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23.04.2003

Sir,

Sub: Discussion paper on Multi year Tariff – reg

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According to Section 27(7) of the Karnataka Electricity Reform Act, 1999, the Licensees are required to file their Expected Revenue from Charges (ERC) for the ensuing year for approval of the Commission, and the Commission shall notify either that it accepts the licensee's revenue calculations and tariff proposals or propose a modification to the same which the Licensee shall accept. One of the issues being discussed by the Government, Licensees and the Regulatory Commission is the possibility of replacing the annual tariff revision exercise by a Multi Year Tariff (MYT) system, especially in the context of privatization of distribution.

The Commission considers that the introduction of an MYT is one of the necessary conditions for successful private sector participation in distribution. In the public sector context also, the Commission is of the opinion that the MYT system can help in better planning for the future. The Commission has prepared a discussion paper on the MYT with the assistance of TERI, New Delhi. The paper is enclosed to this letter.

The Commission would be grateful to you if you could please go through the Paper and offer your valuable comments and suggestions in the matter before 31-5-2003.

Thanking you

Yours faithfully,  
for Karnataka Electricity Regulatory Commission

(R.Sridharan)  
Secretary

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## **Karnataka Electricity Regulatory Commission Discussion Paper on Multi Year Tariff**

### **Introduction**

The Karnataka Electricity Regulatory Commission (hereafter referred to as the Commission) was constituted in 1999. It has issued three tariff orders since then - in December 2000, May 2002 and March 2003. The Commission draws its powers from the Karnataka Electricity Reform Act, 1999. According to Section 27 (7) of the Act,

an annual filing of expected revenues from charges is to be done and the Commission has to either approve the tariff proposed by the licensee or provide an alternative tariff. One of the issues that has been engaging the attention of the government at the centre and in the states as well as the Regulatory Commissions has been the possibility of replacing this annual exercise by a new system where the tariff determination is done for a number of years, in one exercise. This has been termed as "Multi Year Tariff (MYT)".

The concept of MYT can mean several things ranging from

- (i) prescribing the actual tariff numbers for a certain future period to
- (ii) adherence to certain specific benchmarks or more broader principles that will prevail for a number of years.

Such principles or benchmarks could be in respect of the input costs of a utility or, at the other end, the output prices of the utility. These two can be linked as the quantum of revenue to be allowed is linked to the quantum of costs to be allowed.

Conceptually therefore we can distinguish between two types of Multi year regimes – those that seek to specify the input costs and those that seek to specify the output prices. In both cases this can be done either by specifying the precise costs/prices numbers or the mechanism by which these would be adjusted – in a mechanical and predictable way or even by a more flexible methodology that lays down broad principles that gives a certain degree of latitude to the Regulator or other authority regulating the tariffs.

It is important to be precise and clear in specifying the MYT regime that is being discussed as each of these would have different uses, data requirements as well as problems. These various alternatives can be captured in a table, as specified below:

Sl. No.	A- Input	B- Output
1	Specify numbers for various cost components	Specify numbers for each consumer tariff category Specify numbers for only the average tariff
2	Specify benchmarks for all or some of the various	Specify benchmarks for the various tariff categories

	categories of costs	or the overall average
3	Specify principles governing input costs	Specify principles governing tariff

The UK system can be classified as a 2A type since all the costs except generation are estimated in advance and escalated by a predetermined formula – utilities have the freedom to alter individual tariffs to cover these costs. It can also be viewed as a 2B type since at the end of the exercise what is fixed is the opening level of average tariff escalated annually by the RPI (Retail Price Index) –X (efficiency improvement) factor. The Delhi system is also a 2A type since the ATC (Aggregate Technical and Commercial) loss component is frozen in advance and the regulator still has the freedom to decide on allowable costs of other items as well as the tariffs for various categories. Fixing the norm for minimum agricultural tariff as was attempted in the original Electricity Regulatory Commissions Bill in 1998 would be a type 2B system.

It is felt that the present system of annual determination is too flexible giving considerable freedom and therefore can lead to arbitrary decision making. Accordingly a Multi Year system has been seen as the answer to make the tariff setting exercise more predictable. Most of the effort has been to focus on input costs to ensure that costs are recovered in a more or less mechanistic manner without giving room for any arbitrary decision making.

The shift to such a Multi year system is expected to bring the following benefits:

- i) Reduction in regulatory effort on the part of the commissions, utilities and other stakeholders.
- ii) Reduction in regulatory uncertainty and
- iii) Provision of a transparent and stable system of incentives. This is because of the absence of any "claw-back" within the MYT period of gains over the pre-specified efficiency norms. This could therefore lead to greater private sector interest in investment in the distribution segment and consequently in other segments of the power sector.

In this document the term MYT would generally be used to refer to a Type 2 system since a Type 3 system already exists ( in the shape of Schedule VI guidelines and

other principles laid down in the law or tariff orders themselves) and a Type 1 system would be too difficult to attempt. A Type 2 system can also cover a wide range of options and later in the paper the Commission would set out its own views on what is the best option for Karnataka.

The Commission considers that the introduction of an MYT system is one of the necessary conditions for successful participation of the private sector in distribution. The MYT system can also help in better planning for the future in the public sector context. At the same time care has to be taken to ensure that the MYT system is able to achieve the purpose for which it is meant. A premature move to the MYT system can be counter productive. It was in this spirit that the Commission had observed the following in its first Tariff order issued for Karnataka Power Transmission Corporation Ltd. (KPTCL) in December 2000:

*"In the KPTCL's case, the Commission is of the opinion that multi year tariff setting is not advisable at the present juncture for the following reasons:*

- i) Base line data is either not available at all or is completely unreliable. The Regulator and the Utility will have to work closely and intensively for quite some time more before acceptable standards of data availability are achieved. Annual reviews and continuous interaction between the Regulator and the Utility and continuous monitoring will be required for some more time to come. The overheads on this exercise are, however, productive, in terms of improving the quality of the database.*
- ii) The Commission has also not yet set up the standards that are necessary to operate a formula based tariff revision system. This would require instituting a number of detailed studies.*
- iii) Given Karnataka's Hydro-Thermal Mix and the significant volatility in hydro power availability that is possible, multi-year tariff setting on the basis of automatic adjustments according to a set formula would be difficult.*
- iv) Karnataka also faces the prospect of additional capacity coming in at substantially higher costs than the current average cost of supply. As explained in some of the earlier paragraphs, there is as yet no clarity about several aspects of the additions to capacity that are likely. A formula that will cover all these contingencies appears difficult.*

- v) *As explained above, the Commission will be adopting norms for assessing the prudence or otherwise of expenditure. In this process certain minimum standards of efficiency will have to be achieved by the licensee. The Commission is conscious of the fact that this approach penalizes inefficiency compared to the norms but does not provide any incentive for improving efficiency beyond the norms. However, in the light of what has been explained above, the Commission is of the opinion that this is the best that can be attempted in the circumstances.*

*At the same time the Commission is aware of the advantages that a multi-year tariff setting methodology can provide to investors looking at the Distribution Sector in Karnataka as a potential investment option. The Commission will therefore be examining this issue in greater detail in order to balance the requirements of private players for greater certainty regarding their cash flows with the practical requirements of the present situation. At the same time, the Commission believes that the issue of Annual vs. Multi Year tariff setting is only one of several issues that have a bearing on the financial health of the sector and its attractiveness to private sector investors. In the Commission's opinion even more important than this are issues of how soon categories of consumers who are currently subsidized can be brought out of the subsidy net."*

Since then there have been a number of developments in the power sector in Karnataka. KPTCL has been broken up into four distribution companies since June 2002. This is expected to lead later to the privatisation of the four companies. The Government of Karnataka has decided that the distribution companies will be privatised. It has recently released a strategy paper on privatisation of distribution which revolves around the concept of "the distribution margin". In this paper the government has indicated that it is looking at ways of mitigating some of the risks, through introducing predictable multi year regulatory principles. Details of how this would be done have not been provided.

Accordingly this paper is intended to bring out the issues in the introduction of such a system so that there could be a wider discussion of the subject.

### *Structure of the Paper*

The paper is divided into the following sections:

(i) *Legal framework*

The existing legal framework - the central Acts as well as the Karnataka Act are examined to find out whether there are any legal barriers to implementation of MYT and if so, what amendments are required in the legislation to permit such a move towards MYT.

(ii) *International experience*

The experience in other countries is discussed in this section. An attempt has also been made to examine the degree of relevance or otherwise of the experience of these countries.

(iii) *Regulatory experience in India*

So far an annual review has been done in states that have their own Reform Acts and where the Central Act prevails, a review is done whenever a filing is made by the utility. Within this framework there has been some attempt at adopting MYT principles. These examples would be discussed with a view to determining the extent to which the MYT approach has improved matters in these states. Further the experience in the Telecom sector has also been discussed to ascertain if there are any lessons to be learnt from our experience in that sector.

(iv) *Regulatory Experience in Karnataka*

The experience in Karnataka with the MYT concept is discussed. It also brings out the specific problems of the state.

(v) *Institutional context*

The MYT concept could mean different things to the public sector and to the private sector. The extent to which the MYT framework would need to be different in a public sector context, as compared to the private sector context would be explored in this section.

(vi) *Conclusions*

In this section the discussion of the various sections are brought together to bring out the safeguards that would be required to make the MYT system successful.

## I. Legal framework

Commissions in India operate either under the framework of the Electricity Regulatory Commissions Act, 1998 (ERC Act) or under the state specific Reform Act. The powers and functions for the State Commissions relating to tariff under the ERC Act are as follows: (section 22(1))

*"Subject to the provisions of Chapter III, the State Commission shall discharge the following functions, namely:-*

- (a) To determine the tariff for electricity, wholesale, bulk, grid or retail, as the case may be, in the manner provided in section 29;*
- (b) To determine the tariff payable for the use of the transmission facilities in the manner provided in section 29;*
- (c) To regulate power purchase and procurement process of the transmission utilities and distribution utilities including the price at which the power shall be procured from the generating companies, generating stations or from other sources for transmission, sale, distribution and supply in State;*
- (d) To promote competition, efficiency and economy in the activities of the electricity industry to achieve the objects and purposes of this Act."*

The guiding principles of the manner in which the tariffs are to be set are given in section 29 of the ERC Act. It may be seen from these provisions that the Act gives freedom to the Regulator to depart from the principles set out in the Electricity (Supply) Act, 1948 so long as the reasons for doing so are given in writing.

A plain reading of these provisions show that there is no limitation for adoption of a multi year tariff system. In fact in some states where the Central Act is in operation there has been only one tariff order and since this has not been revised it continues to operate for more than one year (Gujarat, Himachal Pradesh). Although this cannot be termed as a MYT this only highlights that there is no need for annual revision and therefore if required a MYT system can be introduced.

The position is different in other states where state specific reform Acts are in place. Thus Section 26(4) of the Orissa Act reads as follows:



"Every licensee shall provide to the Commission at such time and in such manner as may be prescribed in the regulations, full details of its calculation for the ensuing financial year of the expected aggregate revenue from charge which it believes to have been permitted to recover in accordance with the terms of its licence and thereafter it shall furnish such further information as the Commission may reasonably require to assess the licensee's calculation. Within ninety days of the date on which the licensee has furnished all the information that the Commission requires, the Commission shall notify the licensee either: -

- (a) That it accepts the licensee's calculation; or
- (b) That it does not consider the licensee's calculation to be in accordance with the methodology or procedure in its licence and such notice to the licensee shall-
  - (i) Specify fully the reasons why the Commission considers that the licensee's calculation does not comply with the methodology or procedures specified in its license or is in any way incorrect; and
  - (ii) Propose a modification or an alternative calculation of the expected revenue from charges, which the licensee shall accept."

Similar provisions exist in the other Reform Acts. In these Acts there is no specific provision that the tariffs have to be revised annually although it can be said that this is implied in the whole scheme. There are provisions that the tariff cannot be revised more than once in a year except for the fuel surcharge. Even though there are specific provisions requiring an annual review of the Revenue Requirement, there is nothing to prevent a Commission to set down its rules on how it proposes to deal with the specific items comprising the total revenue requirement or how changes in the tariff would take place. In fact as would be seen in section 4 of this paper a few Commissions have tried to do this for the major determinants of Revenue Requirement. In the case of Madhya Pradesh, however, there is specific provision for an MYT.

So far as Karnataka is concerned the relevant sections of the 1999 Reform Act are similar to the provisions of the Orissa Act. The provisions of the Karnataka Act are set out below.

**"27. Tariffs:** (1) The holder of each licence granted under this Act shall observe the methodologies and procedures specified by the Commission from time to time, in calculating the expected revenue from charges which it is permitted to recover pursuant to the terms of its licence and in designing tariffs to collect such revenues.

(2) The Commission shall, subject to subsection (3), have the power to lay down methodology and the terms and conditions for determination of revenue of the licensee under sub-section (1) of this section and the determination of tariff, in such other manner as the Commission considers appropriate and for doing so, the Commission shall be guided by the following factors, namely:

- a. the financial principles and their applications provided in Sections 46, 57 and 57A of the Electricity (Supply) Act, 1948 (54 of 1948) and in the Sixth Schedule thereto;
- b. in the case of the Board or its successor entities, the principles under Section 59 of the Electricity (Supply) Act, 1948;
- c. that the tariff progressively reflects the cost of supply of electricity at an adequate and improving level of efficiency;
- d. the factors which would encourage efficiency, economical use of the resources, good performance and optimum investments and other matters which the Commission considers appropriate for the purpose of this Act; and
- e. the interest of the consumers are safeguarded and at the same time, the consumers pay for the use of electricity in a reasonable manner based on the average cost of supply of energy;
- f. the electricity generation, transmission, distribution and supply are conducted on commercial principles;
- g. national and State power plans formulated by the Central or State Government, as the case may be;

Provided that the contracts concluded by the Government of Karnataka and/or the Board with generation and transmission companies prior to commencement of the Act shall be deemed to have been approved by the Commission under the provisions of this Act and shall be given effect by the Commission.

- (3) *Where the Commission departs from factors specified in the Sixth Schedule to the Electricity (Supply) Act 1948 (Central Act 54 of 1948), while determining revenue of the licensee and tariffs, it shall record the reasons therefore in writing.*
- (4) *Any methodology or procedure specified by the Commission under sub-section (1), (2), (3) above shall be to ensure that the objectives and purposes of the Act are duly achieved.*
- (5) *Any tariff implemented under this Act:*
  - a. *shall not show undue preference to any consumer of electricity, but may differentiate according to the consumer's load factor, power factor and total consumption of energy during any specified period or the time at which supply is required, or the geographical position of any area, the nature of the supply and the purpose for which the supply is required; or paying capacity of category of consumers and need for cross subsidization; and*
  - b. *shall be just and reasonable and be such as to promote economic efficiency in the supply and consumption of electricity; and*
  - c. *shall satisfy all other relevant provisions of the Act, regulations and conditions of the licence.*
- (6) *The Commission also shall endeavour to fix tariff in such a manner that, as far as possible, similarly placed consumers in different areas pay similar tariff.*
- (7) *Every licensee shall provide to the Commission, at such time and in such manner, as may be specified in the regulations, full details of its calculations for the ensuing financial year of the expected aggregate revenue from charges, which it believes to have been permitted to recover pursuant to the terms of its licence and such further information, as the Commission may reasonably require to assess such calculations. Within ninety days of the date on which the licensee has furnished all the information, the Commission shall notify either:*
  - a. *that it accepts the licensee's revenue calculations and tariff proposals; or*

- b. that it does not consider the licensee's revenue calculations and tariff proposals to be in accordance with the methodology or procedure prescribed, and such notice shall:
- (i) specify fully the reasons why the Commission considers that the revenue calculations or tariff proposals furnished do not comply with the methodology, specified procedure or are incorrect;
  - (ii) propose a modification or an alternative calculation of the expected revenue from charges, which the licensee shall accept.
- (8) The Commission may, at the time of notifying the decision under sub-section (7) or within fifteen days of such decision, determine whether the tariff charged by the licensee is required to be modified and if so, require the licensee to modify the tariff or any part thereof.
- (9) Each holder of the supply licensee shall publish in a daily newspaper having circulation in the area of supply and make available to the public on request, the tariff for supply of electricity within the area of supply and such tariff shall take effect only after seven days from the date of such publication.
- (10) No tariff or part of any tariff implemented under sub-section (5) may be amended more than once in any financial year, except in respect of any charges expressly permitted under the terms of any fuel surcharge formula as may be approved by the Commission. At least three months before the proposed date for implementation of any tariff or amendment to a tariff, the licensee shall provide details of the proposed tariff or amendment to a tariff to the Commission, together with such further information as the Commission may require to determine whether the tariff or amended tariff would satisfy the provisions of sub-section (5). If the Commission considers that the proposed tariff or amended tariff of a licensee does not satisfy any of the provisions of sub-section (5) it shall within sixty days of receipt of all the information which it required, and after Consultation with the Commission Advisory Committee and the licensee, notify the licensee that the proposed a tariff or amended tariff is unacceptable to the Commission and it shall provide to the licensee an alternative tariff or amended tariff which shall be implemented by the licensee. The Commission shall notify its decision on the proposed amended tariff within ninety days of receipt of all information.

(11)The licensee shall not amend any tariff unless the amendment has been approved by the Commission and the amended tariff is published in the manner provided under sub-section (9).

(12)Notwithstanding anything contained in Sections 57A and 57B of the Electricity (Supply) Act, 1948 (54 of 1948), no Rating Committee shall be constituted after the date of commencement of this Act and the Commission shall secure that the licensee comply with the provisions regarding the charges for the sale of electricity, both wholesale and retail, and for connection to, and use of, their assets or system in accordance with the provisions of this Act.

**Explanation:** (a) In this section, "The expected revenue from charges" means the total revenue which the KPTC or the licensees are expected to recover from charges for the level of forecast supply used in the determination under sub-section (7), in any financial year, in respect of goods or services supplied to customers.

(b) "**Tariff**" means a schedule of standard prices or charges for specified services which are applicable to all such specified services provided to the type of customers specified in the tariff published."

From this it can be seen that while there is no requirement of a Multi Year Tariff framework, there is no bar either. In fact the Commission had provided a two year projection of required T&D losses in its Tariff Order, 2000.

The Commission has also seen the Electricity Bill 2001. This Bill does refer to the concept of Multi Year tariff principles in section 61, as one of the factors that will guide the Regulatory Commissions. Details of how this will be done have not been provided - presumably this will be for each State and Commission to deal with in the circumstances of the particular state. The Bill also provides for a National Tariff Policy - this would give an opportunity for the Central Government to lay down a National framework for the MYT. Once this Bill comes into force the concept of Multi Year tariffs would be clearly recognised in the law.

## II. International Experience

### United Kingdom

Price regulation in UK for the regulated monopoly "'wires" segment of the Sector takes the form RPI-X, where RPI is the retail price index and X is the efficiency factor. The 'X' factor is set a period of 5 years. The first period for setting of this multi-year tariff regime was 1990-95. Currently, the third price control period is in force. Though the multi-year tariff framework has found success in UK and is characterized by a decrease in prices and existence of competition, there is a need for examining some issues in closer detail.

Review of the distribution price control for 1995-2000 commenced in August 1994. The second distribution control period was to commence in April 1995 following this review. However, the Office of Electricity Regulation (OFFER) reopened this price control review in March 1995 on the grounds that one of the Regional Electricity Companies (RECs) was stronger financially than what it had revealed during the price control review process<sup>1</sup>. The Director General of Electricity Supply (the regulator) announced that the price cuts decided as per the review proceedings since August 1994 would hold only for a year i.e. until April 1996. The price cuts for the period from April 1996 to March 2000 would be re-examined and notified in July 1995. Here, it would be worthwhile to add that some commentators observe that the regulator re-examined the price control proposals in response to criticism of leniency<sup>2</sup>.

The time taken for review of these price controls also needs to be examined in greater detail. It would be interesting to look into the time taken for the review of

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<sup>1</sup> a) **Guide to Economic Regulation of the Electricity Industry, 2001**  
The Oxera Press, UK

b) John Surrey, ed. 1996  
**The British Electricity experiment Privatisation: the record, the issues, the lessons**  
Earthscan Publications Ltd, London : 105

<sup>2</sup> **Guide to Economic Regulation of the Electricity Industry, 2001**  
The Oxera Press, UK

controls for 2000-2005<sup>3</sup>. The consultation process for this review commenced in February 1998 with OFFER's consultation paper that set out the programme of work and reviews foreseen for the next two years, including the distribution price review. In July, there was another paper describing the considerations that would be relevant for the price control review. Further in December, the regulator brought out a consultation paper that set out information on the business plans of the distribution companies. A fourth consultation paper was published in May 1999 which described the regulator's initial thinking on the main considerations relevant to the price control review. Following this, the regulator published a paper in August that set out the draft proposals for revised price controls. These proposals were updated after consultations in October and the final proposals were published in December 1999. These proposals were then accepted by the companies and came into force in April 2000.

The case of UK serves to highlight two main issues. Primary among these is the problem of information availability when fixing multi-year price controls. Lack of information with the regulator or alternatively, incorrect information may lead to inaccurate decisions. This poses several concerns on the extent of risks that arise in formulating a multi-year tariff framework in the light of unavailability of information. Secondly, a closer analysis of the time taken for the review of price controls reveals that the review process in UK took about 27 months. This implies an average of over 5 months for each year. In India, Electricity Regulatory Commissions generally take 3-4 months each year to review the tariff filing of the utility and issue the subsequent tariff order. When compared to UK, the time taken for review serves to highlight that a multi-year tariff framework does not necessarily involve a reduction in regulatory effort and time.

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<sup>3</sup> a) Steve Thomas, 2001

**Theory and practice of governance of the British electricity industry**

International Journal of Regulation and Governance, Volume (1) 1, pp. 1-24

TERI, New Delhi

**b) Reviews of public electricity suppliers, 1998-2000**

**Distribution Price Control Review – Draft Proposals**, Office of the Gas and Electricity Markets,

<http://www.ofgas.gov.uk/docs/distp.pdf>

One of the commentators<sup>4</sup> of the UK experience notes that in practice, the elements required to determine 'X' are the same as are required for the rate-of-return regulation. The main difference is that RPI-X requires that the regulator pre-approve investment programmes. Instead of allowing companies to make independent decisions, the regulator is forced to pre-approve investment decisions. This serves to highlight that multi-year tariffs do not necessarily reduce information requirements.

## Latin America

The electricity sector in Latin America has undergone reforms at different points of time since the early 1980s for different countries and these reforms have been widely acclaimed as impressive and successful. At the start of the reform process, these countries were plagued by problems. Though the extent of problems varied from country to country, the problems mainly related to high losses, low quality service, lack of metering and initial tariffs inadequate to recover total costs. Conflicting utility objectives and political interference undermined the focus on efficacy and efficiency of operations and investments.

While the exact reasons for reforms in these countries vary, the over all factors driving the reform process were essentially problems that were economic and political in nature. Though models adopted by these reforming countries are different, almost all have adopted the multi-year tariff framework. In fact, multi-year tariffs have been mandated in the law in many of these countries. However, different countries have taken different approaches with regard to the incorporation of details of this mechanism in the law and the regulatory framework. The following discussion elaborates the experience of various countries in this region with multi-year tariffs.

## Chile

Chile was the pioneer of electricity reforms in the Latin American region. New regulations for the sector were laid down in 1982. The law contains not only the principles but also the formulae and the specific procedures to be followed for calculation of transmission and distribution tariffs. The key feature of reforms was the

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<sup>4</sup> Steve Thomas, 2001

**Theory and practice of governance of the British electricity industry**

International Journal of Regulation and Governance, Volume (1) 1, pp. 1-24

TERI, New Delhi

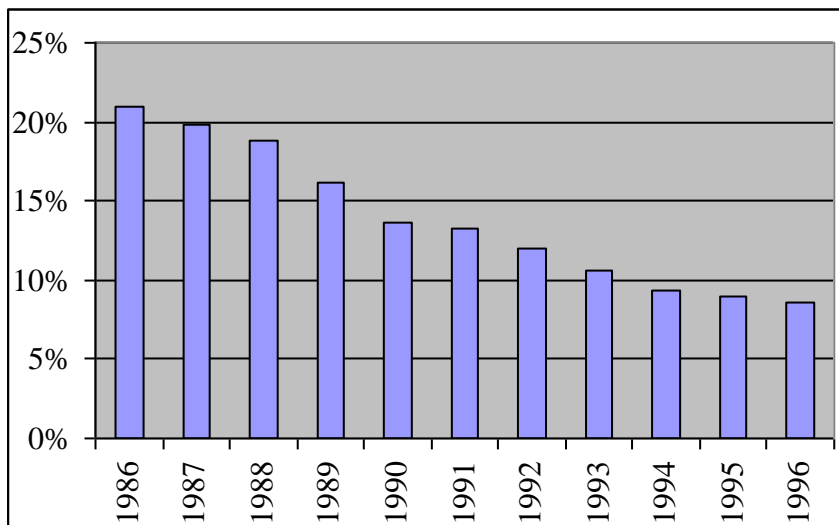


introduction of 'pseudo' market principles in distribution wherein; the private monopoly competed with a reference efficient model utility with the yardstick competition approach. Distribution tariffs are fixed every four years by the Ministry of Economy, which determines the Distribution Added Value based on the information gathered by the regulator.

It is important to note here that the Comisión Nacional de Energía or the regulatory commission consists of a Council of 7 Ministers<sup>5</sup> (Economy, Finance, Defence, Mining, Planning, Secretary General, and a Chairman that is appointed by the president and has the status of a minister) and an Executive Secretariat headed by a presidential nominee. Thus, the independence of CNE has been highly questioned.

The electricity sector in Chile was characterized by the existence of significant losses. These losses, including energy theft, were halved in seven years. Figure 1 shows energy loss reductions in Chile.

**Figure 1.** Energy loss reductions in Chile



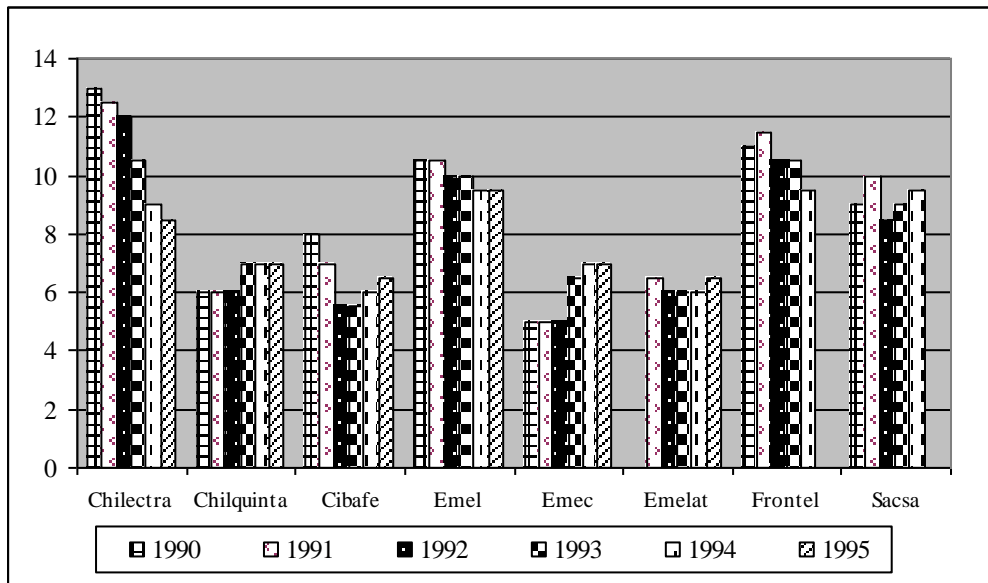
Source. Hugh Rudnick – Restructuring in South America: Successes and failures  
Power Economics, Restructuring Review, June 1998

<sup>5</sup> Inter-American Development Bank, 1999

While there has been an overall reduction in loss levels, a closer examination of electrical losses in percent of energy bought reveals that losses have shown increases in case of some utilities even after reforms. This is shown in figure 2.

The approach to multi-year tariffs as followed in Chile has led to several disputes between the regulator and the regulated on account of differences in the determination of technical parameters of tariff formulation with the tariff process often ending up in the Courts. The efficient firm against which the private monopolies compete does not exist and a simulation model is used as a benchmark. This mechanism is ideal under conditions of symmetric information. In practice, however, asymmetric information creates problems in estimating the cost structure of this efficient firm. The use of actual market data results in costs that are influenced by those of the existing monopoly. This tends to yield the same results as a standard rate of return model<sup>6</sup>.

**Figure 2:**Electrical losses in Chile (in percentage of energy bought)



Source. Hugh Rudnick V. and Ricardo Raineri B., 1993 - Chilean Distribution Tariffs: Incentive Regulation

<sup>6</sup> Frederico Basanes, Eduardo Saavedra, Raimundo Soto, 1999  
**Post privatisation renegotiation and disputes in Chile**  
 Washington, D.C., N° IFM-116  
[http://www.iadb.org/sds/publication\\_area\\_IFM\\_e.htm](http://www.iadb.org/sds/publication_area_IFM_e.htm)

Moreover, when setting tariffs, both the regulator and the regulated make their own cost estimates. In case negotiations are followed by any disparity, the final estimated cost of the efficient firm is the weighted average of the estimates provided by the regulator and the regulated entity. This, along with problems arising out of information asymmetry, often serves as a potential source of disputes.

An example of disputes arising in the course of multi-year tariffs is the events following tariff setting process in November 1996<sup>7</sup>. The new tariffs announced by the regulator in November 1996, for the next four years, were lower than the previous tariffs. Three distribution companies appealed to the Court on the grounds that these new tariffs were arbitrary. Until the Court reached any conclusion, these companies were able to charge the prevailing tariffs. It was soon evident to the regulator that, in the absence of legislations forcing monopolies to return to consumers any extra payments when the court determines the need for tariff reduction, delays in adopting the new tariffs would lead to profits for the companies. On December 4, 1996 the Government enacted a legislation to close this loophole. This legislation came into force on December 28, 1996. On January 31, 1997, the Court ruled in favour of the distribution companies. The regulator further challenged this in the Supreme Court and the tariffs as proposed by the regulator went into effect on April 28, 1997. While the companies returned to the consumers all extra payments made by them in the period from December 28, 1996 to April 28, 1997, the extra income obtained in the period November 4, 1996 to December 4, 1996 was not returned to the consumers. This translated into additional profits of approximately US\$ 7 million.

It is also worthwhile to note certain specific aspects of the Chilean legislation according to which the regulator is not allowed to make public the information used to compute rates except to the regulated firms. This blocks consumer protection agencies from counterbalancing the pressure that firms place on the regulator.

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<sup>7</sup> Frederico Basanes, Eduardo Saavedra, Raimundo Soto, 1999  
**Post privatisation renegotiations and disputes in Chile**  
Washington, D.C., N° IFM-116  
[http://www.iadb.org/sds/publication\\_area\\_IFM\\_e.htm](http://www.iadb.org/sds/publication_area_IFM_e.htm)

## Peru

At the start of the reforms process in 1993, the electricity sector in Peru had accumulated financial losses of US\$ 3 billion during the 1980s, together with an external debt that reached nearly US\$ 3.5 billion in 1990<sup>8</sup>. With reforms, tariff setting for distribution companies follows the Chilean model of yardstick competition in order to stimulate efficiency improvements and reduction in distribution losses. Tariffs are fixed for a period of four years unless the Distribution Value Added tariff index doubles during such a period.

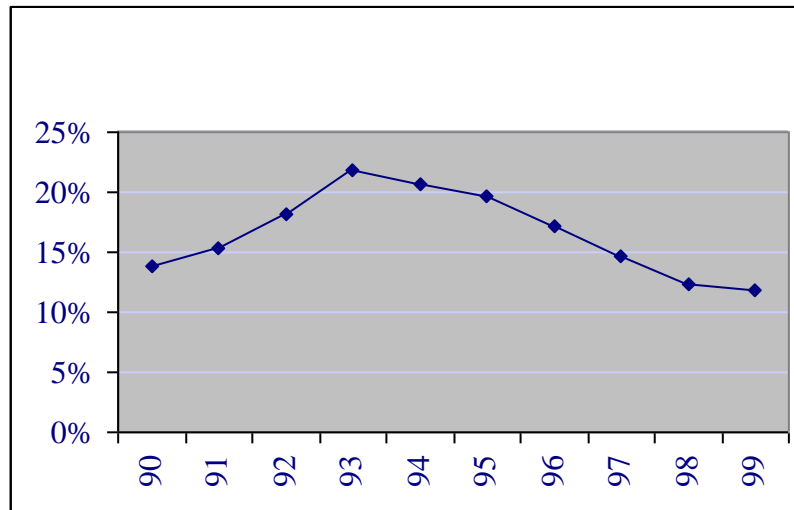
The principles as well as the detailed proceedings and formulae for calculation of tariffs are now set in the main 'Electric Concessions Law'. The law specifies that distribution companies will appoint consultants to prepare and submit to the Regulatory Commission their proposals on tariffs to be applied during the following tariff setting period. The public call for bids to select eligible consultants from the list defined by the Regulatory Commission is the first stage of the tariff setting process and starts around 8 months before the date of beginning of the new control period. In addition to the consultants for the licensees, the Regulatory Commission too, hires its own consultant.

Prior to reforms, the electricity sector was characterized by high energy losses (22% by 1993). Reforms have led to a significant reduction in losses. Figure 3 illustrates this.

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<sup>8</sup> World Energy Council

**Energy Markets in Transition: The Latin American and Caribbean Experience**  
<http://www.worldenergy.org/wec-geis/publications/reports/emt/countries/perudata.asp>

**Figure 3.** Energy losses in Peru (1990-99)

Source: Hugh Rudnick, Electricity markets in Latin America : Costs, prices and quality of service IEE-IEEE Lecture, London, April 5, 2000<sup>9</sup>

An important observation in case of the approach followed in Peru and Chile is that sizeable investments were required and are still required to develop a complex computer model that is maintained by the regulator. Such a system in Peru cost \$10 million (approx. Rs.50 crores) to develop<sup>10</sup>.

## Argentina

Argentina's power sector reforms commenced in 1991. The electricity framework law governing the sector outlines only the major principles of the multi-year tariff framework. The specific procedures and formulae are contained in regulatory decrees and license or concession contracts. After reforms, distribution companies operate under a 95-year concession contract. The first period lasts fifteen years while the remaining are ten-year management periods<sup>11</sup>.

<sup>9</sup> <http://www2.ing.puc.cl/~power/paperspdf/RudnickIEE.pdf>

<sup>10</sup> **IDEAS - Initiatives to Develop Electricity Affordability and Supply**  
July 2002  
Confederation of Indian Industry  
New Delhi

<sup>11</sup> Carlos Manuel Bastos and Manuel Angel Abdala, 1996  
**Reform of the Electric Power Sector in Argentina**  
Buenos Aires

Before the start of each management period, the regulator sets the tariffs to be applied during that period, and then calls for a competitive bid for control of the distribution company. The investor offering the highest bid obtains the concession and pays the bid price to the incumbent holder. The current owner retains ownership only if he submits the highest bid. The first round of bidding was done on the basis of multi-year T&D loss reduction. During a management period, tariffs are adjusted according to an index formula contained in the concession contract. If the distribution company files a petition with reasonable arguments, tariffs may be reviewed after five years. Tariff reviews require a public hearing. Proceedings to set tariffs for the next control period begins around 18 months before the beginning of new control period<sup>12</sup>. The regulator calls for bids in order to appoint consultants for assistance in the definition of an option of tariffs to be applied during the next period.

Reforms also lead to a decrease in the high T&D losses that existed at the start of reforms. Figure 4 shows the decline in overall losses in Argentina from 1992-2000.

In 1992, distribution losses for Edesur - the utility in Buenos Aires – were 26%. These losses were reduced to 12.5% in 1995<sup>13</sup>. There was, however, a breakdown of agreements in Argentina. Tariffs for three distribution companies in Buenos Aires were completely indexed to the exchange rate. As a result, the economic crisis in Argentina and the collapse of the peso in 2001 would have led to an increase of about 200-300% in retail tariffs. Such increases in tariffs were not politically feasible. Hence, the Government passed a new law in January 2002 that declared multi-year tariffs to be null and void.

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<sup>12</sup> Pedro Antmann, 2002

**Main issues involved in the regulation of distribution and retail supply services – the Latin American experience**

International Conference on Electricity Regulation: *Addressing the special concerns in developing countries*

TERI, New Delhi

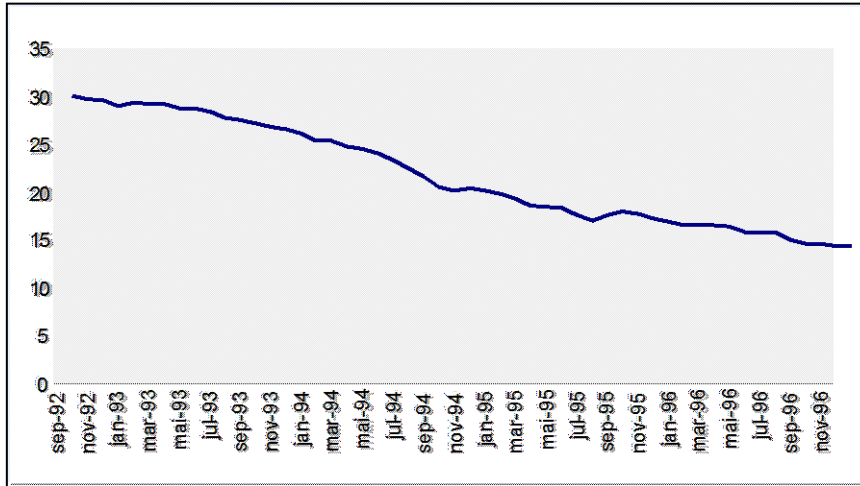
<sup>13</sup> Hugh Rudnick, 1999

**Deregulation and restructuring of the electric power sector in Latin America**

IEEE Engineering Management Society

Deregulation of the Electrical Industry Mini-Conference

San Juan Puerto Rico

**Figure 4.** Overall losses in Argentina

Source. Pedro Antmann, Distribution of electric power - tariff and quality regulation: the Latin American experience International Conference on Electricity Regulation: Addressing the special concerns in developing countries October 18-19, 2002 - TERI, New Delhi

## Columbia

Reforms were undertaken in Columbia in 1994 following a severe energy crisis in 1992-93. The Colombian law outlines the basic principles of multi-year tariffs with the details being determined by the regulator. At the start of reforms, there were high electricity losses of up to 35%<sup>14</sup>. Targets for loss reduction were set as trajectory: 20% for 1998, 15% for 1999 and 1% less for every next year of the five-year period 1998-2002<sup>15</sup>. The status of energy losses for various utilities in Colombia in December 2000 is shown in Figure 5.

<sup>14</sup> Ulpiano Ayala and Jaime Millan, 2002

**Sustainability of power sector reform in Latin America: the reform in Colombia**

Working Paper, Inter-American Development Bank

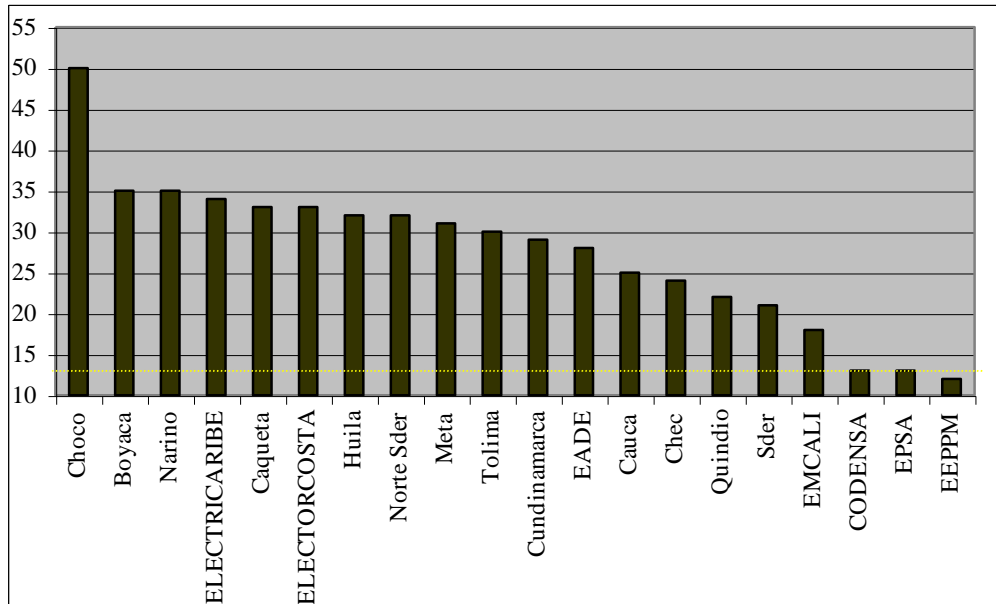
[http://www.iadb.org/sds/IFM/publication/gen\\_2885\\_2951\\_e.htm](http://www.iadb.org/sds/IFM/publication/gen_2885_2951_e.htm)

<sup>15</sup> Pedro Antmann, 2002

**Distribution of electric power - tariff and quality regulation: the Latin American experience**

International Conference on Electricity Regulation: *Addressing the special concerns in developing countries*

TERI, New Delhi

**Figure 5.** Energy Losses in Colombia - % - December 2000

**Source.** Ulpiano Ayala and Jaime Millan, 2002 *Sustainability of power sector reform in Latin America: the reform in Colombia* Inter-American Development Bank

It is to be noted that as part of reforms, most distribution companies were not privatised and remained in the hands of State Owned Enterprises. Several companies continued to show high efficiencies because of physical losses, theft, lack of measurement and poor billing. Moreover, many of these companies serve low income and rural markets. Limited payment capacity and high distribution costs of such markets make these companies dependent on unreliable subsidies from the central government.

Reforms in the Colombian power sector have shown impressive achievements after its commencement. However, the picture is far from rosy now. Colombia has a high dependence on hydro generation and a relatively low storage capacity. It is also plagued by recurring droughts. As a result, supply is limited during droughts and the market becomes extremely volatile. Coupled with transmission system constraints, this provides opportunities to big players to dominate the market. Further, problems of cash flow have resulted in critical financial conditions for many distribution companies, both public and private<sup>16</sup>. Thus, the sustainability of reforms is now under doubt.

<sup>16</sup> Ulpiano Ayala and Jaime Millan, 2002



## Bolivia

The principles for multi-year tariffs were set out in the main law in Bolivia at the time of reforms in 1994. Further, while the law also provides for a monthly-indexation formula and its composition, the efficiency increase index for the purpose of these monthly indexation formulas is determined by the Superintendency of Electricity i.e. the regulator. The procedures for the application of the provisions for multi-year tariffs, as stated in the Law, are established by regulation. The Law also provides for an extraordinary revision of base tariffs. When there are significant variations with respect to the projections for the sale of electricity that were considered in the last approval of base tariffs, the regulator is empowered to make an extraordinary revision of base tariffs on its own motion or at the request of the distribution company.

Tariffs are fixed for a period of four years and are capped through an RPI-X methodology. Distribution companies are given incentives to improve their efficiency because in a period of four years, they get to keep their efficiency improvements through higher earnings. When new tariffs are approved, these efficiency gains are passed on to the consumer by adjusting operating costs by the efficiency factor 'X'.

What is noteworthy about the electricity sector in Bolivia is that it was characterised by low level of energy losses and traditionally there has been no energy theft<sup>17</sup>. The main companies in the industry were efficient in financial and operational terms<sup>18</sup>.

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Working Paper, Inter-American Development Bank

[http://www.iadb.org/sds/IFM/publication/gen\\_2885\\_2951\\_e.htm](http://www.iadb.org/sds/IFM/publication/gen_2885_2951_e.htm)

<sup>17</sup> World Energy Council

**Energy Markets in Transition: The Latin American and Caribbean Experience**

<http://www.worldenergy.org/wec-geis/publications/reports/emt/countries/boliviadata.asp>

<sup>18</sup> **Introducing competition into the electricity supply industry in developing countries: Lessons from Bolivia**

August 2002, Joint UNDP/World Bank Energy Sector Management Assistance Programme (ESMAP)

## Panama<sup>19</sup>

The Electricity Public Service Law of February 1997 laid down the basis for reforms and restructuring in the electricity sector of Panama. This law sets the basis for pricing and tariffs, and establishes principles for promoting energy efficiency and conservation. The regulator is responsible for setting efficiency and performance targets for the public service providers. It also lays down the principles, methodologies and formulas for tariff setting purpose.

The extent of losses in distribution systems is greater than 20%. The distribution segment consists of three distribution companies, which have been privatised and granted regional concessions. In other words, distribution activity is a regulated private monopoly. The operation of these companies is subject to a concession. The Law stipulates a 15-year term limit for distribution concessions. Upon expiration of this period, the concessions will be re-offered by the regulator for an equivalent period of time. These concessions are awarded by means of a competitive bidding process. Distribution tariffs are reviewed every 4 years.

## Brazil

Private sector participation in the distribution segment in Brazil increased from 2.6% in 1994 to more than 60% by the end of 1998<sup>20</sup>. A 'contract by contract' approach was followed for the privatisation of distribution companies, which began in 1995. The concession contracts given to these privatised companies are for thirty years<sup>21</sup>. The features of these distribution contracts include that tariffs are set on a price-cap basis, with annual adjustments for inflation and five-year reviews including efficiency improvements.

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<sup>19</sup> Inter-American Development Bank, 1999

**Profiles of Power Sector Reform in Selected Latin American and Caribbean Countries  
Panama** - [http://www.iadb.org/sds/publication/publication\\_2063\\_e.htm](http://www.iadb.org/sds/publication/publication_2063_e.htm)

<sup>20</sup> Inter-American Development Bank, 1999

**Profiles of Power Sector Reform in Selected Latin American and Caribbean Countries  
Brazil** - [http://www.iadb.org/sds/publication/publication\\_2063\\_e.htm](http://www.iadb.org/sds/publication/publication_2063_e.htm)

<sup>21</sup> Jaime Millan, 2002

**Attracting private investors in the Latin American and Caribbean reformed power markets**  
International Conference on Electricity Regulation: *Addressing the special concerns in developing countries*  
TERI, New Delhi

However, for Rio Light, the distribution company in Rio de Janeiro, it was decided to use RPI with no X factor and to leave this regime in place for a period of seven years. The rationale given for this was that Brazil being viewed as risky in capital markets, the elimination of the X factor would strengthen the incentives for improvements in productivity because all savings in the first 7 years would go directly to the company's bottom line<sup>22</sup>. The use of a 7-year period rather than a 5-year one was justified on the grounds that the longer period would add a level of certainty to investors.

It is interesting to note the experience<sup>23</sup> with this regime. The absence of an X factor, the absence of performance standards, the lengthy initial period combined with the lack of regulatory oversight essentially meant that there was no disincentive to merely cut costs, as opposed to enhancing productivity. Since the rates were not subject to review for seven years, making improvements was not of primary importance to the investors. Subsequent to the various problems that erupted, Rio Light was forced to pay a fine and to improve its operations. On the whole, this experience left many consumers sceptical about privatization.

Agencia Nacional de Energia Elctrica (ANEEL) or the regulator is responsible for granting concessions and regulating prices. It lays out the initial formula for tariffs for all concessionaires. However, reviews performed at the end of each price control period could be delegated to state regulators.

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<sup>22</sup> Ashley C. Brown, 2002

**The privatization of Brazil's electricity industry: sector reform or restatement of the government's balance sheet?**

Inter-American Development Bank

<sup>23</sup> Ashley C. Brown, 2002

**The privatisation of Brazil's electricity industry: sector reform or restatement of the government's balance sheet?**

Inter-American Development Bank

*Ecuador*<sup>24</sup>

The distribution segment in Ecuador is now becoming private and competitive. The law governing the electricity sector empowers the regulator to grant distribution concessions. It lays down the principles of tariff setting, and establishes the conditions and requisites for determining the tariff structure, calculation, and adjustment as well as the monitoring of their application. In particular, it specifies that the regulator will determine the periodicity for reviewing and approving rate schedules, which cannot be less than once a year. The regulator also lays down the norms for calculating the added value of distribution.

The law also states that the terms of duration for the validity of concession contracts of distribution companies will be determined taking into account the nature of the regulated exclusivity under the mechanisms provided for by the present Executive Regulations, and this duration will not be for more than thirty years.

In addition, the law also provides for adjustments for the rate schedules. It makes clear that rate schedules will include automatic upward or downward rate adjustments owing to exceptional or unforeseen cost changes that cannot be controlled directly by the concession holder. These readjustments will be applied if the variation of rates is greater than or lesser than 5% of the value in force on the date of the calculation.

*Pakistan*<sup>25</sup>

In May 2002, the Karachi Electric Supply Company (KESC) - the state owned entity - sought approval from the National Electric Power Regulatory Authority (NEPRA) of a multi- year tariff proposed for the next 10 years. Under this proposed tariff framework, tariff would be subject to an initial review after 10 years and thereafter, every 5 years. KESC has sought for a time of 10 years before the first review on the grounds that a demonstration of a 10-year period is required for compensation of losses in the initial years. The proposed multi-year tariff provides for an annual tariff revision on January 1st each year using a CPI-X indexation formula for adjusting tariff components other than fuel and purchased power costs. It also provides for a claw-back mechanism whereby

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<sup>24</sup> **Law governing the electric power sector**

Supplement –Official register no. 43, Thursday, October 10, 1996

**Regulation for setting tariffs – No. 228**

**Regulations for concessions, permits and licenses – No. 1274**

<http://www2.ing.puc.cl/~power/southamerica/ecuador.html>

<sup>25</sup> **Tariff determination in case no. NEPRA/TRF-14/KESC-2002**

National Electric Power Regulatory Authority, Pakistan, September 2002

profits above a pre-determined rate of return would be shared with the customers by way of reduction in tariff. The Government of Pakistan has also suggested multi-year tariffs as a guideline.

The Privatization Commission of the Government of Pakistan has emphasized that the proposed multi-year tariff would be essential for facilitating KESC's privatization and providing certainty of reasonable returns to investors. This assumes greater importance in view of the current financial unviability of KESC, no improvement in losses and the inability to generate resources from its revenues.

There has been a continuous increase in T&D losses of KESC since 1985-86. Currently, these losses are of the order of 40%. The status of these losses is shown in Table 1. The regulator has laid loss reduction targets for KESC, wherein the utility should be able to reduce losses to 35% in 2002-03 and 30% in 2003-04. In the event of privatization, the regulator also envisages a reduction in loss levels to at least 15% over a period of 10 years. The regulator has also approved KESC's tariff determination on the basis of a multi-year tariff formula. Full details of the methodology have not been provided. However, it has been clarified that in view of the impending privatization of KESC and the envisaged change of ownership and management, the issue of multi-year tariffs has been considered in the background of possible privatization.

**Table 1. T&D losses of KESC, Pakistan**

Year	Transmission & Distribution Losses
1985-86	17.01%
1986-87	18.85%
1987-88	18.84%
1988-89	19.77%
1989-90	20.84%
1990-91	23.58%
1991-92	26.00%
1992-93	27.09%
1993-94	27.12%
1994-95	31.83%
1995-96	31.20%
1996-97	35.53%
1997-98	34.62%
1998-99	38.64%
1999-2000	40.23%
2000-01	36.81%
2001-02	40.10%

Source. Tariff determination in case no. NEPRA/TRF-14/KESC-2002, National Electric Power Regulatory Authority, Pakistan

## **Relevance of international experience**

The above experiences elucidate that multi-year tariffs have not been successfully implemented in a public sector framework in any country. It also serves to highlight that the relevance of international experiences needs to be carefully examined before making a prima-facie case for multi-year tariffs. For example, the lack of adequate and accurate information, as was the case even in UK, may impair the regulator's ability to make correct decisions.

Secondly, while multi-year tariffs have shown success in the Latin American countries, the experiences of countries like Bolivia where energy losses have not been a critical issue hold little relevance for India where T&D losses are an important concern. This is particularly true for the case of Karnataka where losses have been over 30%. All countries surveyed (except Colombia) had much lower initial T&D loss levels.

Moreover, while losses have been reduced in all countries in this region, an overall picture of declining losses may sometimes be misleading. The case of Chile demonstrates that though the overall loss levels have reduced, losses for some individual utilities may increase even after privatization and adoption of multi-year tariffs. The experience in Chile also demonstrates that a multi-year tariff framework is not free of disputes. This has called for the use of discretion by the regulator and, in some cases, led to renegotiations and disputes beyond the authority of the regulator, causing the intervention of public authorities. Moreover, the inability of the regulator to act and the need to approach the Government to enact new legislation in the event of unforeseen events led to improper gains for the companies.

In fact, the inability to anticipate all situations that may arise in the course of implementation of multi-year tariffs and their impacts has also led to problems in Colombia. It has also been seen that the level of losses in Colombia is still high. To what extent this is due to the fact that Colombia has a large segment of distribution business in the public sector is not clear.

The breakdown of agreements in Argentina, although improvements in efficiency have been achieved, again shows that risks and uncertainties cannot be eliminated in a foolproof manner in a multi-year tariff framework. As a result, renegotiations and disputes would be intrinsic to multi-year tariffs as well.

Further, the extent of investments required in a multi-year tariff framework poses some concern. The experience of Peru illustrates that significant investments are required in developing complex computer models if the approach followed is that of an efficient reference utility. After such huge investments if these were to be periodically revised, the cost would be astronomical. Additionally, at the present stage of data infirmity, it would be better to use simpler, more robust and cheaper methods. It would be useful to add here that extensive use of consultants has been made in UK for the price-control review process. However, the costs incurred on this are not known.

To conclude the discussion on the experiences of other countries, it is clear that multi-year tariffs can be used. However, this is not without problems - both in terms of impacts on efficiency and reopening of contracts. The available information on international experience is too limited to assess the likely impact of using these methods in the specific context of Karnataka. Little information is available on the precise methods used to forecast revenues and costs and also on the extent to which these forecasts were revised as a result of actuals being different from the forecasts or targets. Far more information would be required to assess the impact of MYT and to derive conclusive lessons from the varied experience of different countries.

### III. Regulatory experience in India

#### Electricity

In India, very few SERCs (State Electricity Regulatory Commissions) have experimented with multi year tariffs. The limited experience has been of the 2A type restricted to the major issues of T&D loss and collection efficiency. Uttar Pradesh Electricity Regulatory Commission (UPERC) and Maharashtra Electricity Regulatory Commission (MERC) have undertaken some initiatives in this direction. In Delhi, multi year targets have been set through a process of bidding. Andhra Pradesh Electricity Regulatory Commission (APERC) and Orissa Electricity Regulatory Commission (OERC) are also contemplating the implementation of multi year tariff. These are discussed below:

##### 1) Uttar Pradesh

UPERC laid down multi-year targets related to T&D losses and collection efficiency in order to facilitate the utility to improve efficiency in a time bound manner. The framework adopted was incentivising, for the surpluses resulting from attaining targets in advance of the schedule would have been shared between the utility and the customers.

##### T&D losses

###### **Tariff Order – 2000-2001 (issued on July 27, 2000)**

The utility, UPPCL, had proposed to reduce the aggregate technical and commercial losses from 36.5% to 17.5% over the next decade, in its tariff filing for FY01. The UPERC accepted the target for FY01 but fixed annual targets (see Table 2 below) for the next five years, aiming to bring down losses to 20.5% by end of FY06.

###### **Tariff Order – 2001-2002 (issued on September 1, 2001)**

The multi-year path set by the UPERC in its previous order had to be revised, for the losses in FY01 fell only marginally from the starting level of 41.55% to 41.4%<sup>26</sup>.

UPPCL attributed the non-compliance to investment constraints whereas UPERC attributed the same to lack of accountability. The UPERC pointed out that the target of 36.5% for FY01 had been proposed by UPPCL itself; therefore it was imprudent of UPPCL to set out targets without proper homework. The UPERC maintained that had

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<sup>26</sup> The estimate is inclusive of the loss within the KESCO system



the target for FY02<sup>27</sup> been attained by the utility the need for tariff revision would have been averted.

The UPERC revised the targets set out in the previous order and prescribed new targets for the coming five years accepting the target proposed by UPPCL for FY02. The UPERC assumed FY01 to be the base year for the revision of targets. A comparison of targets outlined in both the orders is tabulated below in Table 2.

**Table 2.** Comparison of Multi year targets laid down in Tariff Order-2000 & Tariff Order-2001

Year	Tariff Order – 2000 (in per cent)	Tariff Order – 2001 (in per cent)
2000-2001	36.5	39.05
2001-2002	32.5	36.40
2002-2003	29.5	33.40
2003-2004	26.5	30.40
2004-2005	23.5	27.40
2005-2006	20.5	23.90

### **Tariff Order – 2002-2003 (issued on October 22, 2002)**

The losses reported were 38.76% against the level of 36.4% approved by UPERC for FY02. UPPCL has proposed a loss level of 36.5% for FY03 implying a reduction of 2.26% from the actual level of 38.76%. The UPERC, however approved 33.4% in accordance with the multi-year regime implying a reduction of 3.83%.<sup>28</sup>

### **Status of compliance (T&D losses)**

The present status of T&D loss targets and performance is summarised in Table3 below:

**Table 3: Status of T&D loss - UP (the figures are in per cent)**

Year	Proposed by UPPCL	Approved by UPERC	MYT (as per 2000 TO)	MYT (as per 2001 TO)	Actual
FY00	-	-	-	-	41.55
FY01*	36.5	36.5	36.5	-	41.4
FY02**	36.4	36.4	32.5	36.4	38.76
FY03**	36.5	33.4	29.5	33.4	-

\* The figures for the year are inclusive of the losses within the KESCO region

\*\* The figures for the year indicate losses for UPPCL area only

<sup>27</sup> The estimate, 32.4% is inclusive of the loss within the KESCO system

<sup>28</sup> The estimate of 3.83% has been derived on the basis of loss level of 37.23% for FY02 as estimated by the Commission instead of 38.76% reported by the UPPCL.

## Collection efficiency

In addition to T&D losses, targets related to collection efficiency were also laid down by UPERC.

### **Tariff Order – 2001-2002 (issued on September 1, 2001)**

The UPERC set out multi-year targets for collection efficiency to improve the performance of UPPCL in this regard. The collection efficiency targets specified by UPERC are tabulated in Table 4:

**Table 4. Multi year targets related to collection efficiency in Tariff Order-2001**

Year	Percent
2001-2002	85.0
2002-2003	88.0
2003-2004	91.0
2004-2005	94.0
2005-2006	99.0

### **Tariff Order – 2002-2003 (issued on October 22, 2002)**

Against the target of 85% collection efficiency attained during FY02 was only 78% . The UPERC however, has stuck to the MYT target of 88% for FY03 and has allowed UPPCL the cost of borrowing for revenue beyond the targeted collection of 88%. The UPERC has reiterated the significance of multi-year framework and reinforced all the targets laid down in the previous order.

### **Status of compliance (Collection efficiency)**

The targets fixed by the Commission and the actual loss levels are contrasted in Table 5 below:

**Table 5: Status of Collection Efficiency (the figures are in per cent)**

Year	Proposed by UPPCL	Approved by UPERC	MYT (as per FY02 TO)	Actual
FY00				81.23
FY01	87	86.23	-	78.3
FY02	85	85	85	78
FY03	-	88	88	-

The UPERC stated that efforts made by the utility for complying with multi year targets are inadequate and that targets would remain unachievable if inaction on part of the utility continues. The UPERC highlighted that targets have been fixed

after consultation with the utility and it is in the interest of the sector that these are strictly adhered to. It also clarified that non-compliance on part of the utility should not be mistaken for shortcomings of the MYT attempt made by it.

The following points sum up the Uttar Pradesh experience:

- **Targets fixed in 2000 were not realized by UPPCL, following which, these were revised by UPERC in 2001.**
- **Even with revised estimates, the actual losses reported were more than the targeted level.**
- **The UPERC has retained the revised targets in 2002 - 03; performance is still well below target.**

An overview of the Cost Benchmarking approaches undertaken for the UPPCL

UPERC had in its tariff order for 2002-03 attempted to develop an objective system for tariff determination. Two alternatives were used, drawing chiefly upon the South American experience. In the first case, UPPCL is benchmarked against a Reference Utility (RU), which is based on certain pre-defined efficiency parameters related to network design, operations, maintenance and manpower planning for various activities and adapted to local conditions. In the second case, the operations of UPPCL have been benchmarked with other utilities in India, after adjusting the benchmarks for specific conditions. The data for 2001-2002 has been taken for calculating these efficiency benchmarks. The results obtained in both the cases are summarized as below:

#### **T&D losses**

In the first case, the UPPCL's losses are benchmarked against the 8.25%-15.5% range set by the CEA. As per the Data Envelopment Analysis (DEA), the UPPCL needs to bring down the T & D losses to 22.97% from the current level of 38.76% in order to become an efficient utility. The RU incurs 22.97% of losses even as it sells 16898 MU more than the UPPCL, and at a higher level of LT:HT ratio.

#### **Network Costs**

Even after serving a larger area (35% more than that of the UPPCL) and selling 36343 MU against UPPCL's 19445 MU, the RU incurs only Rs. 1314 crore against UPPCL's Rs. 1505 crore. When compared with Andhra Pradesh and Karnataka, UPPCL is less efficient.

### Summary of results.

The results of the exercises as indicated in the tariff order are summarised in Table 6 below. As can be readily seen the targets that come out of these exercises are not only well above actuals but are also far more ambitious than those adopted by the Commission

**Table 6 : Benchmarking Results - UP**

	<b>Actual Cost FY02</b>	<b>Commission's Order FY02</b>	<b>Approach A</b>	<b>DE Analysis</b>
Network Costs (Rs. Cr.)	1505	1480	1350	1314
Losses (%)	38.76	<b>36.4</b>	<b>8.2</b>	<b>22.97</b>
Value of Losses* (Rs. Cr.) (in terms of additional sales)	-	260	3368	1663
Total Savings	-	285	3523	1854

\*At the average rate of revenue (Rs. 2.63 per KWh) billed by the UPPCL in FY02.

There is no doubt that UPPCL's compliance with the level set out by the RU approaches would certainly improve it's financial health. This is indicated by the amount of savings that would result as a result of compliance with these targets. However, given the past performance of UPPCL in reducing the T&D losses and other efficiency targets, the targets coming out of the Reference Utility approach are very ambitious. The UPERC has pointed out that the targets set in the tariff order are modest compared to what has been thrown up by these models.

Since these models are to be ultimately used for an MYT, the following weaknesses in the approach need to be pointed out:

- a) There is no method for defining the time frame over which these reductions are to be brought about.
- b) As may be seen from the tariff order, the results of this exercise have not been used to determine actual targets.
- c) For the crucial parameter of T&D losses, little analysis is available as to how commercial losses can be reduced and how targets for these can be objectively determined.

It would, therefore, appear that an MYT based on such models would not help in actual decision making. At best, these can be used to provide an academic input into the process of decision making.

## II) Maharashtra

### **Tariff Order – 2000-2001 (issued on May 05,2000)**

MERC too experimented with multi year tariff albeit in an implicit manner. The T&D losses for FY00 were estimated by MSEB to be 29%. The MERC pegged the losses at 31.87% after incorporating the revised norms for LT agricultural consumption.

MSEB was mandated to reach a loss level of 15% (as per CEA guidelines) in a period of four years. The loss level of 31.87% was to be reduced at the rate of 5% every year for 3 years to reach 16.89%. An indicative time series than could be inferred from MERC's guideline is tabulated below in Table 7:

**Table 7. Multi year targets indicated by MERC in Tariff Order-2000**

Year	Per cent
1999-2000	31.87
2000-2001	26.89
2001-2002	21.89
2002-2003	16.89

MSEB therefore was expected to reduce the losses by 5% to 26.89% in FY01 whereas it had proposed 27.66% for the same year. The MERC disallowed all losses in excess of 26.89%.

### **Tariff Order – 2001-2002 (issued on January 10, 2002)**

The losses reported were 39.4% whereas the MERC's approved level was 26.89% for FY01. Had the 5% reduction target been adhered to there would not have been any need to revise the tariff. In fact, the increase in revenue proposed for FY02, which is Rs 1456 crore, is less than Rs 2430 crore that could have been earned on account of meeting the targeted level.

The MERC held that since consumers are equally responsible for the losses, the cost of excess losses would be borne by MSEB and the consumers equally. The excess losses being 12.6%, MSEB and the consumers each would bear the costs of 6.3%

losses in FY02. Taking this into account the losses approved for revenue requirement come out to be 33.2% (26.89 + 6.3) for FY02.

### Status of compliance

The present status of targets and achievements with respect to T&D losses is given in Table 8 below:

**Table 8: Status of T&D losses - Maharashtra.**

(the figures are in per cent)

Year	Proposed by MSEB	Approved by MERC	MYT (as per 2000 TO)	Actual
FY00	-	-	-	31.87
FY01	27.66	26.87	<b>26.89</b>	<b>39.49</b>
FY02	39.49	<b>33.2</b>	<b>21.89</b>	-
FY03*	-	-	16.89	-

\*Since the tariff order for FY02 came into force w.e.f. January 1, 2002, the MERC maintained that it did not expect MSEB to file revision for FY03.

Although MERC desired to set a reduction target of 4% to 5% in FY02, it did not do so as a special case for that year, considering the circumstances prevailing and the estimation involved for T & D losses in the absence of 100% metering. The MERC nevertheless re-affirmed that the revised targets would aim to attain the CEA norms of 15% to 16% in 2 to 3 year's time.

The following points summarize the Maharashtra experience:

- **The T&D target was not achieved by MSEB; in fact the T&D losses reported were substantially higher than the targeted level.**
- **The target for the ensuing year was revised by MERC.**

From the foregoing discussion it is observed that both in UP and Maharashtra, the MYT targets fixed in 2000 were revised in the next tariff order. The revised MYT targets in 2001 in UP have been retained in 2002. However, there is no indication of whether these targets will be achieved.

### III) Delhi

#### **Tariff Order – 2001-2002 (issued on May 23, 2001)**

The order was issued in response to the application of Delhi Vidyut Board (DVB) for approval of the Annual Revenue Requirement for FY02 and Tariff determination principles for the years 2002-03 till 2005-06.

In its tariff filing, the DVB had proposed to Delhi Electricity Regulatory Commission (DERC) long-term principles for tariff determination. In the wake of the impending privatization of the distribution business, DVB opined that long-term tariff principles impart certainty and helps the private investor formulate its business strategy. It outlined a tariff setting formula and process of estimating changes in the costs of its various components. It also proposed that DERC lay down tariff principles for 2006-07 to 2010-11 a year in advance of 2006-07.

The DERC however, maintained that the sector is not mature for the introduction of multi-year tariffs and did not approve the implementation of tariff principles proposed by DVB.

### *Incorporation of multi year tariff in the privatization of Delhi's distribution business*

The Government of Delhi found it is difficult to privatize distribution if reduction in the loss level/efficiency gain is determined annually; this led to the introduction of multi year tariff framework.

The Government fixed reduction in loss levels as the bidding criterion during the privatization process. The Government, in essence, utilized the play of market forces to fix the targets rather than fixing them unilaterally. As a parameter of efficiency, the Government decided upon Aggregate Technical and Commercial Loss (AT&C loss), which was to be brought down over a period of five years. On account of lack of competition the losses finally accepted were negotiated and these were lower than those initially fixed by the government.

The framework adopted is incentivising, for the distribution licensee is allowed to retain 50% of the additional revenue arising from the difference between the level of AT&C bid and the level attained for any particular year.

The net loss reduction envisaged over the five year period as per the minimum level set and the bids accepted by the Government is tabulated below in Table 9:

**Table 9. AT&C loss reduction targets over five-year period**

(figures in percentage)

DISCOM	Minimum	Accepted
Central East	20.75	17.00
South West	19.25	17.00
North - West	19.25	17.00

Source: <http://www.delhividyut.com/bulletinboard/presshandout.htm#package>

A comparison of the opening level of AT&C loss with the level that would be attained at the end of five years is tabulated below in Table 10:

**Table 10. Opening AT&C loss at the beginning and the end of five-year period**

(figures in percentage)

DISCOM	Opening (at the start of 2002-03)	Opening (at the start of 2007-08)
Central East	57.2	40.2
South West	48.1	31.1
North - West	48.1	31.1
All Discoms	50.7	33.7

Source: <http://www.delhividyut.com/bulletinboard/presshandout.htm#package>

#### IV) Andhra Pradesh

##### **Tariff Order – 2001-2002 (issued on March 24, 2001)**

The Andhra Pradesh Electricity Regulatory Commission (APERC) expressed that in the light of given statutory provisions, it is required to deal with the revenue requirement and tariff proposals of the licensee annually. Therefore fixation of tariff rate on a multi-year basis is not possible.

However, the APERC affirmed to prescribe long-term tariff principles on specific aspects such as loss reduction, efficiency gain, incentives and disincentives and such other aspects as it would consider appropriate. The APERC viewed that such a framework would provide certainty to and facilitate long term planning by the licensee. It opined that the framework would aggressively deal with loss reduction and improve efficiency levels.



The APERC mentioned that it would bring out a consultation paper in this regard after proper deliberations and thereafter lay down the long term tariff principles. While it has not laid down any long-term principles till date, it has brought out the consultation paper.

## V) Orissa

### **Tariff Order – 2001- 02 & 2002-03 (issued on April 19, 2002)**

The Orissa Electricity Regulatory Commission (OERC) has stated that it would endeavour to set in motion a multi year tariff regime effective from April, 2003 for the FY04. It proposed to usher in such a framework to reduce regulatory uncertainty in the tariff determination exercise. The OERC, infact, has initiated preparation of a five-year sectoral plan covering generation, transmission and distribution that would provide key inputs to an MYT set up. It has proposed to conduct consultation with and obtain comments from various stakeholders before finalizing the multi-year regime.

The OERC considers that fixing the target over a “control period” rather than targets confining to a single year provides predictability to the consumers, the shareholders and also to the regulatory commission. It outlined that 2001-2002 should be considered as the base year for all the relevant calculations.

## **Telecom**

That uncertainty cannot be eliminated, and renegotiations and disputes are intrinsic to long-term contracts is not restricted to electricity. Such problems have been faced in other sectors as well. The experience of the telecom sector in India is one such example that illustrates how risk and uncertainty can lead to breaking down of contracts resulting in renegotiations or even changing the rules.

Tenders for award of GSM cellular license in the four metros of Delhi, Mumbai, Calcutta and Madras were issued in February 1992. This was before the announcement of the National Telecom Policy 1994. The process of awarding these licenses was closed in April 1995. The process of awarding licenses in the other circles began with the Department of Telecommunications issuing tenders in Feb. 1995. Originally, the fixed license fee of cellular operators was very high. In some cases per subscriber cost worked out to be many times more the total revenue from the subscribers with the result that these operators continued to make heavy losses. They were unable to pay the license fee. Over estimation of demand by these operators was one of the key reasons for this. The Government was aware that

cancellation of licenses would disrupt services. New players would not be forthcoming to acquire licenses and there could have been litigation. Even if new licensees were forthcoming, they would have asked for a change in the license regime. Finally, the government changed the system. Under the New Telecom Policy of 1999, the Government shifted all operators to a one-time entry fee accompanied by a continuing revenue sharing obligation with the government. The license period was also extended.

It would be worthwhile to add that in the telecom sector, the first tariff order was issued in March 1999. There was no specified time period for the applicability of this tariff order. Tariff orders are revised periodically as per need and developments in the sector and so far, twenty-three amendments have been made to this tariff order.

## IV. Regulatory experience in Karnataka

The Commission had not introduced a Multi year framework in its Tariff orders. However it had attempted to fix targets for T&D losses for two years in its first tariff order. This experience is described below; the importance of the T&D issue in Karnataka is also highlighted.

### **Tariff Order – 2000 (issued on December 18, 2000)**

The Commission outlined various reasons for not initiating a full-fledged multi year regime. However, besides approving T&D loss target for FY 01, the Commission also laid down T&D loss target for FY02. These are set out in Table 11 below:

Table 11. **Two-year T&D loss targets set out by KERC in Tariff Order-2000**

Year	Target
2000-2001	31%
2001-2002	24%

The Commission directed that commercial loss should be brought down by 5.5% in FY01 thereby allowing T&D loss at 31%. For the subsequent year i.e. for FY02, the technical loss should also be brought down by 2% and commercial loss further by 5%, thereby mandating a T&D loss of 24% to be attained by the end of FY02.

### **Tariff Order – 2002 (issued on May 8, 2002)**

KPTCL was not able to reduce the loss to 31% in FY01. KPTCL stated that the target of reducing the commercial loss by over 50% (i.e. 10.5% to 5%) in a single year was aggressive, given the socio-economic set up. However, it envisaged meeting the target of technical loss as outlined in the Tariff Order-2000 in FY02; it had reported a loss of 33.5%, for FY02 which was later revised to 34.10%. Regarding the technical loss, KPTCL reported that it had already attained a reduction of 1.2% in FY02. This indicates that the distribution losses actually went up.

KPTCL proposed a loss of 32% for FY03. The Commission, however, did not agree with this estimate. After reworking it pegged the opening losses at 34.11%, and approved 28% as the target for end FY03.

In FY04 the Commission has determined the opening loss levels as 31.68% and has directed that this be brought down to 28% against the proposal of KPTCL to reduce it to only 30.62%.

### Status of compliance

The present position in respect of T&D loss is summarised in Table 12 below:

**Table 12.: T&D losses - Karnataka**

(the figures are in per cent)

Year	Proposed by KPTCL	Approved by KERC	Targets as per Tariff Order-2000	Actual
FY01	36.5	31	31	35.5
FY02	33.5 34.10*	31	24	34.9
FY03	32	28	-	31.68**
FY04	30.62	28	-	-

- Revised estimate
- \*\* Estimate – can vary later

The following points summarize the Karnataka experience:

- **The estimates of T&D losses were not stable. KPTCL revised its estimate for FY02. The Commission corrected the estimate proposed by KPTCL for FY03.**
- **The target set out by the Commission was not realized by KPTCL and the target was revised for the ensuing year.**
- **No forward fixing of the target was attempted for the next year.**

### The significance of T&D losses

The following describes the financial impact on KPTCL arising out of difference in the estimates proposed by it and estimates approved by the Commission for various components of revenue expenditure. The estimates of all the three years for which the Commission has assessed the Revenue Requirement have been taken into account and the results are summarised in Table 13 below.

**Table 13. Variation in cost estimates as approved by Commission for T&D losses and in Other components**

(figures in Rs Crore)

	FY01	FY02	FY03
<b>Cost component</b>	Costs	Costs	Costs
T&D losses	320	177	318
Other components*	55	87	97

\*include Employee cost, R&M expenses, A&G expenses, Interest & Finance charges, Depreciation and Other expenses for FY01. For FY02 and FY03, Provision for bad and doubtful debts is also included.

From this it can be seen that the variation in the revenue requirement on account of the different levels of T&D losses assumed by KPTCL and the Commission dwarf the difference on account of other costs. Further comparing the variation in T&D losses with the return on capital (Table 14) shows how even a slight difference in the figures of T&D losses can cause substantial erosion of the return on capital. Thus any MYT system must arrive at T&D figures that are neither too high nor too low. Failure to achieve this balance will lead to losses or excessive profits.

Table 14. **Return approved by the Commission and T&D costs for FY01, FY02 and FY03**

(figures in Rs Crore)

	FY01	FY02	FY03
<b>Return approved by KERC</b>	76	82.97	90.22
T&D loss variation costs	320	177	318

In its Third Annual Report, the Commission itself has expressed concern over T&D losses, stating that T&D losses is a major issue facing the sector and they have not been reduced despite many activities undertaken to reduce them. Any solution of the problems of the power sector in Karnataka has to find a solution to reducing these losses apart from the Regulatory problems of correctly measuring these and fixing reasonable targets.

Details of how the estimates in Table 14 were made are described below.

### **FY01**

In its tariff petition for FY01, KPTCL had proposed total sales of 18,180 MUs at T&D losses of 36.5%, thereby proposing energy purchase of 28,619 MUs. Against these estimates, the Commission had approved total sales of 18,766 MUs at T&D losses of 31% and energy purchase of 27,197 MUs

As stated above, the Commission had approved total sales of 18,766 MUs. Taking into account this level of sales, the energy purchase at T&D losses of 36.5% (as proposed by KPTCL) is 29522 MUs. The difference between the two estimates (29522 & 27197) indicates variation in energy purchase due to variation in T&D losses and difference is net of the variation in sales. The difference of 2355 MUs at Commission's approved average rate of power purchase i.e. Rs 1.36/kwh gives a cost estimate of Rs 320 crore.

The variation between the proposed and approved costs associated with other components of the revenue expenditure is Rs 55 crore.

### **FY02**

For FY02, KPTCL had proposed total sales of 18,891 MUs at T&D losses of 33.5% and energy purchase of 28,406 MUs. KERC, had approved total sales of 20,024 MUs after considering T&D losses of 31% and energy purchase of 29,020 MUs.

The energy purchase at sales of 20,024 MUs & T&D losses of 33.5% (as proposed by KPTCL) is 30,111 MUs. The difference between the two estimates (30,111 & 29,020) is 1091 MUs. The cost of this variation at the Commission's approved average rate of power purchase i.e. Rs 1.62/kwh comes out to be Rs 177 crore.

Difference between the proposed and approved costs associated with other components of revenue expenditure is Rs 87 crore.

### **FY03**

KPTCL has proposed total sales of 20776 MUs at T&D losses of 32%. The amount of energy purchase proposed is 30,552 MUs. Against this, KERC has approved total sales of 21,997 MUs after considering T&D losses of 28%. The amount of energy purchase approved is 30,552 MUs.

The Commission approved sales of 21,997 MUs and T&D losses of 32% (as proposed by KPTCL) gives an energy requirement of 32,348 MUs. The difference between the two estimates (32,348 & 30552) is 1796 MUs. The cost of this variation at Commission's approved average rate of power purchase i.e. Rs 1.77/kwh comes out to be Rs 318 crore.

The difference between the proposed and approved costs associated with other components is Rs 97 crore.

## **V. Institutional context**

The feasibility of introducing a MYT regime and its design would depend to a large degree on the institutional context. Thus an MYT regime would have different meanings for the public and private sectors. If the public sector is to take advantage of the commercial incentives provided by an MYT system, it must have a very strong commercial motivation. In the electricity sector, this is not the case, as the government's socio-economic objectives are also sought to be attained through this agency. The pressures of democratic impulses can also serve to blunt the commercial motivation of a public sector utility. Not surprisingly, there is no international experience of an MYT regime having been successfully implemented in a public sector context. The MYT system for a public sector therefore needs to be designed in a different way from the usual price cap or efficiency target system alone. Funding would need to be provided to the public sector units which are tightly linked to the achievement of designated efficiency targets and corresponding to this it is necessary to have incentives for the employees. This would require considerable co-ordination amongst the different financing agencies and government. At the same time a greater degree of operational freedom has to be given to ensure that the utility is able to meet the required targets.

For the private sector the MYT regime has to be seen as a system that is primarily to be used as one which provides suitable incentives and reduces uncertainty for the investor. Since the distribution business is going to be a monopoly, tariffs would be regulated. The challenge here would be to fix the principles of tariff settings in such a way that the investor knows clearly what would be his reward at different levels of efficiency. Further he would also be aware of how his total revenue requirement is going to be shared amongst the various consumer classes. Here a firm that is efficient must make profits that are considered reasonable as a private entity cannot survive for long in a loss making scenario. This has to be balanced with the need to ensure that consumers benefit from the process of reforms. In fact it is this which is the end objective of the reform process and the choice of private or public investment are alternatives to reach this objective. Thus for the private sector a balance has to be struck - profits cannot be too low or too high - neither can be sustained.

In the case of Karnataka, the government has already decided that privatisation will take place in the distribution segment. Accordingly the Commission has in the next section attempted to draw certain conclusions on how an MYT system can be

introduced in Karnataka, as a means of furthering the objectives of privatisation of distribution, laid down by the government. Since this would take time, the manner in which this can be done for the public sector in the intervening period is also discussed.



## VI. Conclusions

### Issues

The following issues need to be addressed:

- i) What should be the objectives of a MYT?
- ii) What are the various types of a MYT and how would they achieve the objectives of introducing a MYT?
- iii) What should be the objectives of a MYT for the public sector? What should be the components of such a MYT?
- iv) What should be objectives of a MYT for the private sector? What should be the preconditions for successful introduction of a MYT in the private sector? What are the components of such an MYT?
- v) What should be the respective roles of the market, the Government and the regulator in the introduction of an MYT for the private sector? What changes are required in the present institutional arrangements, including legislative changes?
- vi) To what extent can a MYT system be completely automatic and to what extent is it necessary to build in flexibility in the system?

### Objectives

It is first of all necessary to be clear as to what is being sought to be achieved by introducing an MYT system or shifting to one with greater predictability and less room for judgement. There were three objectives listed in section I.

Of these, the first objective of reducing regulatory effort is unlikely to be achieved in any system. As has been seen in the discussion of UK there is a long process of analysis and consultation preceding the actual decision. Further, as may be seen from the experience of Chile and Argentina, post decision disputes and changes can also arise leading to additional regulatory effort after the tariff order. It therefore seems unlikely that any reduction in regulatory effort is likely to take place. It might seem that some reduction can take place if the Delhi model is adopted. While there would be no need for the Regulator to decide the AT&C targets annually, additional effort would be required to see whether the figures are being correctly reported (since only a part of the efficiency gains are being retained by the private investor). On the whole a significant reduction in regulatory effort appears unlikely.

Reduction of uncertainty depends upon the risk allocation between the utility and the other players in the Sector. There would definitely be a reduction in uncertainty to the extent that the regulator is bound by MYT principles or formulae laid out in advance. Such principles/formulae would restrict the scope of exercise of the regulators (arbitrary) discretion. Of course, where such principles/formulae are seen to be clearly out of sync with the emerging and changing scenario, they would need to be changed. The incentive effect of an MYT regime would be significantly dependent upon whether this is being done in a public sector context or a private sector context. As has been seen in the previous sections an MYT regime will be different between a public sector and a private sector context. As a system of providing commercial incentives it would be successful only in a private sector context.

#### *MYT in the Public Sector*

In the public sector, MYT can succeed only as a mechanism for planning or for establishing benchmarks for reform. Thus only the objective of removing uncertainty can be met so long as ownership remains with the public sector. Since the process of privatising distribution in Karnataka is going to take time the intervening period should be used to improve the information base and attempt an MYT system for the public sector. This will have to be a much more flexible arrangement than for the private sector. It will have to be a system of setting efficiency targets , principally for the T&D losses. Thus it will be a variant of the type 2A MYT, with provision for annual review of targets, either suo motu by the Commission or at the request of utilities or Government.

To start with the targets could be fixed for 2-3 years with annual reviews and modifications where necessary. The efficiency improvement targets must be laid down not only as a regulatory exercise, but also as pre conditions for accessing funding from Government of India as well as various financial institutions, domestic and multilateral. Unless such a mechanism is worked out, the lack of commercial orientation of the public sector will continue to act as a barrier to efficiency improvements. Perhaps it is this difficulty that has led the Government of Karnataka to opt for privatisation of distribution.

*MYT in the private sector*

In moving to the private sector, it would be necessary to devise a system that will be able to achieve both the objectives of reducing uncertainty and providing a stable system of incentives. The World Bank had employed consultants who had given the framework of an MYT. This also corresponds to a type 2 A MYT system. It however requires a very precise formulation of the MYT since it seems to suggest that once the MYT is put in place, subsequent changes in the tariff can be done automatically by the utility itself without any need for regulatory approval. Whether such an automatic system can indeed be introduced would be discussed later. However even if a less rigid system were to be devised, certain preconditions would be necessary to ensure that these objectives of eliminating uncertainty and providing stable incentives can be attained.

First and foremost, there will have to be a much more reliable system of data collection. In Section V, it has been seen that the attempt to fix multi year targets in Karnataka even for one year in advance have not been successful. While a certain degree of deviation is to be expected, clearly for the most important parameter – T&D loss – a major issue is lack of reliable data. At present, there is no reliable means by which one can clearly distinguish between genuine efficiency improvement, and those caused by shifting assumptions and data inaccuracies. The extent to which there is uncertainty embedded in the present system of data collection can be seen from the fact that for the year 2001-02 KPTCL had initially projected the T&D loss at 33% and a few months later this was revised to 34.9%.

Again, Government of Karnataka had approved a Financial Restructuring Plan (FRP) for the power sector in the state, which also envisaged several financial performance targets for the next 10 years. . A comparison with actual performance indicates that whatever was assumed in the FRP has not been achieved and the subsidy requirements are much higher than what was envisaged in this plan. This has been brought out in the Tariff Order, 2002 as well as in the Commission's Annual Report, 2001 – 2002.

The experience of UPERC in fixing multi-year targets is valuable. They have also tried to use the “DEA” approach in fixing norms and benchmarks. This has not yielded much practical result as the multi-year targets were fixed in 2002 and have not been revised even after the study using the “DEA” approach was completed. In fact, as

the UPERC itself has noted, the results of the study show that the targets already set are too modest. It must also be emphasized that constructing these models can be very expensive – as noted in section II, the Peru model cost about Rs. 50 crores to develop. Without an adequate database, these sophisticated models are unlikely to yield results that can provide a guide to actual decision making. For the present context in Karnataka, experimenting with MYT would have to be in the public sector with a limited database. In this situation, it would be better to start with simple models and use more sophisticated methods only when there is greater confidence in the data and our own understanding of the possible pace of improvement.

Apart from improving the information base, it is also necessary to give private investors the confidence that they would be given the required operational freedom to disconnect unauthorised consumption and also for those who do not pay on time.

The other major necessary precondition is a clearer enunciation of the policy towards agricultural subsidy. Given the present difficulty that the Government is facing in meeting its subsidy obligation, investors would have to be satisfied that either the subsidy is going to be reduced and that the enhanced rates from farmers can be collected or that the Government's capacity to meet its obligation is going to be enhanced.

Finally there has to be a clear understanding of the respective roles of the market, the utility, the government and the regulator.

It seems too early to introduce an MYT system at present for the private sector. If an MYT system is introduced and it is found that the targets or the essential features of the design are to be revised, it would only jeopardize the entire process of reforms, robbing it of credibility.

Alternatively an MYT system based on a high degree of uncertainty would either have to be reopened or would lead to bids which are very conservative in terms of efficiency improvements.

The Commission's own experiment with fixing T&D losses for two years has also been discussed in section V. It would therefore appear that given the present level of information and understanding of the power system, any long term calculations are likely to go awry.

### *Risk, Uncertainty and the need for Regulation*

The problem with the electricity sector is not one of just information - there is, as in other infrastructure sectors, a large degree of uncertainty arising from the very nature of the sector. This uncertainty would remain even after extensive improvement in information levels.

In this connection it would be useful to distinguish between risk and uncertainty. In a recent article <sup>29</sup>, the difference between the two has been used to understand the need for incomplete contracts and institutions to address these issues. This has been stated as follows:

*"The plain presence of risky events can without doubt, be covered by contingent contracts – however, for transaction costs to be substantially present, there has to be another element which impairs the ability to write contingent contracts. To get a sense of this other element, it is useful to refer to the distinction between risk and uncertainty suggested by Frank Knight. Risk, for Knight, was the category of known chance whereas uncertainty was perceived as being more diffuse and immeasurable in character, so much so that it is very difficult to write up a contract to eliminate it. Such uncertainty can arise due to an inability to quantify the great unknowns, or because of the difficulties associated with disclosure of privately held information. Both types of lack of knowledge add to the cost of decision-making. **In fact, it is this element of uncertainty that perhaps explains why society is not organised around a collection of complete contracts but about a series of institutions – institutions that are centered on the notion of a residual decision-maker with the power to decide in unspecified circumstances.**" (emphasis added)*

#### *Experience of long term contracts*

What does experience in the infrastructure sectors tell us about the completeness or otherwise of contracts? As has been seen earlier, in the Indian experience, the telecom contracts had to be reopened because of the very high bids made for various circles. In other parts of the world also there have been several instances of long term contracts for infrastructure contracts having been opened up.

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<sup>29</sup> An Economic Analysis of Judicial Activism, by TCA Anant and Jayvir Singh, Economic and Political Weekly, October 26, 2002),

A recent World Bank study<sup>30</sup> estimates that about 74% of transport concessions and 55% of water concessions in Latin America were renegotiated in the 1990s. This study also highlights that since the late 1980s, excluding the telecommunications sector, over 40% of the concessions appear to be renegotiated and 60% of these renegotiations took place within 3 years of the award of the concessions. It would be useful to note that in principle, the contract agreement in case of these renegotiated concessions was for a period of 15 to 30 years. It is interesting to note the other conclusions of this study (based on 307 projects in the water and transport sectors in five countries and further focussing on firm led re-negotiations).

- Re-negotiations have peaked in certain years associated with major economic and political developments in those years
- Existence of a Regulatory body reduces the occurrence of subsequent renegotiations
- Price cap schemes are conducive to more renegotiations probably due to their greater riskiness and fragility to shocks

Although this study does not cover the Electricity Distribution experience, the conclusions are relevant on account of similar problems. As has been seen in Section II, there have been cases of reopening of contracts and disputes - these appear to stem from the basic difficulty of trying to eliminate uncertainty through firm contracts. As time elapses and the fundamental assumptions of the contracts are found to be incorrect, there is need to re-negotiate as one or the other party finds the contract impossible to perform.

#### *Role of Government and Regulator*

In this context, the other issue which is relevant is the respective roles of government and regulator. There is a need to separate the policy, ownership and regulatory functions of the Government. Clear conflicts of interest arise when the Government is the policy maker, operator (in the form of owner of public utilities) and the

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<sup>30</sup> J.Luis Guasch, Jean-Jacques Laffont and Stephane Straub, 2002 Renegotiation of Concession Contracts in Latin America, World Bank, Washington D.C

regulator. In particular, direct control of sector regulation by the Government when it is also the operator would increase regulatory risks and deter private investors. An independent regulatory framework is needed to foster economic efficiency, promote competition and mitigate risks for private sector participation. As has been seen in the previous paragraphs uncertainty is inherent in the economy and cannot be merely addressed by setting out a long term contract or a formula for periodic adjustments. The Regulatory mechanism is required as an institutional response to address the problems that will arise on account of the inherent uncertainty that surrounds any long term contract, which by its very nature has to be incomplete.

At present the role of the government in the tariff setting process in Karnataka has been restricted to framing of the legislation and providing subsidy to the farmers. Beyond this the regulator has wide freedom in the tariff setting process. The government has a dominant role in the power sector in Karnataka, in matters other than tariff. It owns most of the generation and all the transmission and distribution. Clearly if distribution has to be privatised it would be upto the government to take the final decision on timing and methodology.

For the limited purpose of MYT in the private sector context it would appear that while the government can lay down the broad principles, it would be for the regulator to work out the actual numbers and details. This would be in line with the present arrangement where the regulator works out the tariff in accordance with the law and any directives that may be issued by the State Government. International experience suggests that it is possible to use markets and competition to set important benchmarks

#### *MYT System for Karnataka- private sector*

For the limited purpose of the MYT system to be used in a private sector context it would appear that government's role would be to lay down the broad structure of the privatisation process, similar to the one used in Delhi. For the various components of the Revenue Requirement, it would be best if there is an annual review, based on an MYT framework in which the most contentious and crucial parameter – the T&D loss – is determined through a bidding process as was done in Delhi. The reason for preferring the bidding system is that these losses contain a large element of theft, which can be reduced by better management. Unilateral determination of these is more likely to give room for renegotiation. The potential investors would be best

placed to determine how much effort can be put in and what results can be expected.

While the broad policy should be laid down by the government details like the opening loss levels and the minimum acceptable loss levels should be specified by the Regulator. This would be desirable because the regulatory process has acquired a certain legitimacy owing to the transparent process adopted. In addition, with the experience of the last three years the Commission is in a good position to judge the reasonableness of loss levels, either present or those to be achieved in the future.

Quite clearly for such an MYT system to succeed there needs to be sufficient competition. Without competition it is possible that very low levels of improvement are specified. Thus in Hyderabad the T&D losses are said to have come down by about 20% in two years, whereas in Delhi a 17% reduction over five years has been agreed to with the new private sector distributors. It is possible that with more competition, a higher level of loss reduction could have been built in to the privatization in Delhi.

While it would be desirable to have a completely automatic MYT system, (that is, one which permits the utilities to revise end consumer tariffs without the need for any further approval from the regulator) it may not be possible to introduce such a scheme for the private sector to start with. Rather a system based on the Delhi model would be better, with the AT&C loss determined by the market but with provision of annual reviews to assess the other cost components. Gradually these other cost components can also be reduced to a more mechanical system, but with some room for regulatory intervention to deal with unforeseen factors. Simultaneously Government would also have to specify a long term policy on agricultural subsidy to reduce the uncertainty on the revenue side. Such a system would have the advantage of having a flexible system with a transparent mechanism to resolve unforeseen contingencies. As has been seen in the previous sections international experience is replete with such cases. Given the high dependence of Karnataka on hydro power there are even more chances of this happening here. Further the financial weakness of the Electricity sector makes it more vulnerable to the impact of such unpredictable events as a drought. These contingencies can never be predicted and thus require an institutional mechanism. The Commission believes that as more information is made available to the public it would be easier to find solutions in a flexible framework. In contrast a very tight scheme would have the advantage of clarity for stakeholders but would also have



the disadvantage of rigidity and breakdown if no room is provided for mid course corrections. The dangers of a flexible mechanism leading to arbitrariness can only be overcome by having a credible and transparent mechanism of decision making, with extensive public consultation.

To start with the MYT in Karnataka will have to be introduced in a public sector context. This experience in the public sector regime can then be used to graduate to a more full fledged system for the private sector.

This should be attempted only after it has been demonstrated that the gaps between projections and actuals are within limits that can be tolerated. Even when this is done it must be emphasised that an institutional mechanism is required to deal with the inherent problem of uncertainty and incomplete contracts. The change in the governance structure brought about through the introduction of regulation had as its objective the introduction of transparency and an apolitical system of decision making. It is such a system of decision making that can effectively deal with the problems of incomplete contracts.

*MYT and Distribution Margin (DM):-*

The Government of Karnataka has announced that the DM concept would be used for the privatization of distribution. Bidding is to be organized on the Incentive change required by private investors for revenue collections above the Minimum Collection requirement. Bidders would not be able to provide informed bids unless they have some idea of the likely tariff trajectory, especially since a substantial part of their return on equity is to come from the Incentive charge and only a small portion is to come out of the Base Revenue that is guaranteed to them. There is also a detailed and comprehensive risk allocation scheme between the Government, private investors and consumers that has been hinted at. The main points made out above hold even when the DM approach is adopted.

The long-term objective is a stable MYT regime that provides incentives for efficiency improvements at the least regulatory cost. It is hoped that this paper would serve as a useful input into the process of achieving greater clarity on how best this objective can be achieved in the fastest possible time.

