491 001 | -623 741 | -942 960 |
| Other | -705 047 | -745 221 | -788 634 | -589 826 | -165 928 |
| Cash Outflows For Plant | -27 267 700 | -28,281 973 | -27,284 921 | -25 969 656 | -24 824 716 |
| Acquisition of Other Noncurrent Assets | 111 615 | 209 052 | 605 950 | 128 621 | 285 993 |
| Proceeds from Disposal of Noncurrent Assets | 566 838 | 408 650 | 446 002 | 332 964 | 235 779 |
| Investments in & Adv to Assoc & Sub Co | -1 170 952 | -144 173 | -1 679,297 | -989 142 | -242,377 |
| Contributions and Adv from Assoc & Sub Co | 402 829 | 144 019 | 238 638 | 292 908 | 78 392 |
| Disp of Invest in (Adv to) Assoc & Sub Co | -613 762 | -79 830 | 405 094 | 89 465 | 21 139 |
| Purchase of Investment Securities | 405 953 | 638 232 | 593 040 | 594 740 | 583 510 |
| Proceeds from Sales of Investment Securities | 378 472 | 679 508 | 510 098 | 656 334 | 564 724 |
| Loans Made or Purchased | 19 911 | 33 197 | 14 514 | 183 419 | 397 031 |
| Collections on Loans | 1 854 | 370 374 | 119 485 | 90 804 | 338 967 |
| Net (Increase) Decrease in Receivables | 31 172 | -164 618 | -28 608 | -49 243 | -57 134 |
| Net (Increase) Decrease in Inventory | 5 258 | 17 317 | -17 068 | 14 306 | -48 898 |
| Net (Inc) Dec in Allowances Held Speculation | 44 462 | 55 699 | 0 | 0 | 0 |
| Net Inc (Dec) in Payables & Accr Exp | -255 785 | 38 612 | -112,890 | 126 346 | -45 268 |
| Other | 246 734 | -1 449 369 | -1 351,283 | 1 516 164 | -883 820 |
| **Net Cash Provided by (Used In) Investing Activities** | **-28 168,059** | **-29,286,264** | **-29,968,253** | **-24,795 530** | **-26,129,746** |
| Cash Flows from Financing Activities | | | | | |
| Proceeds from Issuance of | | | | | |
| Long term Debt | 15 161 126 | 54 259 804 | 39 811 684 | 17 434 898 | 12 487 891 |
| Preferred Stock | 1,205 605 | 4 910 446 | 4 010 638 | 1 342 854 | 917 620 |
| Common Stock | 1 591 864 | 2 618 378 | 4 350 517 | 2 416 875 | 1 924 286 |
| Other | 987 722 | 1 151 463 | 878 986 | 617 150 | 116 507 |
| Net Increase in Short term Debt | 3 979 322 | 2 508 146 | 3 771 089 | 1 852 302 | 3 172 402 |
| Other | 680 829 | 1 116 987 | 1 028,318 | 951 921 | 943 724 |
| Cash Provided by Outside Sources | 23 606 468 | 66 565 224 | 53 851,233 | 24 616 000 | 19 562 429 |
| Payment for Retirement of | | | | | |
| Long term Debt | 15 068 221 | 54 384 342 | 38 168 644 | 16 139 451 | 9 860 918 |
| Preferred Stock | 1 938 257 | 5 493 686 | 3 774,373 | 1 399 380 | 1 218 784 |
| Common Stock | 361 459 | 297 178 | 121 972 | 637 182 | 698 004 |
| Other | 555 592 | 1 553 235 | 2,750 731 | 833 978 | 1 202 546 |
| Net Decrease in Short term Debt | -2 620 281 | -2 835 932 | -2,681 598 | -3 853 514 | -1 457 774 |
| Dividends on Preferred Stock | 1 701 053 | 1 790 451 | 2,098 636 | 2 026 145 | 1 948 571 |
| Dividends on Common Stock | 15 846 334 | 15 238 810 | 14 746 130 | 13 704 171 | 13 615 910 |
| **Net Cash Provided by Financing Activities** | **-14 484 730** | **-15,028 408** | **-10,490,852** | **-13 977 821** | **-10 440 078** |
| **Net Inc (Dec) in Cash & Cash Equivalents** | **30,353** | **-388,595** | **-753,986** | **1 145 192** | **-1 448,913** |
| **Cash and Cash Equivalents at Beg of Year** | **2,767 001** | **3,156 947** | **3,745,898** | **2,782 465** | **4 324 908** |
| **Cash and Cash Equivalents at End of Year** | **2,797 354** | **2,768 352** | **2,991,912** | **3 927 657** | **2 875 994** |

Note Totals may not equal sum of components because of independent rounding Detailed data are provided in Table 39 Due to its emergence from bankruptcy the 1991 financial statements for the Public Service Company of New Hampshire are from May 16 through December 31 Excluded are the independent power producers and cooperatives jurisdictional to the Federal Energy Regulatory Commission

Source Federal Energy Regulatory Commission FERC Form 1 Annual Report of Major Electric Utilities Licensees and Others

# Appendix E

# Electricity Sector Performance Ratios

## Table 7 Ratios Based on the Composite Statement of Income and Retained Earnings for Major U S Investor-Owned Electric Utilities, 1990-1994

| Ratio | 1994 | 1993 | 1992 | 1991 | 1990 |
|---|---|---|---|---|---|
| **Electric Operations** | | | | | |
| Electric Operating Revenues as a Percent of Total Operating Revenues .. | 91 4 | 91 1 | 91 4 | 91 4 | 90 9 |
| Percent of Electric Operating Revenues | | | | | |
| Electric Operation and Maintenance Expenses | 58 6 | 58 8 | 58 7 | 58 7 | 59 0 |
| Electric Depreciation and Amortization | 10 4 | 10 3 | 10 1 | 9 7 | 9 5 |
| Federal Income Taxes Electric | 4 6 | 4 1 | 3 6 | 3 9 | 3 9 |
| Other Income Taxes Electric .. .. .. .. | 8.2 | 8 0 | 8.2 | 8 0 | 7 9 |
| Provision for Deferred Taxes on Income | 5 8 | 6 3 | 5 8 | 5 9 | 5 0 |
| Provision for Deferred Income Taxes (credit) | 4 8 | 4 6 | 4 1 | 4 5 | 3 8 |
| Investment Tax Credit Adjustments (net) .. .. .... | -3 | -3 | -3 | -2 | -2 |
| Total Electric Operating Expenses ... .... .. .. | 82.9 | 82.9 | 82.0 | 81 5 | 81 3 |
| Net Electric Operating Income .. .. | 17 1 | 17 1 | 18 0 | 18 5 | 18 7 |
| **All Utility Operations** | | | | | |
| Dividend Appropriations | | | | | |
| Preferred Stock Ratios | | | | | |
| Percent of Operating Revenues .. .... .. .. | .8 | 9 | 1 1 | 1 1 | 1 2 |
| Average Dividend Rate | 6 3 | 6 9 | 8 1 | 7 6 | 7 9 |
| Interest Coverage .... .. .. | 12 6 | 10 1 | 9 0 | 8 7 | 8 3 |
| Common Stock Ratios | | | | | |
| Percent of Operating Revenues .. .... | 8 1 | 7 9 | 8 0 | 7 9 | 8 2 |
| Percent of Earnings Available for Common Stock[1] | 86 7 | 95 1 | 91 1 | 96 2 | 95 4 |
| Percent of Average Common Equity Dividend Appropriation Common Stock | 9 8 | 9 7 | 9 7 | 9 6 | 9 7 |
| Interest on Long term Debt | | | | | |
| Percent of Total Operating Revenues .. .. .. | 6 5 | 7 0 | 7 7 | 8 1 | 8 6 |
| Average Interest Rate .. ... .... ........ ... | 7.3 | 7 7 | 8.2 | 8 7 | 9 0 |
| Net Income Divided by Operating Revenues (Profit Margin) .. .. .. | 10 1 | 9.2 | 9 9 | 9 3 | 9 8 |

[1] Includes earnings on equity investments in subsidiary companies

Note Totals may not equal sum of components because of independent rounding Due to its emergence from bankruptcy the 1991 financial statements for the Public Service Company of New Hampshire are from May 16 through December 31 Excluded are the independent power producers and cooperatives jurisdictional to the Federal Energy Regulatory Commission.

Source Federal Energy Regulatory Commission FERC Form 1 "Annual Report of Major Electric Utilities Licensees and Others



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## Table 9 Composite Financial Indicators for Major U S Investor-Owned Electric Utilities, 1990-1994

| Ratio | 1994 | 1993 | 1992 | 1991 | 1990 |
|---|---|---|---|---|---|
| **Activity** | | | | | |
| Electric Fixed Asset (Net Plant) Turnover | 0 49 | 0 49 | 0 47 | 0 48 | 0 46 |
| Total Asset Turnover | 34 | 34 | 37 | 37 | 36 |
| Total Electric Utility Plant Plus Nuclear Fuel per Dollar of Revenue | 3 19 | 3 16 | 3 18 | 3 10 | 3 18 |
| Other Utility Plant per Dollar of Revenue | 1 97 | 2 11 | 2.09 | 1 98 | 1 82 |
| Total Utility Plant per Dollar of Revenue | 3 11 | 3 07 | 3 08 | 3 01 | 3 06 |
| Total Electric Plant to Total Assets | 96 3 | 94 8 | 102.5 | 102 1 | 100 6 |
| Net Electric Plant to Total Assets | 63 9 | 64 2 | 70 8 | 71 7 | 72 2 |
| Total Utility Operating Revenue Plus Other Income as a Percent of Total Assets & Other Debits | 34 7 | 34 7 | 37 2 | 38 2 | 37 1 |
| Electric Utility Depreciation and Amortization to Total Electric Utility Plant | 3 3 | 3 2 | 3 2 | 3 1 | 3 0 |
| **Leverage** | | | | | |
| Current Assets to Current Liabilities | 86 | 87 | 95 | 1 00 | 94 |
| Percent of Total Capitalization | | | | | |
| Long term Debt | 48 1 | 48 5 | 48 9 | 49 3 | 49 3 |
| Preferred Stock | 6 8 | 7 0 | 7.2 | 7 2 | 7 5 |
| Common Stock and Paid-in Capital[1] | 30 0 | 29 8 | 29 2 | 28 6 | 28 3 |
| Retained Earnings[2] | 15 1 | 14 7 | 14 7 | 14 9 | 14 9 |
| Percent of Total Capitalization (Average) Common Equity | 44 8 | 44 2 | 43 6 | 43 4 | 43 3 |
| Percentage of Total Capitalization Including Short term Debt | | | | | |
| Short term Debt | 2 8 | 2 5 | 2 4 | 2 0 | 2 3 |
| Long term Debt | 46 7 | 47 3 | 47 7 | 48 3 | 48 1 |
| Preferred Stock | 6 6 | 6 8 | 7 0 | 7 1 | 7 3 |
| Common Equity | 43 8 | 43 4 | 42.9 | 42 6 | 42 3 |
| Internally Generated Funds to Cash Outflows for Plant[3] | 112 7 | 93 2 | 81 5 | 92 9 | 82 3 |
| Internally Generated Funds to Electric Operating Revenues[3] | 8 6 | 7 5 | 6 6 | 7 2 | 6 5 |
| Interest Coverage Before Taxes with AFUDC | 3 16 | 2 86 | 2.70 | 2 58 | 2 50 |
| Interest Coverage Before Taxes without AFUDC | 3 10 | 2 78 | 2 62 | 2 49 | 2 38 |
| Total Debt to Total Assets | 32 3 | 32 5 | 36 1 | 36 7 | 36 8 |
| Common Stock Equity to Total Assets | 28 6 | 28 3 | 30 9 | 31 1 | 30 9 |
| Accumulated Provision for Depreciation Percent of Total Utility Plant | 34 9 | 33 7 | 32 4 | 31 3 | 29 8 |
| **Profitability** | | | | | |
| Return on Average Common Stock Equity | 12 2 | 11 3 | 12 0 | 11 3 | 11 5 |
| Return on Average Common Equity[4] | 11 3 | 10 2 | 10 6 | 10 0 | 10 2 |
| Return on investment | 3 5 | 3 2 | 3 6 | 3 5 | 3 5 |

[1] Includes reacquired capital stock.
[2] Includes Unappropriated Undistributed Subsidiary Earnings
[3] Calculation revised in 1992.
Includes Equity in Earnings of Subsidiary Companies

Note Totals may not equal sum of components because of independent rounding Due to its emergence from bankruptcy the 1991 financial statements for the Public Service Company of New Hampshire are from May 16 through December 31 Excluded are the independent power producers and cooperatives jurisdictional to the Federal Energy Regulatory Commission

Source Federal Energy Regulatory Comission FERC Form 1 Annual Report of Major Electric Utilities Licensees and Others

## Table 12 Ratios Based on Electric Operation and Maintenance Expenses for Major U S Investor-Owned Electric Utilities, 1990-1994

| Ratio | 1994 | 1993 | 1992 | 1991 | 1990 |
|---|---|---|---|---|---|
| **Operation and Maintenance Expenses as a Percent of** | | | | | |
| Electric Operating Revenues | 58 6 | 58 8 | 58 7 | 58 7 | 59 0 |
| **Sales Expense** | | | | | |
| Percent of Total Electric Operation and Maintenance Expenses | .2 | .2 | .2 | .2 | 2 |
| Percent of Electric Operating Revenues | 1 | 1 | 1 | 1 | 1 |
| per Kilowatthour Sold (mills) | 1 | 1 | 1 | 1 | 1 |
| per Customer (dollars) | 2.65 | 2 35 | 2 33 | 2.40 | 2.55 |
| **Customer Service and Informational Expenses** | | | | | |
| Percent of Total Electric Operation and Manintenance Expenses | 1 9 | 1 8 | 1 5 | 1 5 | 1 3 |
| Percent of Electric Operating Revenues | 1 1 | 1 1 | 9 | 9 | 8 |
| per Kilowatthour Sold (mills) | 7 | 7 | 6 | 6 | 5 |
| per Customer (dollars) | 22 34 | 21 44 | 17 94 | 17 16 | 14 16 |
| **Customer Accounts Expenses** | | | | | |
| Percent of Total Electric Operation and Maintenance Expenses | 3 4 | 3 3 | 3 4 | 3 3 | 3 5 |
| Percent of Electric Operating Revenues | 2 0 | 1 9 | 2.0 | 1 9 | 2.1 |
| per Kilowatthour Sold (mills) | 1 3 | 1 3 | 1 3 | 1 2 | 1 3 |
| per Customer (dollars) | 40 50 | 39 58 | 39 22 | 37 86 | 38 94 |
| **Maintenance Charges** | | | | | |
| Percent of Total Electric Operation and Maintenance Expenses | 11 4 | 12 0 | 12 3 | 12 3 | 12 7 |
| Percent of Electric Operating Revenues | 6 7 | 7 1 | 7 2 | 7.2 | 7 5 |
| Percent of Gross Electric Plant | 2 1 | 2 2 | 2 3 | 2.3 | 2 4 |
| **Production Expenses** | | | | | |
| Percent of Total Electric Operation and Maintenance Expenses | 73 1 | 74 0 | 75 3 | 75 4 | 75 6 |
| Percent of Electric Operating Revenues | 42 9 | 43 5 | 44 2 | 44 3 | 44 6 |
| per Kilowatthour Sold (mills) | 28 0 | 28 3 | 28 7 | 28 6 | 28 7 |
| **Transmission Expenses** | | | | | |
| Percent of Total Electric Operation and Maintenance Expenses | 4 9 | 5 4 | 2.0 | 2.0 | 2 0 |
| Percent of Electric Operating Revenues | 4 | 4 | 1.2 | 1.2 | 1 2 |
| per Kilowatthour Sold (mills) | 3 | 3 | 8 | 8 | 7 |
| **Distribution Expenses** | | | | | |
| Percent of Total Electric Operation and Maintenance Expenses | 5 6 | 5 7 | 5 7 | 5 9 | 5 9 |
| Percent of Electric Operating Revenues | 3 3 | 3 4 | 3 4 | 3 4 | 3 5 |
| per Kilowatthour Sold (mills) | 2 2 | 2 2 | 2.2 | 2 2 | 2 2 |
| per Customer (dollars) | 67 76 | 68 53 | 68 56 | 67 98 | 65 95 |
| **Fuel Costs[1]** | | | | | |
| Percent of Total Electric Operation and Maintenance Expenses | 25 6 | 27 1 | 27 2 | 28 5 | 31 4 |
| Percent of Electric Operating Revenues | 15 0 | 15 9 | 16 0 | 16 7 | 18 5 |
| per Kilowatthour Sold (mills) | 9 8 | 10 3 | 10 4 | 10 8 | 11 9 |

## Table 16 Ratios Based on Number of Ultimate Consumers, Sales, and Operating Revenue for Major U S Investor-Owned Electric Utilities, 1990-1994

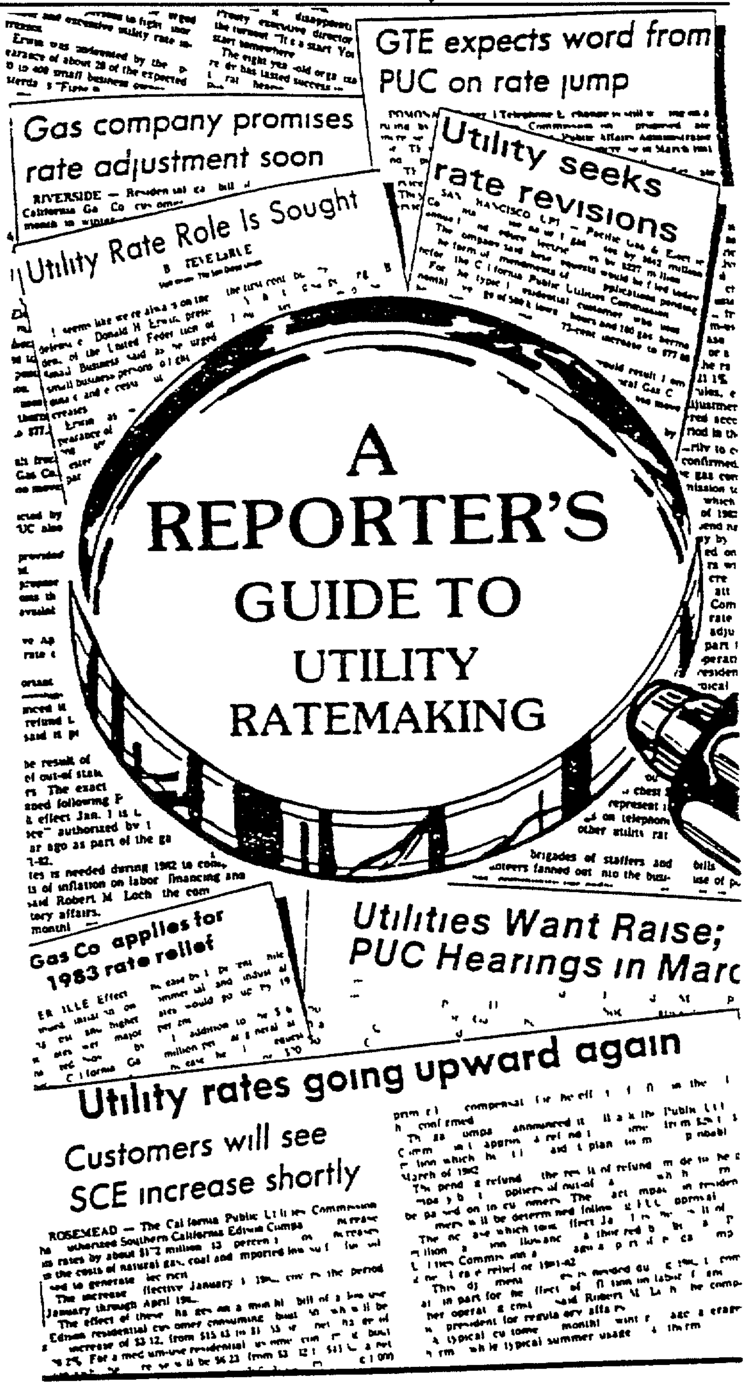
| Ratio | 1994 | 1993 | 1992 | 1991 | 1990 |
|---|---|---|---|---|---|
| **Residential Sales Ratios** | | | | | |
| Percent of Total Number of Consumers | 88 0 | 88 0 | 88 1 | 88 0 | 88 0 |
| Percent of Total Revenues | 40 1 | 40 2 | 39 1 | 39 7 | 39 0 |
| Percent of Total Kilowatthour Sales | 32 3 | 32 8 | 32 0 | 32 8 | 32 2 |
| Average Annual Number of Kilowatthours Sold per Consumer | 9 368 | 9 399 | 8 944 | 9 250 | 9 051 |
| Average Annual Bill per Consumer (dollars) | 827 47 | 824 50 | 772 41 | 782 44 | 742 35 |
| Average Revenue per Kilowatthour Sold (cents) | 8 83 | 8 77 | 8 64 | 8 46 | 8 20 |
| **Commercial Sales Ratios** | | | | | |
| Percent of Total Number of Consumers | 11 1 | 11 1 | 11 1 | 11 1 | 11 1 |
| Percent of Total Revenues | 33 7 | 33 1 | 32 9 | 32 7 | 32 7 |
| Percent of Total Kilowatthour Sales | 30 4 | 30 0 | 29 6 | 29 6 | 29 5 |
| Average Annual Number of Kilowatthours Sold per Consumer | 69 877 | 68 264 | 65 919 | 66 066 | 65 688 |
| Average Annual Bill per Consumer (dollars) | 5 518 25 | 5 401 39 | 5 169 03 | 5 111 28 | 4 921 47 |
| Average Revenue per Kilowatthour Sold (cents) | 7 90 | 7 91 | 7 84 | 7 74 | 7 49 |
| **Industrial Sales Ratios** | | | | | |
| Percent of Total Number of Consumers | 5 | 5 | 5 | 5 | 5 |
| Percent of Total Revenues | 23 5 | 23 9 | 25 1 | 24 8 | 25 5 |
| Percent of Total Kilowatthour Sales | 34 6 | 34 4 | 35 6 | 34 8 | 35 5 |
| Average Annual Number of Kilowatthours Sold per Consumer | 1 919 680 | 1 883 467 | 1 874 623 | 1 870 541 | 1 880 995 |
| Average Annual Bill per Consumer (dollars) | 92 763 23 | 93 574 42 | 93 214 65 | 93 001 18 | 91,250 13 |
| Average Revenue per Kilowatthour Sold (cents) | 4 83 | 4 97 | 4 97 | 4 97 | 4 85 |
| **Other Sales Ratios** | | | | | |
| Percent of Total Number of Consumers | 5 | 4 | 4 | 4 | 4 |
| Percent of Total Revenues | 2 8 | 2 8 | 2 9 | 2 9 | 2 8 |
| Percent of Total Kilowatthour Sales | 2 7 | 2 8 | 2 8 | 2 8 | 2 7 |
| Average Annual Number of Kilowatthours Sold per Consumer | 141 857 | 161 414 | 175 539 | 178 094 | 177 347 |
| Average Annual Bill per Consumer (dollars) | 10 360 76 | 11 818 95 | 12 658 93 | 12 637 70 | 12 474 47 |
| Average Revenue per Kilowatthour Sold (cents) | 7 18 | 7 21 | 7 21 | 7 10 | 7 03 |

Note Totals may not equal sum of components because of independent rounding Due to its emergence from bankruptcy the 1991 financial statements for the Public Service Company of New Hampshire are from May 16 through December 31 Excluded are the independent power producers and cooperatives jurisdictional to the Federal Energy Regulatory Commission

Source Federal Energy Regulatory Commission FERC Form 1 Annual Report of Major Electric Utilities Licensees and Others

# Appendix F

# A Reporter's Guide to Utility Ratemaking

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# THE PURPOSE OF THIS BOOKLET

Utility rates are news They ought to be They affect everybody's pocketbook Because this is so, they usually generate considerable controversy and news coverage The intent of this booklet is to explain how utility rates are made how a typical rate case is prepared, how it is presented and what the key issues in a rate case are likely to be We hope it will give news re porters and editors a guide to the many technical terms and concepts that are involved in utility ratemaking

The focus of this booklet is almost exclusively on **state regulations** because that's the area of interest for most reporters and editors Utilities be they suppliers of gas, electricity, water, or tele phone service - are subject to a wide range of **federal regulations** It is the state regulators, however, who must approve the rates utilities charge and it is state regulation that most news reporters and editors find themselves dealing with

In California the regulatory authority is the **Public Utilities Commission (PUC)** It is charged by law with insuring that consumers receive adequate and reliable service at reason able rates while allowing the utility to earn a return on its investment that is sufficient to maintain its credit and enable it to continue raising the capital necessary to provide satisfactory service in the future

It is important to note that a regulatory authority does not **guarantee** a utility a profit It simply gives a utility an **opportunity** to make a profit If, because of inflation or other reasons, the utility fails to achieve the authorized rate of return (its authorized level of profitability), so be it It can go back to the PUC with a new rate case, but it cannot recover what it failed to earn in a time past

There are four sections to this booklet

- The first section describes the basic steps in a rate case, the procedures followed and the key terms used in describing these procedures

- The second section is a brief history of utility regulation in the United States and the rationale behind regulation

- The third section is the most complicated It explains how the actual rates charged to a consumer are determined, what some of the regulatory, financial and accounting concepts are that have to be perceived to understand rate making and what the big arguments in most rate cases are usually about

- The fourth section is a statement of position, pure and simple It is an argument on the utilities' behalf

# I. PREPARING A RATE CASE

## The Need, The Test Year

Like any other business, a utility constantly assesses its financial position Are prices ade quate? Have there been major changes in costs or in sales that necessitate more revenue? If the answer to the first question is "No," and the second question is "Yes," the utility must petition a state regulatory body for permission to raise its rates

When a utility concludes that it must seek an increase, its management begins preparing a **rate case** In California, the customary procedure is to base the rate case on a future calendar year This is a specific 12 month period for which expenses are estimated and used to demonstrate the company's need for an upward adjustment of rates

In California, general rate cases are processed in keeping with a **Regulatory Lag Plan** This plan commits the PUC to issue a decision within 12 months from the time it accepts a utility's application for a general rate increase based on a forward looking test year The Regulatory Lag Plan also restricts utilities in California to filing for rate relief to improve earnings not more than once every two years

Unlike cost of gas adjustments which cover only the increase in the price of gas, a general rate increase, enables a utility to improve earn ings Such a general increase also provides for higher rates for increased costs of operating and maintaining facilities to serve the public, as well as the higher costs of capital to construct such facilities It is the only opportunity the utility has to seek a higher return on equity to improve earnings

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## Book Numbers And Adjusted Ones

In general, most rate cases are straight for ward proceedings based on hard economic data taken chiefly from the company's books These **book figures** represent costs that have been experienced They can be checked easily since all utilities are required to keep their books in accordance with a uniform system of accounting

Utilities in California generally look at their present operations and costs for the most recent historical period and then attempt to come up with similar costs which can be expected to occur in the future test year

They will build into their estimates such things as wage increases and other increases due to inflation, cost of materials and supplies and expenditures for new plant facilities They also will incorporate any new programs or activities which will be occurring in the test year, but which may not have been engaged in by the company in previous years

## The Preliminary Events

Well before a rate filing, a utility will usually give public notice of its intention to seek rate relief Utilities make sure that their intentions are known, not only to the PUC but also to their cus tomers and to the public in general

When a petition for a rate increase is filed it triggers a series of events and actions First, the PUC staff reviews the application Almost always, it sends out data requests, asking for clarification or requesting supplementary information The staff also may conduct a field investigation of the company and its operations

In addition consumer groups - some repre senting residential customers and others repre senting large industrial and commercial cus tomers of the utility make requests for information The utility must respond to all And

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with the PUC's permission, consumer groups and others can become intervenors in a case, with the right to present evidence and question witnesses

In California, the PUC staff and other inter venors will cross examine the various utility wit nesses to test the assumptions and evidence that the company has presented The company and the other intervenors can also cross examine the PUC staff on contravening evidence that it has submitted

General rate case increases in California are normally allowed to go into effect unconditionally after final PUC approval and are not made **subject to refund** conditions

## The Staff's Position And Hearings

When the **Commission staff** has investigated fully a company's application, it issues a **staff report** setting forth the staff's position on the rate request

There's a lot of room for differences of opinion on rate case issues, because often a company, a consumer's counsel or a consumer group will differ sharply with a staff's conclusions (A com mission itself may ultimately take the viewpoint on an issue different from that of the staff )

Following the filing of the utility's application for a rate increase, the Commission assigns a senior staff person to conduct **hearings** and to take evidence In California, this individual is called an **Administrative Law Judge, or ALJ**

The ALJ calls a **pre-hearing conference** to reach agreement on a schedule of dates for the hearings at which company witnesses testify and are cross examined by staff attorneys and attor neys for the intervenors (Because of heavy case loads some commissions also use pre hearing conferences to limit issues and to stipulate facts, where there is agreement )

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Hearings are usually conducted in the utility's service territory

When the utility has provided its data and arguments and has been cross-examined, the staff and the intervenors offer their own witnesses who in turn, are cross examined by the company's attorneys The utility can submit rebuttal testimony to testimony offered by the PUC staff, and other parties in the case

Usually this takes a good deal of time, and the result is a hefty **transcript** When all the evidence has been presented, the ALJ reviews the written arguments submitted by the parties These are called **briefs,** though they usually are anything but brief

## The Commission's Decision

When the ALJ has finished the review process, he or she prepares a recommendation to the full Commission This includes the ALJ's conclusions as to the **total revenue** required to achieve a specified **rate of return** on the utility's investment The recommendation usually also includes a proposed rate structure to produce those revenues and the ALJ's proposals for resolving any other issues in the case

The Commission reviews all of these documents the transcript, the recommendations of the ALJ and the briefs Oral argument before most or all of the five PUC commissioners is often scheduled, certainly in major cases

Finally, the Commission issues its decision This states the Commission's findings on the company's application, including the explanation of the basis for the Commission's decision

## Appeals

But, that may not be the end of it After the Commission has issued its final order, all parties in the case have the right to request a **rehearing** by the Commission if they are not satisfied with the outcome

If a rehearing is denied or is granted, but any party still is not satisfied with the decision on rehearing, an **appeal** may be made to the California Supreme Court, which is final unless review by the U S Supreme Court is sought and granted

# II. SOME HISTORICAL PERSPECTIVE

## The Early Utilities

Before delving further into the subject of regulation, it's probably worthwhile to take a look at some historical background The earliest utilities were gas companies formed in the mid to late 19th century to supply local communities with so called "city gas" made from coke Next came local electric companies in the 1880s Telephone companies followed in the early 20th century

Each of these enterprises set its own rates and extended service as far as economically worthwhile But it quickly became evident that a great deal of capital was needed three to five times as much as for factories and other industry

It made no sense to duplicate large facilities at needless cost It was also apparent that the public would not tolerate uncontrolled monopolies if they grew to any significant size And so as utility services grew in importance, and as small, local companies merged into larger entities, today's utility system evolved

## The Rationale For Regulation

Whether the utility is a gas distribution company, an electric company or a telephone company, it operates today as a regulated monopoly That is, each company is authorized to provide service in a specific geographic area, under an exclusive franchise In return, the utility is regulated by the Public Utilities Commission which is responsible for insuring that the public receives a good and reliable service at a fair price

This obligation to provide satisfactory service at just and reasonable rates involves a balancing of customer interests with the interest of the utility's stockholders The company must earn, at a minimum, enough money to cover the costs of service as well as to provide a profit to compensate investors for their risk Moreover, a company's cost of service cannot merely provide for current service today There must be adequate planning and financing of future service

# III. FOCUSING ON MAJOR ISSUES

## Some Conceptual Background

It's clear that in every rate case a regulatory commission must set a **level of rates** for the utility s services that are fair to the customer and yet provide opportunity for a reasonable **profit** to the utility



This can be a difficult process If a fair price for the customer is to be established, a careful examination of the utility's costs must be made If a reasonable profit for the company is to be permitted, the commission must first examine how much money the utility has invested in facilities in order to provide service and then determine an adequate rate of return on this money

It is important to recognize just what profit is and is not in this context In the utility business, profit is not a mark up on sales Instead, it is a return that the utility owners (its shareholders) earn on the money invested over the years to build the utility system Many people miss this very basic point about utility regulation and it bears repeating

**Rates are set so that a utility may attempt to earn as profit an amount of money equal to a percentage (determined by the Public Utilities Commission in a rate case) of the amount of money invested in the facilities which are used and useful in providing service to the utility's customers**

## The Areas Of Dispute

Most disputes that reporters are obliged to cover involve one or more of these

1 The size of a utility's **rate base** or **investment base**
2 The treatment of **expenses** to be allowed
3 The **rate of return** to be allowed on rate base
4 The **rate design**

Each of these requires some fairly technical explanation, but understanding them is important There is plenty of room for honest and reasonable people to disagree sharply over the resolution of some of these issues in a rate case And those disagreements are the basis for many news stories

In determining what a utility's rates should be, utility regulators invariably consider those four issues, usually in the order listed

First, regulators try to determine the size of the **rate base** That is, they determine how much money the utility has invested over the years in facilities that serve its customers

As they're doing that, they'll also examine the utility's operating expenses in the test year to make sure that those expenses are really relevant to the utility's task of providing services to customers

Then, they'll try to determine what a fair rate of return on the utility's investment should be

The expense expressed in dollars and the required return also expressed in dollars are then added together This sum is called the utility's total revenue requirement It represents the dollars the utility will be authorized to collect from anticipated sales in order to pay expenses and earn its allowed rate of return

Once that dollar figure is determined, the PUC goes to step four It decides how the rates will be applied to the utility's different types or classes of customers (residential, commercial and industrial) Basically, the PUC is deciding at this point how much of the total revenues should come from residential customers and how much from other kinds of sales

The utility also goes through all these steps in preparing its application for a rate increase The commission repeats and reviews them as part of its regulatory responsibility

it must be obvious at this point that when utilities file for a rate increase, they don't just pick out a high revenue number and hope the regulators will give them some small part of it Every dollar asked for in a rate increase application is carefully documented However, utility rate making is complicated and, as we've said before, there s plenty of room in a rate case for reasonable people to disagree

## The Rate Base

Let's look in detail then, at the **rate base** Unfortunately, that term is misleading to a lot of people It might be better to call it the **invest-**



**ment base** because what it specifically includes is (a) the amount of money that the company has invested in facilities to serve the public plus (b) the amount of working capital required to keep the company going

The numbers for the rate base, or investment base, are not hard to determine The cost of a utility's facilities is recorded on its books, in accordance with a uniform system of accounting And computation of required working capital has evolved into several standard formulas Accordingly, there is little dispute as to that number, either

However, several principal issues often arise with respect to the rate base

**First** In considering the facilities to be included in the rate base, should the investment in partially completed facilities be included? This concept, called **construction work in progress (CWIP),** is particularly important on large projects which may take several years to complete and bring into service Some commissions exclude this item, arguing that the investment in a new plant or other facility should not be made part of the rate base (and thus a source of earnings chargeable to customers) until it actually becomes part of the utility's service equipment

Many utilities argue, on the other hand, that if they were able to earn on a massive project while it is underway, the customer would be better served by gradual additions to the rate base rather than by a very large amount of new rate base coming as a jolt in a single year when a plant goes into service

**Second** Often there is disagreement over whether a piece of utility property belongs in the rate base at all

For instance, a gas utility may decide to purchase a large tract of unmined coal with the expectation that someday it will use this coal to help fuel a coal gasification plant It might want to have this investment in coal included in the rate base The PUC may disagree It may argue that coal gasification is only a remote possibility and that this coal, therefore, may never be useful to the utility's customers The argument turns in part on an assessment of the likelihood that the utility will someday build a gasification plant

**Third** In some states it can be debatable whether investment in facilities be averaged as of the beginning and the end of the test period or should only the investment at the end of the test period be used **California law, however, requires that the averaging method be used**

**Fourth** Some states use **original cost** of the facilities and others allow for an adjustment to current **fair value** or **replacement cost to** reflect inflation **Under California law, original cost is used**

It is clear, then, that determining the size of a utility's rate base determining what should be included in it at any given time and determining how it would be computed is crucially important both to a utility and its customers The customers and the public utility regulators have an obvious interest in seeing that all the investments a utility makes in property are prudent and are for facilities that will be useful in serving the customer

The test for "prudence" and "used and useful" is a basic principle of utility regulation in this country Utility managements do not disagree with it and scrupulously seek to insure that their property additions are the kind that will be allowed in the rate base Otherwise, they will not be able to earn a return on all their shareholder money and borrowed money invested to build facilities, a situation that would affect their financial standing and make it more difficult for them to acquire capital in the future When disagreements over what should be included in a rate base or how it should be calculated arise, the utilities have strong reasons for defending their decisions tenaciously

## Expenses

While a utility commission is examining a utility's rate base calculations and assumptions during the course of a rate case, it will also examine the utility's estimates of the test year's **expenses** These expenses are the money the utility estimates it must spend during its test year for labor costs, for maintenance, for customer services for materials and supplies for fuel for administration of the company, interest, taxes and so on



Generally speaking, a regulatory commission cannot under the law prohibit a utility from making an operating expenditure But if it doesn't **approve** an expenditure, it can prevent the utility from recovering the expense through its rates In other words it can tell the utility that an expense won't be ncluded when it adds up all the expenses that go into the utility's revenue requirement When that happens the utility must absorb the disallowed expense out of what would otherwise be profits, or shareholders' return on investment

Wages and benefits for unionized personnel are set through collective bargaining and generally are not challenged Compensation for management isn't usually questioned if it is within the bounds of what other types of companies must pay for management Customer service costs, meter reading costs, maintenance costs and the like, also occasion little argument

Among the expenses challenged in recent years are expenses for advertising Although advertising expenses are usually a minor part of a utility's expenses, they are highly visible and thus become sensitive Disagreements also occur over a utility's charitable contributions **In California, such contributions are not covered in rates**

Income taxes are another difficult expense area The largest tax costs are state and local taxes, such as property taxes, franchise taxes and gross receipts taxes which take up 10 to 15 percent of a utility bill The key disputes usually arise in the area of income taxes That's because it is Congress and the Internal Revenue Service who decide what expenses are deductible for tax purposes, while regulatory commissions decide what expenses are allowable for rate purposes

It should be understood that in a rate proceeding, taxes, including income taxes, are treated as an expense as a part of the costs of providing service to the customer

One of the least understood and often bitter points of public contention in utility expenses in recent years has been in the area of **fuel costs** As energy costs have risen rapidly in recent years, they have had a profound effect on gas and electric utilities, since both obviously purchase great amounts of fuel For a gas utility, for instance, the costs of purchasing gas can run 80 percent or more of its total expenses

Because fuel costs represent such a large component of total costs, rapid increases in fuel costs, if not recovered quickly by the utility in its rates, could wipe out all earnings and rapidly put the utility out of business

As a result, in the early 1970s utility commissions began to adjust their rates upward to reflect increases in fuel costs through special mechanisms know as **purchased gas adjustments** These allow a commission to act more quickly to approve those increases than it would be able to if they were made part of a lengthy general rate increase proceeding

These adjustment clauses are strictly administered by regulatory commissions, and they can be documented and reviewed with precision

Because fuel costs have been by far the largest factor in increasing utility rates in recent years, they have been very unpopular with consumers who, when faced with financial pressures of their own, have found it hard to understand that the financial solvency of the utilities is at stake

## The Rate Of Return

Without exception, every utility rate case eventually centers on one fundamental question What **rate of return** will the utility be allowed? Rate of return is basically a very simple concept if someone makes a loan of $100 and receives back $100 plus $12 for the use of the money, the rate of return on that loan is 12 percent

In utility ratemaking there are two kinds of rates of return that are important the **total rate of return** (often called the **return on rate base)** and the **return on equity**

Return on rate base, or total rate of return, is the broader measure of a utility's rate of return The facilities represented in the rate base have been purchased with money the utility has raised from its shareholders and with money the utility has borrowed The return on rate base, then, must include enough money to pay the interest costs on the borrowed money plus enough to pay the shareholders for the use of their money

The return to the shareholders is called the rate of return on equity It is the utility s profit (called **net income** by accountants) expressed as a percentage of that portion of a utility s total investment provided by the utility's shareholders through the purchase of stock and retained earnings

The total rate of return includes a specified rate of return on equity Because return on equity relates directly to the interest of stockholders, this is the profitability figure that's most important to stockholders and to the investment community

## Equity Capital, Debt Capital And Other Accounting Terms

To understand rate of return a little better, it's necessary to understand in a little more detail where the money that a utility has invested in its facilities comes from The money invested in facilities is called **capital,** and a distinguishing characteristic of all utilities be they gas, electric, water or telephone – is that they are **capital** intensive That means that it takes a comparatively large amount of money to build a utility system in relation to annual revenues

In the electric utility industry, for example, about $4 worth of investment in facilities is required for each $1 worth of electricity sold This compares with 86 cents worth of investment in steel mills needed for each $1 worth of steel sold and 57 cents of investment needed in the auto industry for each $1 worth of automobiles sold

It is clearly necessary for utilities to raise large sums of money to finance the facilities needed to provide service This money comes from **equity** and from **debt**

Debt or **debt capital**, is borrowed money A utility will sometimes borrow money directly from banks, particularly when it plans to pay the money back quickly (this is **short-term debt)** Most utility borrowings, however, are **long-term debt** and are paid back over a number of years

When a utility borrows long term, it usually does so by selling **bonds** to the public There are two types of bonds **Mortgage bonds** are used when the debt is to be secured by the utility's property In this sense they are like the familiar home mortgage, where the debt used to buy a house is secured by the house Utilities can also borrow money long term through **debenture bonds**, which are secured by the general credit worthiness of the utility, rather than by specific properties

Debt is very important to utilities As much as 50 percent or more of a utility's capital can be debt capital In other words, as much as 50 per cent of the money used to build utility facilities is borrowed

Equity is the other part of a utility's capital the part contributed by owners of the company's stock This money is contributed in two ways In one shareholders contribute capital to the com pany when they buy a **new issue** of the utility's stock The money a utility raises from issuing new stock will normally go directly into building new facilities

Shareholders also contribute equity capital through what are called **retained earnings** When a utility earns profits, its board of direc tors, which represents the shareholders, can do two things with those profits it can pay them out directly to the shareholders as **dividends** on their stock, or it can retain the profits, usually using them to buy new facilities and equipment Often, utilities will retain as much as 50 percent of their profits to help pay for new facilities

Over the years retained earnings can repre sent many millions of dollars and many people unfamiliar with accounting terms assume that this means a company has those dollars put away somewhere and that they're available for use Not at all As a practical matter, a comparatively high level of retained earnings at a utility means simply that the board of directors of that com pany has chosen to take a comparatively high share of the profits and reinvest them in new facilities to serve the customer rather than paying out these profits as dividends to shareholders

# Determining A Reasonable Return

In the final analysis, then, what is a fair and reasonable rate of return for the utility?

There are numerous theories put forth by economists and regulators as to what constitutes a fair rate of return for utilities but, as a practical matter, most utility commissions find their answer by looking to the financial marketplace They try to determine the utility's **cost of capital**, or what it costs the utility to obtain capital from lenders and from shareholders

In this, they are guided by the ground rules set forth by the U S Supreme Court

**"A public utility is entitled to such rates as will permit it to earn a return on the value of its property which it employs for the convenience of the public equal to that generally being made at the same time and in the same general part of the country on investment in other business undertakings which are attended by corresponding risks and uncertainties, but it has no constitutional right to profits such as are realized or anticipated in higher profitable enterprises or speculative ventures**

**"The return should be reasonably sufficient to assure confidence in the financial soundness of the utility, should be adequate, under efficient and economical management, to maintain and support its credit and enable it to raise money necessary to the proper discharge of its public duties A rate of return may be reasonable at one time, and become too high or too low by changes affecting opportunities for investment, the money market, and business conditions generally "**

Two things stand out in that decision, handed down almost 60 years ago One, the court clearly felt that utilites are less risky than some other business enterprises Two, the justices also felt that the changing financial marketplace is the vital determining factor in deciding what makes a return reasonable

In stressing the changing marketplace, the court had in mind exactly the sort of fluctuation which has occurred in the financial markets over the last decade or so Thus, what might have been a reasonable rate of return in the late 1960s and early 1970s would be quite unrealistic in conditions prevailing in the 1980s

Utility bonds are not considered risk free, unlike U S Treasury notes and certain federally insured bank or savings certificates Consequently, lenders require an interest rate on utility bonds that is several percentage points above the current Treasury notes

And the return on common stock must have a premium of several percentage points more than the current cost of debt to a utility in order to attract investors since a common stock purchase is a higher risk investment than a loan

## Allocation Of Costs And Rate Design

Once the PUC has determined what the rate base should be, what operating expenses are, and what the rate of return on the rate base should be, it can then add up all the dollars represented by expenses and all the dollars represented by the percentage return on rate base, and come up with the utility's total annual revenue requirement

Total revenue requirement as explained earlier means the dollars the utility will have to realize from selling its product It s the total amount the utility will have to collect from its customers in return for the service it is providing them if it is to pay its expenses and have a profit left over

At this point, the PUC has a final job to do it must devise a **rate structure or rate design**



When a utility proposes a rate increase it also proposes a rate design The PUC will review these proposals and often take a different position from that of the utility, sometimes the commission will substitute it's own ideas on these issues These are important issues to both customers and the utilities, and they often become areas of dispute

Utilities are usually considered to have three classes of customers **residential, commercial** and **industrial**, and the costs of serving each is different

In determining the rates each class of customer will pay, then, utilities and regulatory commissions have normally sought to reflect in rates the differing costs of serving customers The standard rule has been to prevent **undue discrimination or preference** among the customer classes In a period of rapidly rising utility rates, utility commissions have often sought for understandable political reasons to shift a part of the cost burden that might normally be borne by residential customers to industrial and commercial customers Industrial and commercial customers resist this, of course, and in many instances, so do the utilities

That's because the gas utilities often face much more competition from other fuels -- such as oil for industrial and commercial markets, and shifting costs to these markets through fuel switching can adversely affect total sales In the utility business where economies of scale are important declining total sales result in increases in unit cost Thus, the residential customer can ultimately be hurt when industrial sales decline This is an important, often overlooked, factor

Once allocation among classes is determined, allocations of costs within classes must be done, usually depending on the amount of gas or electricity a particular customer uses This allocation of costs within classes is called rate design

In California beginning in 1976 a new rate design concept called lifeline" was established It is designed to encourage conservation of energy, while providing basic amounts of natural gas and electricity to residential users at minimum rates

These basic volumes, known as "lifeline allowances," are the minimum amounts of gas or elec tricity considered necessary for cooking, water heating and home heating The rates paid each month by residential customers for gas used within these lifeline allowances are considerably lower than the rates paid for natural gas consumed in excess of these set volumes Residential rates beyond the lifeline rates rise sharply the more energy is used

It is clear that costs must be allocated among different customer classes This is difficult enough just from the technical and accounting standpoint Though many numbers and formulas may be involved, rate design is not an exact science Many technical judgments can be questioned and debated It becomes even more difficult when what are essentially public policy or sociopolitical issues enter the process

# IV. POINT OF VIEW

## The Difficulty Of News Coverage

When reporters cover rate cases there are usually three numbers that are important to the coverage They are the total dollar increase in revenues that the utility is seeking, the percentage increase in revenues sought, and the impact of the rate increase on the average residential customer

All three numbers are very basic to any rate increase, and the last is particularly important since it answers, from the reader or listener perspective, the question "What does it mean to me?"

Frequently unreported however, is what the rate increase means to the utility The dollar value of the revenue increase and even the percentage increase in revenues do not adequately explain the utility s application

**The reasonableness of any rate increase request or any rate hike approved can only be judged properly in terms of the rate of return And the reasonableness of any given**



**rate of return can only be judged adequately in light of the utility's cost of capital -- what it must pay in the marketplace to acquire funds through equity and debt**

Granted, these are extremely difficult issues to explain to the public in a space as short as the typical newspaper story and even more so in a radio or television news report And reporters are, perhaps, to be forgiven if they are frustrated because understanding the utility point of view requires knowledge of complex principles, and by the fact that the public, in the current climate of consumer suspicion and irritability, probably doesn't want to hear any complex arguments anyway

Nevertheless, these are the issues And they are critical elements a reporter should consider

Rates of return in the utility business have not been high in recent years compared to the costs of capital

## The Financial Squeeze And Future Needs For Capital

In the end, every utility rate case centers on the ultimate determination of "just and reasonable rates that are non-discriminatory " Not surprisingly, the regulatory process has encountered difficulties in adjusting to the problems and pressures resulting from inflation The economies of scale that helped to hold down rates or even reduce them in the period between 1946 and 1960 no longer offer a solution

The cost of new facilities has escalated at a much faster rate than the consumer price index And, more recently, the cost of all capital both debt and equity -- has reached record highs Utilities that paid three or four percent on 20 to 30-year bonds sold in the 1950s now must pay anywhere from 15 to 18 percent for long term debt -- if they can get it Gas utility financing now often falls largely in the 10 to 15 year time span, with guarantees against early redemption usually pledged for at least the first five years

All of these factors have imposed a financial squeeze on utilities, affecting adversely their ability to maintain reliable service and plan prudently in anticipation of greater customer demands in the future

What complicates the commission's task, and what dismays utility management, is that they are dealing with a moving target By the time a final rate order is issued, inflationary pressures have continued Thus, by the time the order is issued, the newly authorized return on investment already is outdated and the game of catchup must begin again In addition, this results in a continuous erosion of the shareholders' return and the financial health of the utility

As a result of this, utilities are very often not able to earn their allowed rates of return Under today's inflationary conditions, most utilities do not realize the return authorized by the commission Actual profitability often falls short of allowed profitability, which is not guaranteed

All of this is of more than academic interest to the public which depends on the ready and instant response of the nation's utilities for jobs, food and vital services

Without gas, electricity, water and telephone service, our highly industrialized society could come to a sudden, grinding halt And unless utilities are permitted adequate earnings, those utility services are certain to deteriorate

It is estimated that the nation's electric companies will have to invest $356 billion (in 1980 dollars) in new plants between now and 1990 And, taking a somewhat longer projection, the gas industry expects to spend upwards of $480 billion (in 1982 dollars) in the period 1982 2000, or six times the value of its present plant and facilities

These are enormous sums of money Raising this much capital will tax the capacity of the nation s financial structure And obtaining it won t be cheap even if interest rates decline substantially over the next few years

Thus, utilities and regulatory commissions alike, will continue to face agonizing decisions over ever increasing rates that will be required if the public is to be assured of adequate utility service in the years ahead

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