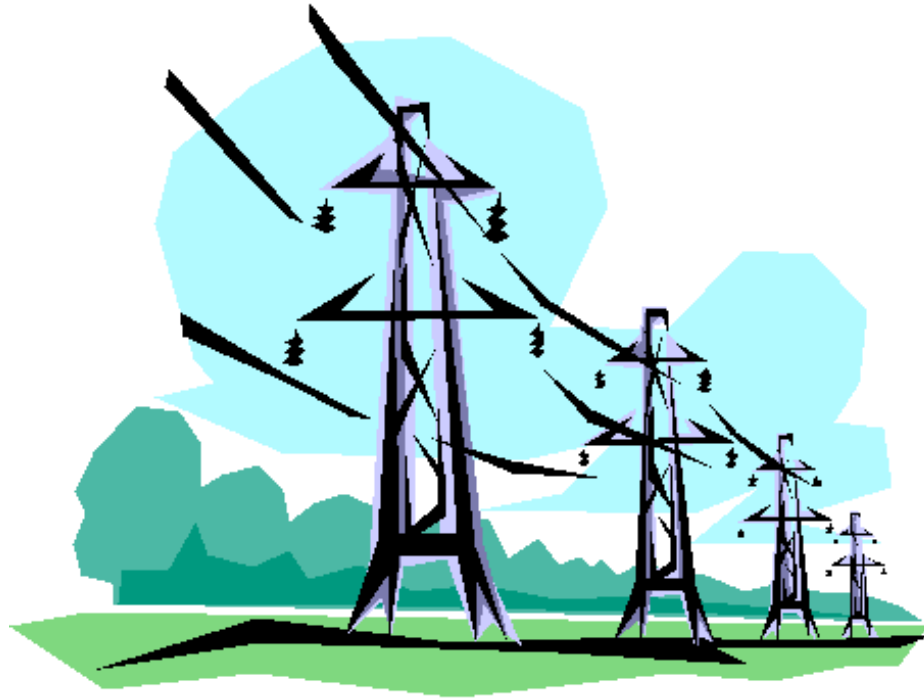


# DISTRIBUTION POLICY COMMITTEE REPORT



**MINISTRY OF POWER**

**MARCH 2002**

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## **1 FOREWORD**

Recognizing the critical importance of reforms in the distribution sector, the Ministry of Power, Government of India, constituted a committee to study the issues related to distribution sector including private sector participation in the distribution sector. The committee under the chairmanship of Shri Ashok Basu, Secretary, Ministry of Power, comprised:

1. Shri J.L.Bajaj, Chairman UPERC
2. Shri Jairam Ramesh, Deputy Chairman Planning Board, Karnataka
3. Shri K.V. Kamath, CMD ICICI
4. Shri Deepak Parekh, Chairman IDFC
5. Dr Uddesh Kohli, Ex CMD PFC
6. Shri R.V. Shahi, CMD BSES
7. Shri Sumantra Banerjee, MD CESC
8. Shri Charles Lenzi, AES CESCO
9. Shri T.L. Sankar
10. Principal Secretary Power, GoNCT Delhi
11. Principal Secretary, Energy, GoAP
12. Shri S.J. Coelho
13. Shri V.V. Desai
14. Shri Birendra Kumar, MD&CEO, SBI Caps Market Limited
15. Shri Rajendra Singh, ex CMD, NTPC.
16. Shri G. Sanjeeva Reddy, President, INTUC
17. Shri Ajay Shankar, Joint Secretary, Ministry of Power- Member Secretary,

The Terms of Reference of the committee are as follows (Annexure 0):

- (a) Review of Coelho Committee recommendations and their implementation;

- (b) Review of privatization of distribution in Orissa and experience of other distribution licencees in India;
- (c) Suggest viable strategies/measures for attracting private sector participation in distribution with special reference to:
- methodology of seeking private sector participation;
  - handling of past liabilities and making of the privatization offer attractive for potential investors;
  - regulatory framework and policy;
  - issue of introduction of open access in distribution;
  - possible linkage of private investments in generation with taking over of responsibility for distribution; and
  - increasing number of potential investors.

While doing so the Committee would also take into account international experience specially in other developing countries and transition economies.

- (d) Recommend appropriate management structure of distribution in rural areas with special reference to:
- Feasibility of attracting private sector investment in distribution of large rural areas; and
  - Decentralized management through Panchayats, Cooperatives/Users Associations/Franchisees.

While doing so the Committee would also take into account experience of other developing countries.

- (e) Measures for improving management of distribution in the SEBs with special reference to management and incentive systems and enforcement of accountability; and
- (f) Any other aspect relating to distribution that the Committee considers relevant.

After initial discussions, the following three sub-committees were constituted which went into the following areas in depth.

- Sub-committee headed by Dr. Uddesh Kohli to study the issues related to "Distribution System Reform".
- Sub-committee headed by Shri R.V.Shahi, Chairman and Managing Director, BSES to study the issues related to "Privatization of Electricity Distribution".
- Sub-committee headed by Shri T.L.Sankar to study the issues related to "Management of Distribution in Rural Areas".

After the sub-committees had completed their analysis, these were then considered by the full Committee. The Committee would like to record its appreciation for the painstaking and comprehensive analysis of the very complex issues and problems that confront the sector undertaken by the three Sub Committee Chairman and the Members.

The committee records its appreciation of the representatives of ICICI Energy Group in the preparation of this report.

## **2 Summary of conclusions & recommendations**

Distribution business in India has suffered from a number of problems, which have accumulated in the past fifty years. These problems primarily include lack of commercial orientation, excessive T&D losses, distorted tariff policies etc. The distribution operations in its present state, if allowed to continue, are likely to deteriorate further. Recognizing the current state of the sector, a number of committees have been formed and several important suggestions have been made for improvements (section 3.2.14). However, implementation of the suggestions has been uneven across the country and significant progress towards attainment of efficiency gains is yet to be made. Although there have been practical and real life limitations in the implementation of the recommendations, the most significant factor affecting implementation has been the lack of political will. There is an urgent need to evolve a consensus among all states towards reforms in power sector, which backed by resolute political commitment and action can transform the sector from its current state.

With a view to achieving the objective of commercial viability, there would be a need to evolve a well planned strategy for improvement of the distribution sector. The strategy would need to focus on the root causes of the problems afflicting the sector and identify measures for improving the same. A viable strategy would need to encompass improvements in efficiency through various measures including better management, suitable investments etc. (section 4). Since capture of efficiency gains induced through an orientation driven by commercial principles is the key driver, there would be a need to insulate the sector from the sometimes-dysfunctional compulsions, of the political process.

An important segment of the strategy for improvement of the distribution sector is rural supply. The nature of rural supply with higher costs, lack of ability to pay as well as the socio-economic objectives would necessitate subsidization to continue for some time. In this context, the strategy for rural supply would need to be guided by the principle of 'relative supply costs'. The nature of the rural sector coupled with the objectives would necessitate a customized approach for the rural segment (section 5).

Distribution reforms is considered to be of utmost importance if the electricity sector is to turnaround and become self sustaining. For this purpose, alternative models like co-operatisation, corporatisation etc. can be attempted, the bottom line being that the sector must achieve commercial viability in two to three years.

Where improvements in efficiency of operations a

re difficult within the current ownership framework, private sector participation in distribution would be an objective which state governments may need to seriously pursue. In this context, the primary focus of policy must be on creating the conditions that are essential for providing an investment framework, wherein the investors would see value in investing in the distribution business. As a result, considerable amount of preparatory work would need to be undertaken preceding privatization to create a conducive environment.

Privatization of distribution needs the adoption of an appropriate model (Annexure 4) and a suitable independent regulatory system. Further, the pace of privatization would depend upon the model adopted. Experience in Orissa and in other states has highlighted the issues that need to be addressed for an appropriate investment framework. In Orissa, the entire distribution area was privatized at one instance. It has been found that privatization can also be attempted alternatively by privatizing the high load urban areas first, which can be achieved without tariff shocks or subsidies and privatization of rural areas at a later date. Micro-privatization of rural areas may also be attempted (section 6). However, the process of distribution privatization would necessarily have to focus on resolving the transition issues (section 9) related to distribution operations such as past losses, receivables, subsidy etc.

The appropriateness of any given form of privatization, as well as its pace would be determined by the specifics of individual state administrations (e.g. political commitment, implementation capacity), as well as the circumstances of respective SEBs (e.g. financial situation, consumer profile, system performance). However, certain generic issues would have to be taken into account in developing a policy towards privatization of distribution operations. The important measures / actions which would be required to be expedited through reforms would include measures for identification and measurement of losses, enforcement related issues, rationalization of staff resources, financial restructuring, loss reduction etc.

a) Further, it would be important to develop time frame for the various actions in terms of what can be achieved within six months (short term), over a period of twelve months (medium term) and over a period of eighteen months (long term). It is likely that few of these actions that are initiated, may not be completed within the suggested timeframe on account of various reasons including logistics management, external environment changes etc. and may continue well beyond the time period indicated. However in such a scenario immediate initiation and completion on the other actions would still be needed to provide important signal to various stakeholders about the commitment of the authorities to the reform process. The measures suggested are beneficial on their own also.

The various actions pertaining to the above strategy are as follows:

## **2.1 Improvement in efficiency of operations**

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### ***2.1.1 Metering (Section 4.2) - Short Term***

An important requirement for fully converting the energy flows into cashflows is to institute metering of all consumers. There should be a conscious effort to overcome the various problems encountered in implementing earlier programmes on metering. Electricity accounting in the distribution circles could be introduced even before 100% metering is achieved to focus on reduction and ultimate elimination of theft. Metering at all 11 kV feeders coupled with selective metering at distribution transformers would be a good starting point for Electricity Accounting till 100% metering at consumer level is completed. Further, a metering plan should be drawn to complete metering at all levels.

### ***2.1.2 Improvement in efficiency of operations (Section 4) - Short Term***

Actions that would enhance operations, improve efficiency levels and increase accountability such as creation of responsibility / profit centers need to be pursued.

Effective energy audit where energy flows and revenue are correlated on a contemporary basis with the use of Information Technology (IT) is essential for effective action against theft and avoidable technical losses. The sector has yet to benefit from the enormous potential of IT. These measures would be beneficial even if the state governments were planning to undertake privatization of distribution.

For bringing in commercial orientation within the existing framework, alternative models like co-operatisation, corporatisation etc. can be attempted. The bottom-line being that the sector must achieve commercial viability in two to three years.

### ***2.1.3 Legal changes - Short Term (Section 4.1.4, 9.1.7)***

Indian Electricity Act (1910) empowers the licensee to disconnect the supply of power if a consumer neglects to pay charges. Section 39 of this act also provides for penalties for theft of power. These provisions need to be enforced vigorously. State governments should provide law and order support to licensees/ SEBs to enforce these provisions.

If the enactment of Electricity Bill which has been introduced in the Parliament, is delayed then the government should consider promulgating an ordinance bringing suitable amendments in the existing law to provide for stringent penalties against theft of power. To provide a revenue focus rather than criminal prosecution, it is necessary to have a provision similar to the provision of assessment as provided in the Electricity Bill 2001. Under this provision the officer of licensee or Board can be empowered to assess the quantum of theft committed by a person and raise the demand from such consumer.

### ***2.1.4 Empowerment and training (Section 4.1.2) - Medium Term***

Sensitization seminars should be organized to enhance professional expertise and leadership needed by the electricity industry. In-house training programmes should be organized by SEB/State Utilities on a regular basis for distribution circle personnel to keep them up-dated about technological developments. This should be combined with an effective communication and outreach program for average consumers whose support and co-operation is vital.

## **2.2 Rural Electrification**

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### ***2.2.1 Management / funding of rural electrification plans (Section 5) - Short Term***

There is a need to implement a customized approach for the rural segment. This would require separation of the main stream operations from the rural operations and adopting specific policies and plans for rural operations. The approach to be adopted to accelerate the pace of rural electrification should be based on the following principles:

- a) Rural electrification should be treated as part of the socio economic development plans of the village and the investments should be supported from the budget preferably as a grant;
- b) Rural electrification should preferably be managed in a decentralized manner through rural cooperatives or rural entrepreneurs approved by the local communities or through franchisees or through panchayats; and
- c) In the case of pumpsets, subsidy can be operationalised through:
  - Sale of power to decentralized rural distribution entity at subsidized rates with the subsidy being provided to the utility; or
  - Grant of subsidy directly to rural consumers either as a collective or as individuals.

## **2.3 Privatization of distribution business**

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### ***2.3.1 Guidelines for regulators (Sections 8.4) - Short Term***

So far the Regulatory Commissions have been following the annual tariff fixation policy. This policy has its drawbacks in terms of uncertainty and it does not adequately incentivise efficiency gains. The central government should come out with a Tariff Policy. This is important, as this would help the regulators in the country in maintaining a consistent approach towards tariff determination and also act as a guideline for the Regulatory Commissions for the tariff determining process.

### ***2.3.2 Agencies for determining baseline data (Sections 6.3.1.4, 9.1.1) - Short Term***

Detailed information on technical, commercial, administrative, economic and accounting aspects would need to be prepared and incorporated in the tender documents. In relation to the initial or starting conditions it would be important that the government and the private investor agree upon the values for the same. In order to determine the baseline data, which would serve as the starting point, agencies may be appointed prior to privatization. State governments may identify the agencies to undertake the assignments.

### ***2.3.3 Incentivisation for privatization (Section 9.1.8.2) - Short Term***

Under the Mega Power Policy, the benefits from cheaper power of mega projects is to be given to only those states that privatize distribution in cities with population over one million. This needs to be adhered to. Extending this to cover privatization of cities with population over five lakhs may be considered.

### ***2.3.4 Determining incentives for loss reduction (Section 9.1.1) - Short Term***

Since, priority for SEBs as well as the private investor is to reduce T&D losses as soon as possible, it would be appropriate to provide incentives to the investor for any additional loss reduction above the target set. The incentive could be a percentage of the savings arising on account of loss reduction above the target level as additional profit.

### ***2.3.5 Marketing of privatization benefits (Section 6.3.1.7) - Medium Term***

Considerable preparatory work would be needed to be carried out in two areas viz. conceptualizing a dynamic approach for private sector participation and result oriented marketing to potential investors. The marketing function would be essential to attract more players including foreign players. The consumers also have to be convinced of the benefits of privatization.

### ***2.3.6 Identifying agencies to take up distribution (Section 6.2.4) - Medium Term***

In India, presently there are very few private entities involved in the business of distribution, key players being BSES, TEC, CESC, AEC and SEC. For rapid and competitive privatization of distribution business, it is imperative that there is larger number of players in the sector. The entry of International players into this sector being limited as of date, it may be worthwhile to involve additional entities into this sector by encouraging them to diversify into this sector.

### ***2.3.7 Institutional strengthening of SERC/CERC (Section 8.5) - Medium Term***

As indicated earlier, a key issue impacting the effectiveness of the functioning of the CERC and SERCs, is the issue of institutional strengthening. This would require attracting people of high caliber and appropriate experience. Incentives should be provided to the right kind of people for joining the Regulatory Commissions in the form of a personnel policy statement, career management path and benefits.

### ***2.3.8 Asset valuation of distribution companies – Medium Term (Section 6.3.2.4)***

Distribution business is characterized by a small capital base vis-a-vis the huge turn over associated with the business. As in case of other businesses, Business Valuation is one of the approaches, which may be used in the valuation of distribution business. However, distribution being a regulated business, regardless of the approach adopted for valuation at the time of formation of the distribution companies, a pragmatic view would be required (including the valuation of the land and other assets). This is necessary to avoid the need for steep and unacceptable tariff increases after privatization which has been one of the lessons from Orissa distribution privatization experience.

### ***2.3.9 Transparency in the procedural aspects of privatization - Medium Term (Section 6.3.3)***

Although there are a number of approaches including bidding on the basis of T&D loss reduction path, share price, subsidy requirement etc., the process of inviting private investors and the criteria for selection should be clear and transparent to all the stakeholders especially the media and the public.

### ***2.3.10 Creation of Power Sector Reform Fund - Medium Term (Section 9.1.3)***

The commitment of the state government should be firmly institutionalized through the establishment of a Power Sector Reform Fund (PSRF). The state government should credit privatization proceeds into the PSRF for the sole purpose of restructuring the power sector and the same should not be used for other expenditures of the government. By removing such uncertainties, the state government would be able to realize a better value at the time of privatization.

### ***2.3.11 Capital project/ working capital funding (Sections 9.1.4, 9.1.5) - Medium Term***

The distribution companies in India are characterized by huge transmission and distribution losses. It is imperative that substantial investment

would be required to improve the system. World Bank, Asian Development Bank, International Finance Corporation, Power Finance Corporation, etc. should be approached to support investment.

### **2.3.12**      *Deciding on the model for privatization (Section 6.3.1.8, Annexure 4) - Long Term*

The long-term strategy for privatization would include selection of privatization model for the state. However, appropriateness of any given form of privatization, as well as its pace would be determined by specifics of individual state administrations (e.g. political commitment, implementation capacity), as well as circumstances of respective SEBs (e.g. financial situation, consumer profile, etc.). This would have to be finalized by the respective states.

### **2.3.13**      *Deciding on the transition path (Section 9.1) - Long Term*

It would be futile to imagine that the mere act of privatization would solve all the problems inherent in the distribution system immediately. A transition period would thus be essential for the entity to transform itself from the present status of poor quality and financial sickness to a well-managed profitable entity. The transition path set for the private investor would need to consider the following major issues:

- Cost related issues : To keep the input costs under control till the end of the transition period and to prevent tariff shocks, level of returns to state owned transmission and generation business may have to be reviewed carefully; and
- Revenue gap and arrangements for financing the same: During the transition period, the revenue deficit along with the proposed investments in the sector would have to be met. A definite plan for meeting the requirement of funds during transition has to be agreed upon by the state government and the private investors prior to privatization.

## **2.4 Incentives from Centre to States**

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Reforms in distribution sector, primarily being the prerogative of the states, there is need for the centre to incentivise the states. This could be achieved by linking progress in reforms on the basis of the above action plan to benefits from the activities of CPSUs like NTPC, NPC, NLC, PFC, REC and PGCIL activities as well as funds from programmes like APDRP, AGSP and AREP.

<b>3 Present structure of distribution and need for review</b>
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### **3.1 Present Structure**

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Power is a concurrent subject with the involvement of both the central and state governments. Distribution, however, is the exclusive responsibility of the state governments. Central Power Sector Utilities (CPSUs) such as National Thermal Power Corporation (NTPC), National Hydro-electric Power Corporation (NHPC), North Eastern Power Corporation (NEEPCO), Power Grid Corporation of India Limited (PGCIL) etc. were created by Government of India to help the states. The State Electricity Boards (SEBs) which were formed under the Electricity Supply Act, 1948 are responsible for generation, transmission and distribution of electricity within the state. The development of the sector till the time of liberalization was envisaged at the state level through the monopolistic SEBs with the CPSUs supporting SEBs. The growth and development of the electricity industry has been steady and commensurate with the growth in the Gross Domestic Product (GDP). The elasticity of electricity consumption with respect to GDP for the period 1980-81 to 1998-99 has been about 1.41.

Over a period of time, on account of a number of factors, which have been highlighted later and also highlighted in Annexure 12, the operations and financial condition of the SEBs began to deteriorate and impose increasingly unsustainable burden on the finances of the state governments. In order to improve the sector performance and to mobilize investments for its development, the Government of India introduced the policy of private participation in 1991, as a part of its economic reforms program. The initial policy focussed on private sector participation in generation. There has, however, been only modest addition to generation capacity from the private sector. Presently it accounts for about 10 % of the total capacity of about 104,000 MW. The distribution sector is still a monopoly of the SEBs with very limited involvement of the private sector. Pre-existing private licensees such as Tata Power, BSES, CESC etc. represent barely 3% of the total distribution business in the country. New private licensees have been scarcely added in the last few decades.

Prior to the formation of the Regulatory Commissions, the Central Electricity Authority (CEA) was the industry's chief regulator. The authority of the CEA was exercised through the process of grant of techno-economic clearance and the stipulation of norms. CEA was also responsible for the tariff-related issues of the central generating stations. At the state level, the state governments and the SEBs were responsible for the regulatory function of the sector. Over the years, tariff decisions in the states have become increasingly subjected to compulsions of political populism with financial viability not receiving due attention. With the reforms being undertaken in various states, State Electricity Regulatory Commissions have been formed. The function of tariff setting at the central level is now under the purview of the Central Electricity Regulatory Commissions (CERC). At the state level it is under the purview of the State Electricity Regulatory Commissions (SERCs).

### 3.2 Need for review

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The performance of power distribution entities in India, as in several developing countries, is characterized by considerable inefficiencies, which has resulted in poor quality of service and huge financial losses. The performance of the SEBs has been deteriorating over the past few years. Commercial losses are estimated at about Rs. 26,000 crore during 2000-01. Gross subsidy, which was Rs. 7,450 crore in 1991-92, is estimated at about Rs. 38,000 crore in 2000-2001. The pricing mechanism has led to a situation where, on average for the whole country, the tariff provides for only about 69% (in 2000-01) of the cost of supply of power. This has led to SEBs showing an average rate of return (without subsidy) of @ -33.8 % in 1999-2000 indicating further deterioration from -12.7% at 1992-93 levels. As on March 31, 2001, the total outstanding payable by SEBs to central power sector and related entities was about Rs. 27,760 crore.

The problems with the present distribution structure are highlighted as follows:

### ***3.2.1 Lack of commercial orientation***

Traditionally the supply of electricity has been viewed as a public service and the overall operations of the SEBs have been characterized by a lack of commercial orientation. One reason for this is that since inception the SEBs have been focussing towards attaining the objectives of government of providing electricity to larger sections of society and to agriculture at low rates. The second but the more important reason for the lack of commercial orientation has been the absence of incentives for improving efficiency. Under government ownership, performance based rewards or penalty for the staff and the management of the SEBs is weak. This has a greater impact on the distribution operations, which employ a large number of staff and require proactive supervision and management to achieve efficiency. As a result, the performance on the distribution side has remained poor with high levels of technical and commercial losses.

### ***3.2.2 Transmission & Distribution (T&D) losses***

The technical and commercial losses in 2000-01 were officially reported to be about 25%. The reported figures of distribution losses underestimated the real extent of energy lost (or unaccounted for) because a substantial part of the losses were being shown as unmetered agricultural consumption. Based on the experience in some states, the actual levels of losses are much higher at about 40%-50% including about 15%-20 % of technical losses along with 25%-30% of commercial losses.

Commercial losses are a euphemism for theft. Ministry of Power has for the first time recognized the magnitude of the problem and has indicated that theft of electricity is estimated to cost the country Rs. 20,000 crore per year. The technical losses are mainly due to over extended and overloaded low voltage distribution lines and weak distribution network. The commercial losses or theft are due to 'illegal tapping' of low voltage lines, faulty metering and underbilling.

### ***3.2.3 Political involvement***

The SEBs were formed under the Electricity Supply Act (ESA), 1948. Since the ownership of the SEBs has been with the government from inception there has been significant involvement of the government in the managerial, operational, and commercial decision making process of the SEBs. The ownership structure has also resulted in effective control of the SEB's lying with the political executive of the day who in turn has not been able to insulate the functioning of the SEBs from the conflicting and competing claims of the political process. Further, the increasing level of political involvement in the day to day operations including postings, transfers, procurement and action against errant employees and delinquent consumers. has adversely affected the functioning of the SEBs.

### ***3.2.4 Tariff setting***

Tariff setting has been problematic both in terms of the authority for setting tariffs as well as the level of tariffs. Tariff revision required political decision making, as a result of which sound commercial principles had to be repeatedly sacrificed to meet the compulsions of political populism. With average tariff not being adequate to cover cost of supply, there is an incremental loss for every additional unit sold. Over the years, these have resulted in accumulated losses assuming staggering proportions. Further, the tariff structure has also been characterized by a high level of cross subsidization resulting in distorted tariff structures across different consumer segments. While cross subsidies may have served a useful purpose initially these have now become counterproductive.

### ***3.2.5 Investments***

The investments in transmission and distribution have not matched the growth in generation (Annexure 12). A thumb rule for investment in generation and T&D has been that an investment of one Rupee in T&D is necessary for every one Rupee of investment in generation. In India, up to the IX Plan period, the plan outlay has been about 0.73 in both transmission and distribution for every unit investment in generation. Further, the investments in distribution alone have been significantly less than the requirement. Lower investment in T&D has also resulted in higher technical losses due to inefficiencies in the system.

### ***3.2.6 Unwieldy size and monolithic structure***

The size and monolithic structure of distribution operations of the SEBs has resulted in lack of accountability, unmanageable size of distribution system, concealing of areas of weaknesses etc.

### ***3.2.7 Supply to rural consumers***

India pursued rural electrification vigorously for over four decades till the early nineties with credit from Rural Electrification Corporation (REC). A village was deemed to be electrified if electricity reached any point within the boundary of the village. This definition was later amended so that a village would be deemed to be electrified if electricity reached the village habitation. As a result of this while over 5,08,000 villages are claimed to be electrified, many of these would still be in a condition where most of the houses still remain unelectrified and street

lighting, lighting of schools is yet to be done. In recent years the pace of rural electrification has slackened due to the deteriorating financial health of the SEBs. The status of rural electrification is detailed in Annexure 10.

### ***3.2.8 Quality of supply***

Quality of supply is poor in most parts of the country. Un-scheduled load shedding, low voltages, voltage and frequency fluctuations are far too common. Service to the consumers in terms of addressing of complaints and restoration of supply on account of local faults etc. is also not perceived as being satisfactory by most customers. It is indeed quite poor by international standards.

### ***3.2.9 Work culture***

Most SEBs are over staffed with about 9 employees per 1000 customers as against 3-5 employees in many middle income developing countries. Employee related problems include low motivation levels, poor productivity, low skill levels and lack of training for skill up-gradation. Also, due to the lack of competition from either direct competitors or comparative competition on performance from other players, the motivation and incentive to improve is weak. This non-accountable and non-commercial oriented work culture is not conducive to efficient functioning of the SEBs and the system as a whole. Compounding this problem is the connivance and involvement of staff and unscrupulous consumers in pilferage of electricity, which has been the single most important factor contributing to the abnormally high incidence of distribution losses.

### ***3.2.10 Metering***

Flat rate unmetered supply was introduced on the consideration that this was cost effective for small loads, which were widely dispersed. The cost of metering, reading these meters and billing was higher than the revenue realized from such consumers. Over a period of time, this has led to unmetered supply as a percentage of total supply becoming so large that energy audit and measurement of energy flows and its correlation with revenues flows has become increasingly difficult – if not impossible. As a result there has been a tendency to inflate the percentage of electricity supplied to the non-metered segment so as to project a respectable figure for T&D losses.

### ***3.2.11 Collection and billing***

Billing and collection efficiency is poor with only about 55% of the energy generated being billed. Of the energy generated, only 41% is collected. The major defaulters of SEBs include government departments, enterprises and municipal undertakings taking power for water and

street lighting.

### **3.2.12**      *Financial problems*

The current levels of tariff do not allow SEBs to cover supply costs and to earn return on the capital. The gap in resources is supposed to be financed through subsidies from the state governments. However, due to the inability of state governments to provide funds towards subsidy and capital expenditure, SEBs face a resource crunch which in turn has affected investments in system up-gradation, leading to deterioration in the quality of supply and increasing losses.

### **3.2.13**      *Persisting inertia*

While it is generally recognized that several measures need to be undertaken to improve the functioning of the SEBs, and efforts have been made in the past, the reality is that the situation has, in fact deteriorated. The sheer size and monolithic structure of distribution operations construed with lack of accountability and good governance have made the SEBs inefficient and financially weak in most states. There is a mixing of priorities and concealing of areas of weaknesses. This coupled with corruption, lack of incentives and competition has resulted in hardly any improvement being made in the functioning of most SEBs.

### **3.2.14**      *Recent Initiatives*

#### **3.2.14.1**      **Coelho Committee**

In 1997, a single member committee was formed under Shri S.J. Coelho. In terms of the conclusions (Annexure 8), the committee recommended that there are no standard solutions to the problem of restructuring of the industry. Further, the committee recognized that efficiencies have to be introduced into distribution, which can be possible through the following:

- Breaking up the monolithic structure of the SEBs distribution system into more manageable and viable distribution zones;
- Restructuring the distribution system into corporate units which could lend themselves more conveniently to a transition from public sector to private ownership;
- Creation of regulatory mechanism;
- Release of the SEBs from the current government ownership to enable them to work with greater autonomy and efficiency and accountability;

- Evolve a timeframe and modus operandi by which the private sector can be meaningfully associated in the transition process;
- Identify and ensure a transparent arrangement by which the private sector could be involved in the restructuring effort; and
- Progress from a cost plus return on the capital base to a performance oriented return on investment.

The report of the committee was circulated by the Ministry of Power to the various states for necessary action. The full report of the committee can be accessed on the Ministry of Power web site [www.powermin.nic.in](http://www.powermin.nic.in).

### **3.2.15**        *Recent developments*

In view of the critical state of the Indian power sector, on the distribution side, strategies for improvement have focussed on the following:

- Setting up of Independent Regulatory Commissions;
  - Metering of all consumers;
  - Reduction of losses at the sub-transmission and distribution level;
  - Increased investment for strengthening the system and reducing losses in transmission; and
  - Reforms and Restructuring.

Of the above action points, there has been significant progress towards the evolution of an independent regulatory mechanism through the enactment of the Electricity Regulatory Commission Act in 1998 and the State Reforms Acts. Apart from the Central Electricity Regulatory Commission, State Electricity Regulatory Commissions have been set up in nineteen states and twelve of these have passed tariff orders.

#### **3.2.15.1**        **Chief Ministers / Power Ministers conference**

With an objective of providing thrust to power sector reforms and build a nation wide consensus, the Prime Minister of India convened a meeting on March 3rd 2001 of all Chief Ministers. It was agreed that there was an urgent need to depoliticise power sector reforms and speed up their implementation. Some of the important resolutions adopted in the area of distribution include the following:

- Energy audit at all 11 kV feeders to be made effective within a stipulated timeframe;
- Full metering of all consumers to be completed on a priority basis;
- Commercial viability to be achieved in distribution in 2-3 years through any or all of the following:
  - Creating profit centres with full accountability;
  - Handing over of local distribution to panchayats/ local bodies/ franchisees/ user associations, wherever necessary;
  - Privatization of distribution;
  - Or any other means.
- Efforts by states, at inviting private investment in the power sector need to be focussed towards distribution sector.

### 3.2.15.2 World Bank / ADB support for reforms

Multilateral agencies viz. World Bank and Asian Development Bank are providing reform support to a number of states. These states include Orissa, Rajasthan, Uttar Pradesh and Andhra Pradesh .

Privatization of distribution is at the core of the reform strategy in the World Bank aided reform programmes. The World Bank is also providing technical assistance to Karnataka for privatization. The ADB is now assisting Gujarat and Madhya Pradesh in power sector reforms.

### 3.2.15.3 Accelerated Power Development Program

Recognizing the critical need for distribution reforms, the Government of India has launched a new programme called the Accelerated Power Development Programme (APDP) where distribution circles are identified and concentrated efforts on metering, energy audit and reduction of technical losses as well as control of theft is being undertaken to create models of success with international standards so that they can be replicated in other circles. Technical upgradation and energy audit are the key features of APDP.

Under the scheme, financial assistance is being provided to states, which are committed to power reforms, for undertaking renovation & modernization programmes and for strengthening of transmission and distribution works. The scheme is envisaged to continue till the end of 11th Plan i.e. 2012. Government of India, Ministry of Finance, had made a provision Rs. 1500 crore for the year 2002. The amount is being provided as additional Central Plan Assistance to the state governments, based on the progress made by States on meeting certain milestones, such as setting up of Regulatory Commission, metering etc. The present scheme covers sixty circles in the country. There are four hundred circles in the country, the remaining circles would be covered subsequently.

The funds are released under APDP with the funding modalities as follows:

Sr. No.	Category of States	% of Projects / Scheme Cost from APDP as		% of Projects Scheme Cost from PFC/ REC/ Own/ Other Sources
		Grant	Loan	
1	Special Category States	90	10	-
2	Non-special category States	25	25	50

Funds are released by Ministry of Finance, Government of India under the advice from Ministry of Power. During the last two years i.e. 2000-01 and 2001-02, projects have been/are being sanctioned that meet the short-term objectives i.e. outage reduction and revenue increase, followed by long-term measures that involve detailed network and load data collection and analysis of the same through computer software for preparation of detailed project report. The details of the short and long term measures which need to be undertaken for availing assistance under

the scheme have been provided in Annexure 11.

The Ministry of Power, GoI has also formulated a six level intervention strategy to rejuvenate the power sector. The strategy envisages interventions at the national level (policy issues, accounting etc.), state level (tariff fixation, unbundling etc.), SEB level (restructuring, MIS etc.), distribution circle level (outage reduction, loss reduction etc.), feeder level (reliability, erratic voltages etc.), and consumer level (metering, consumer satisfaction etc.). The details of the same are provided in Annexure 13.

### 3.3 Strategy for reforms

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Thus although initiatives have been undertaken in a number of areas, implementation of the other action points has been uneven across the country on account of various factors and significant progress towards attainment of efficiency gains is yet to be made. In this context, since reforms in the distribution sector is primarily the responsibility of the states, there would be an urgent need for the states to delineate and crystallize the strategy to be followed for reforms in distribution. Although it is likely that states may take different views on the strategy for reforms, the focus of the entire exercise should be commercial orientation within the sector and quality service at reasonable price.

These objectives however would be extremely difficult to achieve without addressing the issue of governance. A prerequisite for good governance would include a number of factors including broad based management, independent decision making powers on commercial and technical parameters, grievance redressal mechanisms, flexibility of postings etc. Although several countries have gained by the involvement of private sector in distribution, states may take a view to consider a model for good governance within the existing framework. This strategy can only be successful if there is insulation from the dysfunctional compulsions of the political process supported by the preconditions highlighted above, which considering the past would be a challenge. A viable strategy would need to encompass improvements in efficiency through various means such as distribution circle management, investments in technical upgradation of the system, metering, outsourcing etc. This has been elaborated under section 4.0.

*Distribution reforms are considered to be of utmost importance if the electricity sector is to turnaround and become self-sustaining. For this purpose, alternative models like co-operatisation, corporatisation etc. can be attempted within the existing framework. The bottom line being that the sector must achieve commercial viability in two to three years.*

On account of the inherently unviable nature of rural supply arising from the dispersed nature of the distribution system, the nature of the load, costs involved in electrification coupled with the lack of ability to pay and the socio - economic objectives involved etc. it is likely that the need for subsidy for rural supply would continue for quite some time in many states. This would necessitate a customized approach for the rural segment. This part of the strategy has been further elaborated in section 5.0.

As good governance and insulation from the dysfunctional compulsions of the political process is the key to turn around in the distribution business, private sector participation in distribution is an option which state governments may need to seriously pursue. This part of the strategy has been further elaborated in section 6.0.

## **4 Improvement in efficiency of operations**

The key components of this part of the strategy are as follows:

### **4.1 Change in the management systems to Distribution Circle management**

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As indicated earlier, power sector in India, like in most developing nations is characterized by a lack of incentive mechanism and commercial orientation. The system is characterized in most places by pervasive political influence at various levels leading to lack of accountability. Over the years it has become increasingly difficult first to identify the various factors and then to establish the impact that each of the factors (such as subsidy, operational losses, commercial losses etc.) have on the financial condition of the state owned entities. As a starting point it is essential to develop systems which would identify the various leakage points and provide indicative figures of the losses that the state owned entities incur on account of each of such factors. Actions that would improve the efficiency levels and increase accountability would need to be pursued. The focus should be on identifying and eliminating / minimizing the impact on account of the internal factors (commercial, technical losses etc.) and then targeting the external factors. A critical parameter in the implementation of this approach would be that of accountability coupled with responsibility. There would be a need to associate losses with various internal factors. Given the size of operations of the state entities, central monitoring of operations at each 11 kv feeders would be a gigantic task. One approach to obviate this would be the dis-aggregation of the operations in the form of responsibility / profit centres. As per the existing structure, distribution systems in SEBs consist of a number of Distribution Circles. The Distribution Circle represents a defined and manageable area, which caters to all categories of consumers in that area. The Distribution Circles are also responsible for collection of revenue from all categories of consumers in the defined area. Thus Distribution Circle is best suited to become a business unit or Profit / Responsibility centre. The various components of the Distribution Profit Centre (DPC) are discussed as follows:

#### ***4.1.1 Objectives***

The objectives of the DPC are as follows:

- Create responsibility centres and accountability within organization; and
- Delegate commensurate authority to line managers and establish a set-up for effective discharge of responsibility in view of the Distribution circlewise electricity accounting.

#### ***4.1.2 Organization structure***

The present organization systems in the SEB may have to be changed and new systems introduced which result in effective delegation of authority and responsibility. Distribution Circles may be empowered and delegated responsibility either in a phased manner or full responsibility for the initial pilot projects by respective SEBs / State Utilities to become responsible for operating as a Business Unit. Creation of such distribution circlewise responsibility / profit centers would lead to the setting up of benchmarks and performance based competition. This would also help in creating commercial orientation with due attention to costs and revenues in the organization at the field level. This is absent today and this reorientation in attitude and the work culture is a pre-requisite for a qualitative transformation.

### **4.1.3 Functions**

The role of the DPC is to enhance accountability. The Distribution Circle, which is selected as profit centre in the SEBs should function as a single self contained unit. The functions of the DPC are detailed as follows:

- Ensure availability of supply, improving quality of supply, loss reduction and realization of total revenue;
- Electricity accounting and financial accounting at each Distribution Circle;
- Utilization of stores without sacrificing economies of scale;
- Planning of Distribution System;
- Design incentives to improve culture among the work force in the DPC;
- Monitor the theft of electricity;
- Designated personnel to hold regular public grievance, redressal sessions to ensure quick settlement on payment of dues; and
- Customer service.

Performance indicators for DPC would include commercial parameters including:

- Progress in increase of revenue per unit;
- Control of theft/pilferage;
- Collection efficiency;
- Progress towards 100% functioning meters with all consumers;
- Externally verifiable energy audit;
- Technical parameters;
- Local Supply interruption;
- Voltage levels;
- Distribution transformers;
- Failure rate;
- Status of capacitors; installation/upkeep; and
- Use of I.T.

Parameters of performance and responsibilities would need to be carefully designed at every level. The measurement of “required revenue collection” and “actual revenue collection” could be the measure of performance.

#### **4.1.4 Powers**

The creation of Distribution Profit Centre (DPC) would improve accountability. However, mere creation of a DPC would bring no results unless appropriate delegation of authority is undertaken. Further, for the effective functioning of the DPC the following changes need to be undertaken:

- For each Distribution Circle DPC Key performance targets for each Month and Quarter may be fixed and these shall be internal to the Organization;
- Funds for Operation & Maintenance should be allocated to each DPC and to the extent possible revenue collections should be used for the purpose;
- Indian Electricity Act (1910) empowers the licensee to disconnect the supply of power if a consumer neglects to pay charges. Section 39 of this act also provides for penalties for theft of power. These provisions need to be enforced vigorously. State governments should provide law and order support to licensees/ SEBs to enforce these provisions;
- If the enactment of Electricity Bill which has been introduced in the Parliament, is delayed then the government should consider promulgating an ordinance bringing suitable amendments in the existing law to provide for stringent penalties against theft of power. To provide a revenue focus rather than criminal prosecution, it is necessary to have a provision similar to the provision of assessment as provided in the Electricity Bill 2001. Under this provision the officer of licensee or Board can be empowered to assess the quantum of theft committed by a person and raise the demand from such consumer;
- Performance incentives to employees could include both ‘Group Incentives’ and ‘Individual Incentives’;
- Meter reading, Electricity Bill distribution and revenue collections for innovative applications for outsourcing power or an suitable; and
- DPCs should to the extent feasible be gradually given the freedom to procure materials, implementing technology plans etc.

*With an objective of achieving efficiency of operations some of the SEBs have already initiated actions against defaulting consumers. In this context, Karnataka has recently regularized about 2,00,000 connections in a drive conducted during the period March 11, 2002 to March 25, 2002. Similarly, Maharashtra has recently discontinued connections to about 25 lakh defaulters. Other states may also need to initiate such measures.*

## **4.2 Metering**

Metering is vital for the conversion of energy flows into money flows. It results in identifying the quantum of energy supplied and hence the losses in various sections of the system and is therefore a pre-requisite for energy audit and loss reduction. In spite of its critical importance, the metering system in India is inadequate and covers just about 40% of the total sales. The agriculture sector accounts for the bulk of the unmetered sales. The result is that SEBs have been concealing their inefficiencies and losses under agriculture sales.

*To ensure proper accounting of the energy flows and to obtain more reliable data on the location and the extent of losses, it is necessary that a proper account of the energy flowing in the system is carried out through meters of appropriate specifications and types (Annexure 3).*

### **4.3 Outsourcing of processes / turnkey solutions**

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The primary focus under this segment of strategy for improvement of distribution system is to enhance operations of the state entities and improve the efficiency levels. One such efficiency enhancing mechanism is outsourcing, which is also being actively followed in the ‘global corporate environment’.

Outsourcing could be considered in areas where the external agency would be able to perform the functions in a more effective and profitable manner on account of various factors such as technology, skill base, economies of scale etc. The gamut of services, which may be outsourced, could cover a wide range from outsourcing of specific functions to turnkey solution outsourcing. Services outsourced, could include:

- Meter reading / billing / collection;
- Repair of faults and restoration of lines;
- Energy audits, MIS; and
- Turnkey outsourcing of technical loss reduction programs; etc.

While undertaking outsourcing, the existing employees of the state entities may also be encouraged to participate in the exercise where possible.

Management contract could be a form of outsourcing. However, the benefits from the same may not accrue unless complete decision and control of staff is vested with the contractor, which is difficult under the present legal framework. This is the reason why management contract, which was initially tried in Orissa was given and privatization through disinvestment of 51% shares was inevitable.

The issue of supplying electricity to rural areas requires to be specifically examined. This is because supplying electricity to rural areas inevitably costs more than the revenues that are collected from rural consumers and thus requires to be subsidized. However, the extent of subsidization reduces with efficiency. Some of the reasons for increased cost of supply are as follows:

- i) Mammoth size of the distribution system;
- ii) Electricity loads in the rural areas are relatively small and widely dispersed resulting in higher technical losses;
- iii) Extension of rural electricity management by the existing SEBs or distribution companies casts a heavy burden of a high cost administrative system and high overheads; and
- iv) Extension of transmission lines to un-electrified villages entails high capital expenditure.

5.1 On account of the problems highlighted above along with the lesser capacity to pay, the need for subsidization in some form may be there for quite some time. The traditional practice is to cross-subsidize rural consumers by imposing an explicit/implicit 'social charge' on the non-rural consumers of electricity and also to meet part of the subsidy bill from the government's budgetary sources. Since privatization by itself cannot eliminate the need for subsidizing rural electricity supply operations, it becomes necessary to examine the two somewhat separate questions: whether there is merit in privatizing distribution operations in rural areas and what would be the best way to finance the subsidy-irrespective of privatization or otherwise.

5.2 The decision to privatize rural distribution or not to do so must be guided by the relative supply costs of the private sector and the state entities. It is sometimes argued that subsidization is inconsistent with privatization and if subsidy is required to be continued privatization cannot be justified. This reasoning is incorrect because the ability of rural consumers to pay for electricity does not depend on the ownership of a supplier. Therefore, if lower supply costs can be achieved through privatization, it would also mean lower subsidy bill. Therefore, privatization of rural supplies would be appropriate only if the supply costs would be lower than those of the state entity would. As discussed earlier in this section, the issue of ownership is material for efficiency gains and in effect reducing costs. However, given the problems associated with rural supply as explained earlier and the nascent stage of private sector participation in distribution, the response by the private sector towards rural supply may not be encouraging.

5.3 Another approach, which may be considered, could be decentralized management in the form of rural cooperatives users association / panchayats / franchisees. The decentralized independent entity would undertake rural distribution on the basis of normal commercial business of paying for the electricity it buys and recovering enough money for what it sells to cover full costs failing which there would be no supply. In this regard the SEB staff could also be encouraged to become independent operators of a commercially viable distribution business. For this they could be given leave without pay initially and if the experiment succeeds they could formalize their relationship as franchisees.

5.4 The other issue of how to mobilize the resources for subsidizing the rural supplies is however, more complex. There are conceptual and administrative difficulties. The complexity becomes compounded with the change in ownership. A 'social charge' to be levied upon non-rural consumers for subsidizing the rural supplies, whether serviced by a private or a state entity is an option that could be considered. The government should subsidize rural power supply by providing budgetary support. The insulation of the main stream operations from rural operations and adopting a specific plan of action for rural operations is an approach, which has some merit. Budgetary support from

government may be the only alternative for completing the task of extending the network to attain full coverage and for sustaining supply at subsidized rates. This budgetary support for extending the network should preferably be given as a grant.

5.5 While accepting the need for support from the government, it would be essential to delineate the various factors that are responsible for the monetary support from the government, highlight a clear priority in relation to these factors and define the driving principles in relation to these factors. As highlighted in section 3.2.7, the pace of rural electrification has slackened in the recent years as compared to the pre nineties period. Supply of electricity to the rural households would thus need to be at the top of the priority list. The extent of support to be provided in the form of grants would need to be driven by an explicit and well-defined rural electrification plan set up upfront by the state governments. The second and third important factors on the priority list would be the subsidy element to be provided for rural consumers who are below the poverty line and small and marginal farmers as well as farmers in the drought prone areas respectively. The important aspect here would be to ensure that the subsidy is clearly quantifiable and reaches the target consumers. One mechanism of ensuring this would be to provide subsidy coupons to the consumers. Subsidy for consumers other than the above would be at the bottom of the priority list. The state governments would need to clearly define a path for reducing the extent of support in relation to this factor. The priority list can be summarized as follows:

- (i) Granting access to rural consumers;
- (ii) Support for consumers falling below the poverty line;
- (iii) Farmers affected by drought etc.; and
- (iv) Support to other consumers.

5.6 Thus the approach to be adopted to accelerate the pace of rural electrification could be based on the following principles:

- a) Rural electrification should be treated as part of the socio economic development plans of the village and the investments should be supported from the budget. This money may preferably be given as a grant;
- b) Rural electrification should be managed in a decentralized manner by rural cooperatives or rural entrepreneurs approved by the local communities or through franchisees or through panchayats;
- c) In the case of pumpsets, subsidy can be operationalised through
  - Sale of power to decentralized rural distribution entity at subsidized rates. Subsidy being provided to the utility; and
  - Grant of subsidy directly to rural consumers either as a collective or as individuals.

*Treatment for rural electrification should be separate and should be managed by local agencies. It would need to be recognized that subsidy to the rural areas would continue either in the form of budgetary support from the government or by levying a social charge on power consumption / imposing 'universal service obligation' on all franchisees (surcharge mechanism at bulk supply for other segments). In other words in rural areas micro-privatization would be an option.*

5.7 Where rural communities lack cohesion and are subject to sharp social and others pressures, a local franchisee who can manage rural distribution on a commercial basis with lower overhead costs may be a better option. The state governments in consultation with the local committees would need to take a view on which option to pursue.

## **6 Privatization of the distribution business**

### **6.1 Rationale for privatization**

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It would be useful to consider in detail the rationale for involving private sector in power distribution and also specify the objectives to be achieved through it. Traditionally, the SEBs have evolved from the Government departments responsible for power supply and have focused on extension of the network and provision of energy. Their operations have lacked the requisite commercial orientation. There has also been a high level of political involvement in the operations of the SEBs. Distribution involving a large number of customers is sensitive in terms of management supervision and organizational responsiveness for a large work force and customer interface in a complex political environment. The poor financial condition of the SEBs has resulted in resource constraint faced by the utility for meeting its future expansion needs. This has resulted in investment not being commensurate with the requirements in the power sector, especially in distribution operations resulting in further deterioration in their operational efficiencies and consequently of their financial condition with the revenue deficit becoming unsustainable.

#### ***6.1.1 Government***

Efficiency gains through privatization of distribution would result in the reduction of financial losses of the state entities and reduced outflow of funds from the government towards subsidies. This may help in reducing the requirement of the state resources to be infused into the sector thus allowing the government to utilize funds in other critical areas such as health and education. As commercial viability is achieved in distribution it would also make private investment in generation and transmission viable and self-sustaining.

Privatization is expected to improve operational efficiency, obtain commercially driven tariff rates from Regulators and relieve the government from the burden of subsidizing the sector. Although this could be achieved only over a period of time, three phases can be foreseen:

1. Arresting further escalation in losses;
2. Progressive reduction in losses; and
3. Generation of profits.

#### ***6.1.2 Sector***

Privatization of the sector is expected to stimulate direct and / or comparative competition in the distribution business. Further, privatization is expected to bring about a commercial orientation and a cost-conscious approach in the distribution business. The change in the management culture and the commercial orientation would assist in reducing losses at a faster pace. The benefits gained due to higher efficiencies would help in reducing tariffs to the consumer in long term and in improving the quality of service. Further, the depoliticising of the present distribution set up through privatization would be one of the key factors contributing to efficiency gains in distribution.

The privatized distribution companies are expected to achieve the financing capability to efficiently serve future expansion plans and also, increase efficiency and productivity in operation and management. They are expected to bring in the much needed management dynamism into the sector.

*Privatized distribution combined with transparent functioning of the independent Regulatory Commissions is expected to provide the common man better service both in terms of quality of supply and cost associated with it. It is also expected to benefit the government and assist in the development of the sector. However the mere act of privatization would not resolve the acute financial problems that the sector has been experiencing. Privatization cannot be expected to provide an instantaneous solution to an acute financial crisis. Hence there is need to carefully analyze and delineate the transition path. The various issues relating to privatization and the strategy that may have to be followed for optimizing the impact of privatization needs to be carefully analyzed and a clear strategy based on ground realities drawn up.*

## 6.2 Approach to privatization

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6.2.1 Since the driving force behind privatization is efficiency gains rather than ideology, enhancing efficiency of distribution activity in the country must be the guiding principle in approaching privatization. Precondition for privatization would be the availability of interested parties. The pace of privatization would depend upon the private sector appetite for distribution assets, which at present is modest. International investors have shown a declining interest for the energy assets in Asia. Some of the events that have taken place in the recent past which have a bearing include shift in focus of many of the international utilities to markets back home. There are very few existing domestic private players in the electricity distribution sector and the interest of Indian industry to diversify into electricity distribution is yet to emerge.

6.2.2 The problem of making the distribution business attractive to private sector investors is compounded by the fact that distribution business is considered to be less attractive business than generation. The reasons identified are as follows:

- The managerial and organizational resources required for distribution companies are much more than that required for the generation business. This is because the distribution companies have to interact with a large customer base for billing and collection of revenues;
- Non-viable tariff. Revenues inadequate for meeting cost of power;
- Regulatory uncertainty;
- Requirement of taking over existing staff; and
- Requirement of managing an existing not so efficient work culture and a nexus between employees and non paying consumers.

Keeping the same in mind, privatization of distribution business has to be implemented with an efficient and effective strategy.

### 6.2.3 The following approaches could be considered for privatization:

- Under appropriate conditions privatization may be attempted in the whole state at a single instance as in case of Orissa. In this option, a few distribution zones would be sold to the private investor. However, this option carries the risk that it may not work as the distribution areas offered may be too large in size and the quantum of subsidy to be provided and its rate of growth may make it appear non attractive to potential investors. The option can only be attractive if the state government can establish its credibility regarding the ability to pay subsidies. Further, in certain cases from the point of the size of investment, it may be too large for medium size investors and lead to competition being restricted to the existing few players;
- Privatization can be done in a phased manner. The distribution area may be classified into two distinct areas such as urban area and rural area. The distribution area in the urban areas are likely to be better understood than that in the rural areas in terms of load density, the number of consumers and losses. Private investors would therefore be interested in these areas, as they would be able to predict the risks much better and generate faster impact in terms of reduction in losses. This has been the approach in the case of Kanpur Electricity Supply Company (KESCO) in Kanpur, Uttar Pradesh. Privatization of urban areas/cities may not result in tariff shock for the consumers as the consumers in the cities are not highly cross subsidized, the load density is quite high in the cities and hence, the tariff hike would be needed only to cover costs, if required. Also, the capacity of the consumers to pay as well as the acceptability to change would be higher;
- As indicated earlier, the rural areas would have to be subsidized, as these areas may not be financially viable. The subsidy could be from power users of urban areas by levying a social charge on power consumption through the instrument of electricity duty and earmarking of revenues from this for grant of subsidy through the budget. In addition to the surcharge mechanism envisaged in the Electricity Bill the allocation of other government owned cheaper sources of power for rural areas only can be introduced.

*All the stakeholders have to recognize that subsidies especially for the weaker sections and the rural sector may have to continue for some time. In the case of models where the privatization would be undertaken across the state with homogeneous zones, it would be essential to clearly define a multi year path for reducing the extent of support at the time of privatization. The state government may consider releasing a white paper in this regard. Further, in a multi-year framework, the other element, which would need to be specified upfront, would be the extent of capital expenditure that would be required to be brought in especially in the rural areas and the manner of funding the same. Both these factors would reduce uncertainty and provide transparency at the time of bidding.*

6.2.4 In India, presently there are very few entities involved in the business of distribution, key players being BSES, TEC, CESC, AEC etc. For privatization, it is imperative that there are a lot more players in this sector. This would help in creating a healthy environment for competition. The entry of International players into this sector being limited as of date, it may be worthwhile to involve additional entities into this sector. Encouraging small and medium enterprises for investment in certain selected small and medium towns could also be considered. Further, Independent Power Producers (IPPs) which have not achieved financial closure on account of unavailability of an adequate payment security mechanism may be encouraged to take part in the distribution business. At the same time the number of players in the distribution business would increase. It has also been suggested that Central Power Sector Utilities such as NTPC, PGCIL may be encouraged to take part in the distribution business. Joint ventures may be formed by the CPSUs with Companies in other sectors that may be interested in distribution business.

*IPPs which have not achieved financial closure on account of unavailability of an adequate payment security mechanism may be encouraged to take part in the distribution business. Further, Central Power Sector Utilities such as NTPC, PGCIL and also business houses may be encouraged to take part in the distribution business. The guiding principle in this exercise should be that the new entity should act independently while imparting the desired commercial orientation.*

## **6.3 Road map for privatization**

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Independent of the approach, which is finalized for the purpose of privatization, the prevalent factors of ownership work culture, existing regulatory and legal framework, orientation of the various stakeholders etc. would necessitate certain actions to be completed before privatization. Such preconditions to privatization would be critical in facilitating success and optimizing the gains from privatization.

### **6.3.1 Preconditions to privatization**

The governments both at the state and national level are responsible for creating the right environment for investment. In this context, some of the key issues to get the investment framework right would be as follows:

#### **6.3.1.1 Political commitment**

Establish government commitment for reform in terms of political will, support and implementation capacity. The commitment to reform could be demonstrated from the policy decisions taken. Rationalization of subsidy, timely payment of subsidies and actions against theft of electricity would also demonstrate support to reforms. Many of decisions may not be acceptable to the subsidised consumers, people with vested interests and some political groups. Tough decisions would therefore require resolute commitment, irrespective of who is in power. Further, the political environment is an important factor influencing the decision of investors. Most investors are unwilling to invest in an environment where there is lot of resistance to tariff hikes/reforms in the sector. This increases the perceived risk of the investor community who would need confidence that the political ambience is such that their investment in the business is secure.

#### **6.3.1.2 Legal framework**

The immediate priority of the investor upon privatization would be to reduce the commercial losses. Investors may look towards adequate effective enforcement of anti-theft measures. Further, access to the legal system for speedy resolution of disputes would be looked upon favorably by the investors. Further, timely and full payment of electricity bills by government agencies including municipal bodies and firm action against theft are the two critical issues.

### 6.3.1.3 Regulatory framework

The regulatory framework is the most significant factor affecting investor sentiment. The Regulator should be viewed to be independent in delivering his functions to the sector. Some of the key aspects of the regulatory framework are as follows:

- Credible and predictable regulatory approach outlining medium to long run approach to tariff setting by the regulator. A multi-year tariff framework appears an essential pre-requisite to take care of perceived ‘regulatory risk’. The multi-year tariff should commence from the time privatisation takes place. The state government may associate the regulator in the process and thereby provide comfort to the investors;
- An operational framework for a truing up mechanism at the end of each year of the power purchase and other operating costs of a distribution company. This ensures recovery of costs, which are beyond the control of the utility;
- Determination of reliable baseline data on distribution loss, collection efficiency and its acceptance by the Regulator;
- Fixation of reasonable and achievable targets for improvements, for determining tariff would be useful; and
- Capital expenditure recognition over the medium term.

*Investors would prefer to have a clear multi-year Tariff Policy from the SERC. This would in turn reduce regulatory risk.*

### 6.3.1.4 Base line data

Investors expect the technical and financial information provided to them at the time of privatization to be as close to reality as possible. Reliability of data on T&D losses as well as the true picture of assets and liabilities is crucial. This would include reliable data on system operations and location of losses at 11 KV feeders, true value of assets and liabilities of distribution entities (especially the full extent of unfunded pensions). This concern is borne from the experience of investors in the Orissa distribution network, wherein, the investor were not particularly convinced with data provided to them. Further, a zero date would also need to be defined as a date on which the operations of the distribution company are handed over to the private investor. This date should be the reference point for the decisions of the regulator.

*APDP programme and its key inputs of metering, energy audit and IT application would assist in addressing the issue of base line date for future privatization.*

### 6.3.1.5 Avoid major investments and procurement commitments immediately prior to privatization

State governments / SEBs should avoid major investments and procurement decisions immediately prior to privatization, since such measures will reduce the flexibility of private investors in opting for more efficient investment options. However, this should not constraint essential investments required for the normal operations.

*The objective would be to ensure that the choices available to the private sector for deciding on the nature of investments, type of technology etc. are not pre-empted.*

#### **6.3.1.6 Third party sales**

An alternative of third party sales has been suggested for certain projects as a form of payment security structure. The scheme as suggested proposes to allow the generating company the right to supply to specified customers of the SEB directly in the event of payment default. It is most likely that the generating companies under the proposed scheme would opt for the better quality customers of the SEB who could primarily be industrial customers. Since this may result in complications at the time of privatisation of distribution, it should be examined very carefully whether third party sales would prove to be a workable solution.

#### **6.3.1.7 Communication**

It is important to formulate and implement a well structured communication strategy addressed to all stakeholders including politicians, bureaucrats, SEB employees, press/media, public to explain the rationale and the need for privatization as also the expected reasonable speed with which improvements can be achieved.

*Preparatory work would need to be done in two areas viz. conceptualizing a dynamic approach for private sector participation and result oriented marketing to potential investors.*

#### **6.3.1.8 Deciding on the privatization model for the sector**

The privatization of the distribution entities all over the world, especially in the Latin American countries had involved/accompanied a comprehensive restructuring programme. The objective of privatization being to achieve efficiency through competition, the model for restructuring as described earlier would depend upon the specifics of a given state. The distribution model to be chosen would also be contingent upon the political will, support and implementation capacity of the state. The pace of privatization, as discussed earlier would also influence the model to be adopted. Once, the privatization model is decided, implementation of the same should be taken up in the right earnest. The details of the various feasible models have been provided in Annexure 4.

No one model can be recommended for adoption by all the SEBs in the country. While many of the problems are common to most SEBs

there are different situations prevailing in different states. There are states where SEB's have been highly successful in performance of their power stations. In fact, some of the power stations have demonstrated better performance than even internationally accepted norms. There are other states where each one of the three elements viz. generation, transmission and distribution is in difficulty. The availability and Plant Load Factor are low, the agriculture consumption varies, the transmission and distribution network is weak, the distribution loss is very high and commercial working is far from being satisfactory. It is for this reason that different states may have to evolve their own models of restructuring and privatization.

Another point that needs to be made is that in any state it is not necessary that only one model will work in the entire state. It could be possible that a state chooses different models for working in different areas. There could be areas where vertically integrated companies having own generation, transmission and distribution network operate successfully and in the same state in other areas other models may succeed. In so far as transmission is concerned there could be a reasonable state control since transmission cost as a percentage of the total cost is a small percentage and the scope for achieving efficiency improvements in transmission compared to the generation and distribution would be limited.

### **6.3.1.9 Open access**

As a part of the reform strategy, open access is contemplated to provide the benefits to the consumers through competition. However, a prerequisite for open access technically would be reserve capacity in the grid and grid stability. Given the current state of distribution, where the system operates at lower frequencies more often than desired, this would be difficult to achieve in the short term. However, with privatization of distribution, the private investor would be oriented towards correcting these factors with additional investments and would in a way assist open access. The Electricity Bill as introduced in the Parliament, has addressed this issue of open access satisfactorily. As per the Electricity Bill, it is the duty of the distribution licensee to develop and maintain the distribution system and supply electricity from a generating company or any licensee other than the distribution licensee in the area of supply, if allowed by the SERC. However, as per the Electricity Bill, open access would need to be introduced in phases such that the issues highlighted earlier and other issues such as cross subsidy are addressed satisfactorily. The issue of cross-subsidy has been addressed through the mechanism of a surcharge, which is to be phased out along with cross-subsidies. On the basis of international experience, open access can only be introduced in phases. The requisite technical (real time metering) and commercial arrangements have to be put in place.

*No one model can be recommended for adoption by all the SEBs since there are different situations prevailing in different states. Further, it is not necessary that only one model will work in the entire state on account of diverse characteristics of different areas within the state.*

### **6.3.2 Financial Restructuring Plan (FRP)**

Keeping in mind the objectives of the reforms process, it is necessary that the restructured entities be funded on the basis of reliable

assessment of operational and financial conditions of the SEBs and providing them with an opportunity for revival and also facilitating private sector participation in the power sector. Private investor would then be able to take comfort that the assets and liabilities have been realistically valued and therefore, be able to make an accurate estimate of the value of the restructured entities.

The FRP would aim to remove all the past distortions in the financial statement(s) of the erstwhile SEB before the dis-aggregation (functional unbundling of the structure depending upon the privatization model chosen) is done. The FRP and the dis-aggregation should address the following issues:

### **6.3.2.1 Employee and other liabilities**

The restructuring of the SEB and its subsequent privatization creates a lot of apprehension in the employees about their future. The apprehension is more so in the case of retired employees. One of the important and contentious issues, which have been observed in Orissa and Andhra Pradesh has been the unfunded employee liabilities relating to pension and gratuity. Once SEBs are corporatised under the Companies Act, 1956, trusts have to be necessarily created to address the pension and gratuity liabilities. Since, the amounts involved are large and since this could be a common problem for all the reforming states a mechanism that can be adopted by the reforming states needs to be developed. One option is that the unfunded liabilities relating to employee retirement benefits should be retained by the state government. This may be the only feasible option in most cases.

### **6.3.2.2 Backlog of receivables – assessment and write off which are not reliable**

An accurate estimate of the past receivables should be made. Receivables, which cannot be recovered, should be written off. To avoid any controversy, the state/SEB/Transco can take over the receivables to their account. The agency that takes over the distribution company may be asked to collect these, without taking over these receivables as assets, on a revenue sharing formula.

The objective of the entire exercise is that the investor would have an accurate estimate of the cash flow that can be expected in the system.

### **6.3.2.3 Past losses – treatment**

The SEBs in the country have been running into losses and have been earning a negative rate of return. As per the ESA Act, 1948, SEBs are to earn a surplus of 3% on the Net Fixed Assets. SEBs, in order to meet this requirement have been showing the additional revenue requirement above sales as subsidy from the government. However, the governments, because of the resource constraints faced by them have been unable to give this subsidy. As a result, SEBs have been showing large amounts of subsidy receivable, which are nothing but the past losses.

These past losses/subsidy receivable may be treated in the following manner:

- During the transfer schemes, the subsidy receivable may be adjusted against government loans/other liabilities to the government. As on date of transfer, the past accumulated losses will have to be taken over by the government; and
- As the utility may continue suffering losses, the utility in turn does not make payments for power purchase, fuel etc. Many times the utility converts these short-term liabilities into bonds (long term liability), payable at a later date. The subsidy receivable can be adjusted against these bonds. The bonds would then be taken over by the state government.

A special purpose vehicle can be created, as in the case of Andhra Pradesh & Delhi, which take over these bonds.

#### **6.3.2.4 Valuation – Delhi distribution approach**

In the case of privatization in Delhi, the valuation of assets has been done by applying the Business Valuation method; by making reasonable assumptions on retail tariffs, efficiency improvements and expenses in the future, the assets have been valued at a level which enables the electricity business to become self sustainable in a specified period of time. Business valuation has also been used to determine the quantum of liabilities which shall be transferred to each successor entity of DVB that can be serviced through reasonable tariff increases and efficiency improvements with the balance liabilities (total existing liabilities less serviceable liabilities) being transferred to a holding company. The liabilities of DVB employees relating to Terminal Benefits upto the date of transfer scheme shall be funded by Government of NCT of Delhi (GNCTD).

*The objective of the above exercise would be to create opening balance sheets, which would provide a clear idea of the assets and liabilities i.e. there should be no hidden liabilities in the sector. The investor would then be able to correctly assess the value of these companies.*

#### **6.3.3 Procedural aspects of privatization**

The process of inviting private investors and the criteria for selection should be very clear and transparent to the investors. Further, the process should ensure adequate competition among the investors. The approach followed in most of the states in the country is the traditional one, under which the selection would be on the basis of bidding for management control through purchase of shares on a premium. The commercial bidding exercise is a two step process involving a separate RFQ evaluation of the technical operational and financial strengths, followed by the RFP stage. The share price bid reflects the valuation of the respective bidders.

In the case of privatization in Delhi, bids are proposed to be invited on the basis of the percentage reduction in aggregate technical and distribution loss (AT&C losses) for each year for the years 2002-07, with the shares being sold at par value. The selection criteria would be

based on the AT&C loss figures. Further, the reduction in AT&C losses each year for the years 2002-07 would be the lower of the loss figures as provided in the bid by the private investor or the levels stipulated by the state government.

Another option which is theoretically possible and which has been attempted in countries such as Chile is the one in which the selection criterion is based on the extent of subsidy sought with the shares being sold on par value. However, the success of this kind of approach would depend on the availability of accurate information and may not be of interest to the bidders if all the information is not available prior to bidding.

*Thus although various approaches may be identified, no single approach can be recommended for all the states and the selection of the approach should depend upon the market conditions at the time of bidding. Further of the various approaches that have emerged, the approach suggested in the case of DVB (Annexure 5) appears to address a number of concerns satisfactorily.*

## **7 Orissa experience**

Orissa was the first state in the country to go in for a comprehensive restructuring of the electricity sector starting with the enactment of the Orissa Electricity Reform Act, 1995 and the unbundling of Orissa State Electricity Board (OSEB) into generation, transmission and distribution entities. This was followed by the corporatisation, commercialization and privatization of the distribution entities and the creation of a statutory authority – Orissa Electricity Regulatory Commission (OERC).

Under the first transfer scheme (effective from April 1996) the assets, liabilities, procedures and personnel of the erstwhile OSEB were transferred to Orissa Hydro Power Corporation (OHPC) for hydel generation and Grid Corporation of Orissa (GRIDCO) for transmission and distribution. The thermal assets of OSEB were transferred to a new company, Orissa Power Generation Ltd. (OPGC)

The second transfer scheme focussed on the creation of the distribution entities and their subsequent privatization. The state was divided into four different zones with four separate joint venture companies (51% equity participation from the private sector). BSES formed a joint venture with Gridco in three zones – Northco, Southco and Wesco. It paid about Rs. 117 crores to acquire a 51% stake in these three units against a face value of Rs. 78 crores. AES took a 51% stake in the central zone, Cesco, for a consideration of Rs. 41 crores.

The privatization process did not generate sufficient investor interest, with only three bidders finally submitting bids. An Investor Survey carried out by Frontier Economics to assess the reasons for lack of participation by several investors who had evinced interest in the early stages of the privatization process. The main reasons cited were:

- High level of losses and collection risk. Poor condition of system and difficulty of collection for private players;
- Problems of inherited staff. Difficulties of imposing own management and bringing in own employees;
- Lack of paying capacity among consumers;
- Tariff uncertainty. Tariff decisions based on marginal increase in tariffs for different consumer segments resulting in revenues not being adequate;

- Lack of guaranteed incentives for efficiency gains;
- Uncertainty on asset base that would be allowed;
- Poor information and data records; and
- Returns too low for risk involved.

Further with an objective to review the power sector reforms in the state, the Government of Orissa in May 2001, constituted a Committee of Independent Experts under the chairmanship of Shri Sovan Kanungo. The terms of reference of the committee included the following:

- To examine whether the reforms in the electricity sector have progressed on the desired lines;
- If not, what corrective steps need to be taken to ensure that the intended benefits of the reforms process flow to the targeted groups;
- What can be done to strengthen the key institutions like GRIDCO and the Orissa Electricity Regulatory Commission;
- What specific steps need to be taken to promote socially relevant objectives like Rural Electrification, Energisation of L.I. Points and providing electricity to under privileged sections of the community; and
- Any other matter connected or incidental thereto.

The committee has submitted its report (Annexure 7 – Executive Summary of Report). The key findings made by the committee are as follows:

- The assumptions in the growth in demand for power in the state especially for the industrial consumers were highly ambitious, not only in terms of amount but also in the composition;
- T&D losses which were excessively high and were targeted for substantial reduction could not be reduced at the projected rates;
- Reform scheme was further vitiated by sharp up-valuation of assets at the time of transfer to the utilities which led to steep increase in the cost of power;
- Unrealistic assumption that GRIDCO would become profit earning from 1997-98 led to abrupt withdrawal of subsidy by state government from 1996-97;
- Reform scheme had sought to address the problem of T&D losses through (a) capital investment to strengthen transmission and distribution system so as to reduce technical losses, and (b) privatization of distribution to bring in better management skills and practices for enforcement of accountability to reduce commercial loss. Success is yet to be demonstrated; and
- Rural electrification has unintentionally become the worst casualty of the reform process.

Based on the key findings the committee has suggested various actions. Some key suggestions are as follows: (The full report of the committee is available on Ministry of Power web site [www.powermin.nic.in](http://www.powermin.nic.in))

- To ensure that the OERC is fully functional at all times; state government must make prompt appointment of commissioners. Further, the OERC should institute regular systems of monitoring to ensure that the prescribed standards of performance are actually adhered to;
- Large capital investments are being made with World Bank assistance. Efforts need to be intensified to complete and commission the on-going works so that benefits are visible;
- Revaluation should be kept in abeyance till the system is brought to balance and shock of steep increase in cost of power is prevented;
- Transition financing needs to be provided; and

- Efficiency gains through increase in collection efficiency and reduction in T&D losses need to be hastened.

This Committee has considered the Orissa experience and has drawn up the following conclusions:-

- The committee has noted that there have been a number of areas where there have been improvements after privatization. Some of these include extent of metering, strengthening of the distribution network, MIS, complaint redress mechanisms, introduction of micro privatization for rural areas etc.;
- When Orissa reforms were initiated and privatization undertaken only 30% of the consumers were metered. In the absence of 100% metering of 11kv feeders to all consumer segments, the assessments regarding T&D losses become susceptible to a wide margin of error;
- In the absence of adequate metering proper book-keeping and existence of verifiable data, it became difficult for Regulatory Commissions to discharge their statutory responsibilities in an objective manner which receives widespread acceptance from both consumers as well as utilities;
- The upward valuation of assets and the resultant fiscal shock of sudden increase in the cost of power may need to be reviewed;
- The various stakeholders including the state government may need to acknowledge that privatization may not result in commercially viable entities immediately and there would be a transition path;
- For privatization to succeed support of the state government in the transition period is a vital in terms of the following:-
  - i. Ensuring that government departments/agencies and municipal bodies are able to pay for their electricity bills and accept the commercial discipline that electricity cannot be supplied without timely payment.
  - ii. Governance and law and order support for assisting the privatized utilities in bringing about the change in deep-root ethics in their employees as well as customers towards the commercial orientation that all energy flows would be metered and audited and supply dis-continued in the absence of timely payment.
- Even prior to privatization a outreach programme for mass communication with public representatives and the people at large to drive home the basic and key facts, the diagnosis of the problems, projection of the transition path and pain of adjustment in terms of tariff rationalization is essential pre-requisite for reforms to succeed. It is also essential that unrealistic expectation of efficiency gains in the short run should not be made;
- It is necessary to ensure that the work of extending the network to cover new villages and households in Orissa acquires fresh momentum through pragmatic decision making so that people do not perceive reforms as leading to the neglect of rural areas and concerns of equity; and
- In the transition period till the new system settles down a close cooperation and partnership between government and the privatized companies is absolutely necessary to avoid crisis that has been experienced in Orissa.

## **8 Regulatory issues**

Until recently, the Central Electricity Authority was the industry's chief regulatory body while the SEBs were responsible for regulatory functions at the state level. With the increase in private sector participation in the power sector, there was a consensus that the regulatory function be performed in a credible, transparent, non-discriminatory and open manner. Accordingly, the Electricity Regulatory Commission Act, was passed in 1998 paving the way for the establishment of independent and autonomous regulatory bodies – the Central Electricity Regulatory Commission (CERC) at the central level and the State Electricity Regulatory Commissions (SERCs) at the state level. The CERC is already a functioning body and several states have taken the initiative to set up SERCs. As on date SERCs have issued tariff orders in

twelve states. The status of reforms in various states have been provided in Annexure 9.

## **8.1 International experience**

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Based on experience around the world, it is observed that the key regulatory functions in the electricity sector include ensuring competitive conditions in the market, issuing licenses and setting performance standards, monitoring the performance of regulated entities, establishing the level and structure of tariffs, establishing a uniform accounting system, arbitrating disputes among stakeholders and reporting and advising to the government.

It should be noted that the orientation of the CERC and SERCs in India need to be some what different as compared to the regulatory institutions in most other countries on account of the peculiarities of the power market in the country. In the next 10 years in India, there is a need to create huge generation capacities, transmission systems and distribution networks and to develop related input industries. In most developed countries, the need to expand is modest since most of the facilities have already been created. Raising the level of confidence of investors is, therefore, of great importance in India.

The Australian Competition and Consumer Commission in 1999, created a comprehensive listing, examining how these features contribute to the development of policies that balance the interests of various stakeholders:

*Communication* – Information should be made available to all stakeholders on a timely and accessible basis;

*Consultation* – Participation of stakeholders in meetings promotes the exchange of information and the education of those affected by regulatory decisions;

*Consistency* – The rationale, data sources and legal basis for decisions should be consistent across market participants and over time;

*Predictability* – A reputation for predictable decisions facilitates planning by suppliers and customers, and reduces risk as perceived by the investment community;

*Flexibility* – The Regulatory Commission should use appropriate decisions in response to changing conditions, balancing this regulatory discretion against the costs associated with uncertainty;

*Independence* – Autonomy implies freedom from undue stakeholder influence and promotes public / investor confidence in the regulatory system;

*Accountability* – Regulators should provide clearly defined processes and rationales for decisions. In addition, appeals procedures need to be specified to provide appropriate checks and balances.

*Transparency* – The openness of the process to various stakeholders promotes legitimacy in the system.

## **8.2 Clarity of policy / approach**

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In the evolution of the regulatory framework in India, there is a need for an overall developmental oriented approach which would send right signals to the industry that the regulator is keeping the interest of the consumer in mind as well as providing the necessary motivation and

incentives to those who wish to invest in the sector. The main emphasis of regulation should be quality and reliability of power supply to the consumer at the cheapest price. Given the dilapidated conditions of the network and the widespread supply scarcity, the Regulatory Commission would be required to facilitate fresh investments into the sector and, at the same time, protect the consumers, even as tariffs in each category eventually reflect the cost of supplying electricity to that category.

In order to attract investors to the sector, it is critical to have clarity about the policy initiatives to be taken up by the Regulatory Commissions and their approach towards the same. The Regulator's actions should lead the utilities towards improved efficiency and financial viability by ensuring generation of sufficient revenues to cover operating costs and capital expenditure and a reasonable return. The regulator has to promote efficiency in the system by ensuring the lowest possible unit cost of power, efficient usage of resources and maximizing consumer satisfaction. This, in turn, would stimulate investment on the basis of commercial viability in the sector.

### **8.3 Tariff fixation**

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The revenue models of the distribution companies are determined by the regulatory philosophy and tariff orders of the SERCs. So far, the existing SERCs have continued to use Schedule VI of the Electricity Supply Act as the basis for retail tariff determination. Schedule VI is a cost based approach that provides a rate of return to the SEB or licensee based on costs that include inter alia, fuel and power purchase, investments in the network and energy losses. The SERCs have struggled to collect realistic baseline data on distribution losses, collection, receivables, bad debts etc. Specifically, the SERCs have had difficulty in deciding on an appropriate level of energy losses that could be allowed as part of the tariff fixation process. So far tariff fixations have been on an annual basis. This leaves the distribution company open to the risk of varying revenues and returns over time.

An annual tariff determination policy has its drawbacks since there is a level of uncertainty in projecting future increases making valuation of the company at the time of privatization difficult. Therefore, in order to provide adequate incentives to the private distribution companies to reduce losses in an aggressive manner, to reduce the uncertainty and hence the risk premium that may be included in the bids and also to instill confidence in private investors to attract more participants in the bidding process, a framework of regulators approach to tariff setting is essential, to mitigate problems inherent in the annual tariff determination process. One solution is to institute a multi-year regulatory approach. This has the following advantages:

- Provides strong incentives to improve efficiency;
- Improves the valuation of the business by reducing uncertainty;
- Provides a degree of tariff stability;
- Consumers are aware of the broad magnitude of tariff changes that they can expect in the years immediately following privatization;
- and
- Assists in increasing both the manageability and acceptability of the reform process.

Such approaches involving a multi year tariff framework, have also been used internationally in successful distribution privatization.

In making decisions, four variables are critical, viz., the power purchase price, distribution losses, demand growth, and investment requirements. While the first three of the above parameters would determine the amount of power purchase costs that the utility will be allowed to recover through the tariff, the fourth parameter would provide the utility with information about the regulator's view as to the extent of investment that will be needed. Given the poor condition of the network and the lack of reliable data, this exercise may have to be undertaken in a careful and well planned manner. Even if a SERC is unwilling to pronounce a full medium term tariff order, that takes into account all expenses over the next five years, it may be willing to consider an order that provides clarity with respect to these four parameters.

Since the power purchase costs constitute the major proportion of the costs of the distribution company and steep increases in consumer tariff is being generally resisted, the input tariff rate from generation companies will need to be reviewed carefully.

#### **8.4 Principles and guidelines for regulators**

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It is necessary that the Regulatory Commissions operate in a framework which provides them the necessary autonomy and empowerment to take decisions. There should be predictability and continuity through clear rules and procedures, public announcements of issues under consideration, opportunity for all concerned parties to participate, transparency of the Commission's decisions through a detailed written order and the opportunity for appeal against the Commission's decisions through review petitions. The regulatory framework should not provide any scope for regulatory uncertainty in terms of tariff setting, losses to be allowed etc. when potential investors come up for bidding of distribution areas. No bidder would be keen to bid if there is uncertainty regarding approach to tariff fixing, basis for asset valuation, expected performance levels and time frames associated with these parameters for the initial few years.

While it is important to create a competitive environment to ensure that customers get the best advantage, it is equally important to motivate investors to infuse funds into the sector. An investor's interest to invest in the power sector can be created only if the regulatory mechanism, policies and various systems and procedures provide an environment and assurance that their investment is equally remunerative in the power sector as it is in other sectors.

*Government of India should formulate a comprehensive tariff policy, including a multi year tariff approach and notify the same for necessary action by the Regulatory Commissions.*

#### **8.5 Attracting the right people**

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A key issue, which could impact the effectiveness of the functioning of the CERC and SERCs, is the issue of institutional strengthening. Commissions need to be able to attract high caliber professionals, to ensure effective and credible functioning. The current framework provides little incentive for many professionals to join the Regulatory Commissions since there is a lack of clarity regarding potential career path. Currently, it is difficult for relatively young candidates to join since they do not see a career in being part of the commissions. Training

programs including international experiences need to be organized to generate the requisite shifts in the Commissions to enable the employees to discharge their responsibilities.

## **9 Tackling major/transition issues**

### **9.1 Deciding on the Transition path till turnaround**

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The Private investor upon taking control of the distribution entity would be inheriting a company, which would be beset with problems of the past. The problems would include high T&D losses, lack of commercial orientation and non-reflective tariffs etc.. It would be futile to imagine that mere privatization would solve these problems immediately. A transition period would thus be essential for the entity to transform itself from the present status to a well-managed profitable entity.

The transition path set for the private investor would need to consider the following major issues:

- Base line data and projections;
- Cost related issues;
- Revenue gap and arrangements for financing the same;
- Capital project funding;
- Regulatory issues;
- Legal issues; and
- Other issues.

#### ***9.1.1 Base line data and projections***

The main issue of contention would be the starting point for T&D loss reduction and the reduction path to be assumed. In relation to the initial or starting conditions it would be important that the government and the private investor agree upon the values for the same. In order to determine the baseline data, which would serve as the starting point, agencies may be appointed prior to privatization. State governments may identify these agencies to do these assignments. Further, with the aggressive metering programme being undertaken, this task may become easier. The loss reduction pattern would depend upon a number of factors such as amount of losses, load mix, investments, effectiveness of anti-theft legislation etc, and prescribing a generic loss reduction profile could be difficult although an initial agreed transition path would definitely be useful. Some conclusion may also be drawn from international experiences. Details of the same have also been provided in Annexure 1. A reduction of about 10 % in T&D losses over a period of 5 years has been observed in certain Latin American countries. However the extent of actual reduction in losses would also vary depending on starting conditions. It would also be appropriate to provide incentives to the investors for any additional loss reduction above the target level. In case of privatization exercise being undertaken in Delhi,

it is envisaged that if the distribution company is able to bring in efficiency improvements beyond the bid value, the distribution company may be entitled to retain 50% of the additional revenue and the balance 50 % being used for reducing the tariffs.

### ***9.1.2 Cost related issues***

In Orissa as may be argued, resulted in increase in costs of distribution operations. One reason for this is that prior to privatization, the generation and transmission companies had not charged any returns to the downstream units. However, post privatization the generation and transmission companies charged the same and this has increased the total costs in the system by about Rs. 300 crores. This may have to be examined closely, as the burden of increased costs in generation and transmission would have to be borne/recovered by distribution companies. This may be difficult, as it may result in tariff shocks.

### ***9.1.3 Revenue gap and arrangements for financing the same***

The power sector in its present state is unable to recover its costs and is thereby making losses. The reasons are mainly T&D losses and non-cost reflective tariffs. Till the turnaround in the sector takes place, it is likely that the sector would be making losses.

*Normally, it is assumed that a transition period of 5-6 years would be required. During the transition period, the revenue deficit along with proposed investments in the sector would have to be met. A definite plan for meeting requirement of funds during transition has to be agreed prior to privatization.*

The measures for meeting the revenue deficit would include:

- Reduction in T&D losses & improvement in collection efficiency;
- Tariff increases;
- Subsidy from the state government. The commitment of the state government should be firmly institutionalized through the establishment of a Power Sector Reform Fund (PSRF). The state government should credit privatization proceeds into the PSRF for the sole purpose of restructuring the power sector and the same should not be used for other expenditures of the government. By removing such uncertainties, the state government would be able to realize a better value at the time of privatization;
- Equity requirement to finance part of the deficit; and
- Bond financing may be contemplated for these losses. However, the security mechanism may have to be finalized. It may be mentioned that prior to privatization, these bonds were backed by state government guarantee. Since, this mechanism is being contemplated in lieu of subsidy, government guarantee may have to be considered. Further, the debt servicing of these bonds would have to be recognized by the regulator.

In the case of privatization in Delhi, in order to mitigate the uncertainty during the transition period, it is proposed that the bulk supply tariff

for the distribution companies may be set at a level that can be supported by the revenues. A backward calculation has been carried out for determination of bulk supply tariffs wherein all the expenses other than power purchase expenses shall be deducted from the revenues to arrive at the power purchase cost. The per unit bulk supply price shall be determined by dividing the power purchase cost by the projected units input. The revenues from sale of power and other income each year will be projected at existing and proposed retail tariffs on the level of Aggregate Technical & Commercial Loss (AT&C loss) committed by the selected investor for each year in the bid.

The resultant gaps if any, between the bulk supply tariff so determined and the actual cost of power for transmission company at the point of supply, shall be met through support from the GNCTD in the initial three years. This support shall be in the form of loan to the transmission company. The bulk supply tariff of the distribution companies shall in effect be lowered to the extent of the support, which in turn will ensure that the distribution companies are viable.

An example of the transition path for a representative state has been attempted for illustrative purposes (Annexure 6). It provides an idea of the subsidy required during the transition period and as may be observed from the analysis, even a modest efficiency gain results in considerable reduction in losses and need for subsidy.

#### ***9.1.4 Capital project funding***

The distribution companies in India are characterized by huge transmission and distribution losses. It is imperative that investment to improve the system and also, to expand the system for additional capacity need to be made to achieve the desired reduction in these losses, especially transmission losses.

The distribution companies, in the initial years and till turnaround would not be having significant internal accruals. To facilitate the investment, these companies would look towards outside sources for funding these investment requirements. However, as the companies would be suffering losses very few agencies would come forward to finance these entities.

Soft funding under the GoI's APDP programme for meeting capital investment needs and transition period financing should be provided to the distribution companies.

*Government may assist / facilitate availability of funds through agencies such as the World Bank, Asian Development Bank, International Finance Corporation, Power Finance Corporation.*

#### ***9.1.5 Working capital gap***

The investors would be taking over entities, which are highly inefficient in their working capital management. The earlier SEBs survived on

the fact that in case payments from the consumers does not come through they would delay/not pay their payments for power purchase. However, once these distribution companies are privatized the same system can not continue. In this scenario, initially when the payments from the consumers are not forthcoming, loans (with lower coupon rate) to fund the gap between the revenue collected and the working capital requirement would greatly help the distribution companies. In this regard the central government could consider funding by the government agencies, which may be linked to the performance by the states of reform milestones. Such funding may be provided without the usual restrictions on borrowing limits of the states. A plan should be developed by the private sector to identify this gap based on realistic cash flow, recovery rate, progress in reducing energy losses, improving billing and collection etc.

*Bridge finance, tax-free bonds etc. could be useful way by which during the initial 3-5 years the transition could be facilitated. Funding of working capital gap on a reducing scale would have to be considered. The model evolved by Delhi Vidyut Board (DVB) and Government of Delhi may be considered.*

### **9.1.6 Regulatory issues**

#### **9.1.6.1 Licensing**

The distribution companies are licensees as per the ESA Act, 1948. Further, the licenses are issued by the Commission for a fixed term. The Regulator has the powers to revoke the license. Since, the distribution companies are operating in an environment wherein, the companies are making little or no returns, it is necessary that the Regulator takes a long term view on the term of the license. The Regulator should fix the period of the license long enough such that the sector turns around and the investor has made enough returns. The Regulator, once the sector turns around, may issue more licenses in the same distribution area in order to introduce competition.

RFQ/RFP documents, with required clarity on baseline data, targets for improvement, asset list and valuation, treatment of past losses, treatment of receivables, accurate and specific details of liabilities like pension, PF, gratuity etc. a minimum 5 year tariff perspective, modality of transfer, should be prepared. These should to the extent necessary be accepted by the Regulatory Commission in advance or should be binding so that the risk perception of the private investor is reduced.

### **9.1.7 Legal issues**

Indian Electricity Act (1910) contains penalty provision in relation to non-payment of dues, theft and malpractice. However, in the past there have been enforcement-related issues on the same. In the case of Andhra Pradesh a bill has been passed in the state legislature and has further received the consent from the President in October 2000, thus amending certain provision of the aforesaid act. The bill provides for stiff

penalties for non-payment such as imprisonment for a maximum of five years and a minimum of three months & penalty of a maximum of Rs. 50,000 and a minimum of Rs. 5000. Further, a person once convicted for the offences shall be debarred from getting any supply of energy for a period of two years. Thereafter, Karnataka, Madhya Pradesh, West Bengal and Uttar Pradesh have also passed similar stringent state laws relating to theft of electricity.

According to the Electricity Bill introduced in the parliament, the punishment for theft includes imprisonment for a term which may extend to three years, or with fine, or with both. A person having been once convicted of an punishable offence and being again guilty, shall be punishable for the second or subsequent offence for a term of imprisonment which shall not be less than six months but which may extend to five years and shall also be liable to fine which shall not be less than twenty five thousand rupees.

*If it is expected that Electricity Bill which has been introduced in the parliament may take time, the government may consider issuing an ordinance on the subject of theft.*

### **9.1.8 Other issues**

#### **9.1.8.1 Escrow related issues**

It is likely that when the private entity takes over the operations of the distribution company, there could be certain areas for which the revenues might have been earmarked for certain projects. Further, there might also be a requirement of earmarking receivables in the future. Thus there would be a need to implement a suitable structure which would take care of such issues after the private entities have taken over the distribution companies.

#### **9.1.8.2 Centre to link reform with the following**

The subject of power being a concurrent issue, it is essential that states undertake reforms with urgency. The central government needs to encourage and support states for rapid implementation of privatization. In this scenario, the following instruments can be considered:

- CPSUs power allocation on preferential basis

The power available from NTPC, NHPC, NPC and NLC plants forms an important source of power for the SEBs in the country. Approximately, thirty percent of the power requirement of the SEBs is met by these organizations. As the SEBs are highly dependent upon them for their power requirement, it is likely they would like to maintain the present share in the system. In this context, the Centre would be able to incentivise SEBs to implement reforms by linking power allocation with the progress in reforms. The Centre would give

preferential treatment to the states, which implement reforms. While undertaking this exercise, the government may have to provide due considerations to existing agreements and directives in existence for sharing among different states. Further, such preferential allocation may be easier for new allocations.

- Powergrid investment in the state may be linked to concrete reform initiatives with specified milestones undertaken by the state.
- Assistance from PFC / REC

PFC provides financial assistance to the extent of 80% of the cost of the scheme for state sector projects as per its normal operational policy. The Centre could initiate schemes through these organizations for implementing its policies. In the past, in order to incentivise SEBs to implement metering plans, PFC had disbursed loans with a four percent interest subsidy. Further, PFC had also relaxed some of the eligibility criteria such as 3% rate of return, availability of exposure limit and minimum economic or financial rate of return. REC too gives substantial loans for the rural electrification schemes. Incentives could be given through REC also, for carrying out certain activities.

Under the Mega Power Policy, the benefits from cheaper power of mega projects is to be given to only those states that privatize distribution in cities with population over one million. This needs to be adhered to. Extending this to cover privatization of cities with population over five lakhs may be considered. This initiative has tremendous potential to provide right momentum in the reform process.

*Power being a concurrent subject, there may be a need to incentivise states to conform with the directives of the Centre. This could be achieved by linking reform initiatives with activities of CPSUs. While undertaking this exercise, it would need to be ensured that no existing laws and directives applicable for such agencies are violated. Extending this to cover privatization of cities with population over five lakhs may be considered.*

### 9.1.8.3 APDP Scheme

Availability of funds for states under the scheme may be linked to specified reform initiatives. The funds may be utilized only for funding and supporting reforms in T&D and payment may be linked to specified milestones. Further, for the states where privatization has been undertaken, the assistance under the scheme may be made available to the distribution companies on the same terms as that received from the centre. In this regard, there would also be a need to streamline this process.

## 10 Annexures

### Annexure 0

### Terms of Reference of the Committee

No.23/9/2001-R&R  
Government of India  
Ministry of Power  
\*\*\*\*\*

Shram Shakti Bhavan, Rafi Marg,  
New Delhi, the 9<sup>th</sup> March, 2001

Recognizing the critical importance of reforms in the distribution sector for the restoration of financial health in the power sector as well as the need for attracting private sector participation in distribution, it has been decided to constitute a Committee comprising the following persons to examine various issues and suggest suitable policy and other measures:-

- |     |   |                       |
|-----|---|-----------------------|
| 1.  | Shri Ashok Basu, Secretary, Ministry of Power                 | Chairman              |
| 2.  | Shri J.L. Bajaj   | Chairman UPERC Member |
| 3.  | Shri Jairam Ramesh, Dy. Chairman, Plg. Board,<br>Karnataka.   | ”                     |
| 4.  | Shri Deepak Parekh, Chairman, IDFC                            | ”                     |
| 5.  | Shri K.V. Kamath, CMD, ICICI                                  | ”                     |
| 6.  | Dr. Uddesh Kohli, Ex-CMD, PFC                                 | ”                     |
| 7.  | Shri R.V. Shahi, CMD, BSES                                    | ”                     |
| 8.  | Shri Sumantra Banerjee, MD, CESC, Calcutta                    | ”                     |
| 9.  | Shri Charles Lenzi, AES, CESCO                                | ”                     |
| 10. | Shri T.L.Shankar, Principal, ASCI                             | ”                     |
| 11. | Principal Secretary, Power GONCT Delhi                        | ”                     |
| 12. | Principal Secretary, Energy, Government<br>of Andhra Pradesh  | ”                     |
| 13. | Shri S.J. Coelho  | ”                     |
| 14. | Shri V.V. Desai   | ”                     |
| 15. | Shri Ajay Shankar, Joint Secretary(R&R),<br>Ministry of Power | Member Secretary      |

2. The terms of reference of the Committee would be:

- (a) Review of Coelho Committee recommendations and their implementation;
- (b) Review of privatization of distribution in Orissa and experience of other distribution licencees in India.
- (c) Suggest viable strategies/measures for attracting private sector participation in distribution with special reference to:

- methodology of seeking private sector participation;
- handling of past liabilities and making of the privatization offer attractive for potential investors;
- regulatory framework and policy;
- issue of introduction of open access in distribution;
- possible linkage of private investments in generation with taking over of responsibility for distribution;
- increasing number of potential investors.

While doing so the Committee would also take into account international experience specially in other developing countries and transition economies.

(d) Recommend appropriate management structure of distribution in rural areas with special reference to:

- Feasibility of attracting private sector investment in distribution of large rural areas;
- Decentralized management through Panchayats, Cooperatives/Users Associations/Franchisees.

While doing so the Committee would also take into account experience of other developing countries.

(e). Measures for improving management of distribution in the SEBs with special reference to management and incentive systems and enforcement of accountability.

(f) Any other aspect relating to distribution that the Committee considers relevant.

3. The Committee will submit its report within three months from the date of constitution. Secretarial support to the Committee would be provided by the Power Finance Corporation who would also bear the expenses relating to the work of the Committee.

(A. K. Sachan)  
Director  
Tel: 371 4000  
Fax: 371 7519

All Members of the Committee

No. 23/9/2001-R&R  
Government of India  
Ministry of Power

Shram Shakti Bhawan, Rafi Marg,  
New Delhi, the 3<sup>rd</sup> May, 2001

**Subject:** Setting up of a Group for suggesting distribution reforms policy – regarding.

In continuation of this office order of even number dated 9<sup>th</sup> March 2001, it has been decided to include Shri Birendra Kumar, MD & CEO, SBI Capital Markets Ltd., as a as a member of the Group headed by Secretary (Power) constituted vide order of even number dated 9<sup>th</sup> March 2001, for examining various issues in the electricity distribution sector and suggest suitable remedies.

(A.K.SACHAN)  
Director  
Tel: 371 4000  
Fax: 371 7519

To

Shri Birendra Kumar, MD & CEO, SBI Capital Markets Ltd.  
(Copies of order dated 9<sup>th</sup> March 2001 is enclosed)

Copy to all other Members of the Committee:

1. Shri J.L. Bajaj, Chairman, UPERC
2. Shri Jairam Ramesh, Dy. Chairman, Plg. Board, Govt. of Karnataka
3. Shri Deepak Parekh, Chairman, IDFC
4. Shri K.V. Kamath, CMD, ICICI
5. Shri R.V. Shahi, CMD, BSES
6. Shri Sumantra Banerjee, MD, CESC, Calcutta
7. Shri Charles Lenzi, CEO, AES-CESCO
8. Principal Secretary, Power GONCT Delhi
9. Principal Secretary, Energy, Government of Andhra Pradesh
10. Shri S.J. Coelho, Expert
11. Shri V.V. Desai, Expert
12. Shri T.L. Shankar, Expert
13. Dr. Uddesh Kohli, Expert
14. Shri Ajay Shankar, Joint Secretary (R&R), Ministry of Power

Copy for information to:

1. PPS to Secretary (P)/ SS(P)/AS(P)

( S.K.Chatterjee )  
Desk Officer

No. 23/9/2001-R&R  
Government of India  
Ministry of Power  
\*\*\*\*\*

Shram Shakti Bhawan, Rafi Marg,  
New Delhi, the 16<sup>th</sup> May 2001

**Subject:** Setting up of a Group for suggesting distribution reforms policy – regarding.

In continuation of this office order of even number dated 9<sup>th</sup> March 2001 and 3<sup>rd</sup> May 2001, it has been decided to include Shri G. Sanjeeva Reddy, President, Indian National Trade Union Congress (INTUC), as a member of the Group headed by Secretary (Power) for examining various issues in the electricity distribution sector and suggest suitable remedies.

(A.K.SACHAN)  
Director  
Tel: 371 4000  
Fax: 371 7519

To

Shri G. Sanjeeva Reddy, President, INTUC  
(Copies of order dated 9<sup>th</sup> March 2001 & 3<sup>rd</sup> May 2001 are enclosed)

Copy to all other Members of the Committee:

1. Shri J.L. Bajaj, Chairman, UPERC
2. Shri Jairam Ramesh, Dy. Chairman, Plg. Board, Govt. of Karnataka
3. Shri Deepak Parekh, Chairman, IDFC
4. Shri K.V. Kamath, CMD, ICICI
5. Shri R.V. Shahi, CMD, BSES
6. Shri Sumantra Banerjee, MD, CESC, Calcutta
7. Shri Charles Lenzi, CEO, AES-CESCO

8. Principal Secretary, Power GONCT Delhi
9. Principal Secretary, Energy, Government of Andhra Pradesh
10. Shri S.J. Coelho, Expert
11. Shri V.V. Desai, Expert
12. Shri T.L. Shankar, Expert
13. Dr. Uddesh Kohli, Expert
14. Shri Ajay Shankar, Joint Secretary (R&R), Ministry of Power
15. Shri Birendra Kumar, MD & CEO, SBI Caps Market Limited

Copy for information to:

1. PPS to Secretary (Power)/ PPS to Special Secretary (Power)

( S.K.Chatterjee )  
Desk Officer

No. 23/9/2001-R&R  
Government of India  
Ministry of Power  
\*\*\*\*\*

Shram Shakti Bhawan, Rafi Marg,  
New Delhi, the 3<sup>rd</sup> October 2001

ORDER

It has been decided to co-opt Shri Rajendra Singh, Ex-Chairman & Managing Director, NTPC as a member of the Committee on Distribution Reforms, constituted by this Ministry under the Chairmanship of Secretary (Power) for examining various issues in the electricity distribution sector and suggest suitable remedies.

(Prabhakar)  
Under Secretary to the Govt. of India  
Tel: 3320 759

To

Shri Rajendra Singh, Ex-CMD, NTPC, New Delhi

Copy to all other Members of the Committee:

1. Shri J.L. Bajaj, Chairman, UPERC
2. Shri Jairam Ramesh, Dy. Chairman, Plg. Board, Govt. of Karnataka
3. Shri Deepak Parekh, Chairman, IDFC
4. Shri K.V. Kamath, CMD, ICICI
5. Shri R.V. Shahi, CMD, BSES
6. Shri Sumantra Banerjee, MD, CESC, Calcutta
7. Shri Charles Lenzi, CEO, AES-CESCO
8. Principal Secretary, Power GONCT Delhi
9. Principal Secretary, Energy, Government of Andhra Pradesh
10. Shri S.J. Coelho, Expert
11. Shri V.V. Desai, Expert
12. Shri T.L. Shankar, Expert
13. Dr. Uddesh Kohli, Expert
14. Shri Ajay Shankar, Joint Secretary (R&R), Ministry of Power
15. Shri G. Sanjeeva Reddy, President, INTUC
16. Shri Birendra Kumar, MD & CEO, SBI Caps Market Limited

Copy also forwarded for information to:

1. PS to MOP/PPS to Secretary (Power)/ Sr. PPS to SS(P)/PS to JS (RR)/ PA to Dir (RR)/PA to US(RR).

(Prabhakar)  
Under Secretary to Govt. of India  
Tel: 3320 759

Annexure 1

**10.1 International experience on privatisation**

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**10.1.1 Privatization of distribution**

Electric utilities in most developed and developing countries were traditionally government owned. In USA there were largely private investor owned utilities. The electricity supply business was considered a natural monopoly and therefore kept primarily in the public sector. The institution of independent Regulatory Commissions was evolved in the early part of the twentieth century in USA to regulate the private investor owned utilities. The restructuring of utilities followed by privatization and / or introduction of gradual or phased open access in distribution is relatively recent phenomenon, beginning in the late 1980s.

Several countries have undertaken reforms and privatization. The underlying reasons for change have been different in different countries while some trends have been common. The major drivers for change in developed countries, such as UK and USA, have generally been changed political and economic thinking. It was felt that objectives of efficiency, lower price levels and better service to the consumer could be achieved by introducing competitive forces in the sector and treating generation as an activity that could be undertaken competitively and therefore left to market forces. The wires business of transmission and distribution only need to be seen as naturally monopolistic.

Accordingly, the consumers would benefit through the efficiency gains from deregulation and competition in generation and supply and the network for transmission and distribution should provide non discriminatory open access with the transmission and distribution tariffs being regulated.

UK was a pioneer in unbundling its government owned vertically integrated utility and privatizing it and introducing generation to continuous competition through a spot market and a power pool. In USA, which is a very large federal country, the situation varies across states. California was a pioneer in attempting to replicate the UK approach. In contrast, drivers for change in developing countries such as in Latin America and South East Asia have been poor performance and public sector financial constraints. While in developed countries, the availability and quality of supply was not an issue, developing countries were facing increasing demand supply gaps. Private sector investment was seen as necessary to upgrade existing systems and to finance additional capacities. While the conditions prevailing in the power sector in Europe and USA were different from those in India, the Indian situation may be found to be closer to some of the Latin American and South East Asian countries.

There have been more than 70 electricity distribution privatization's over 1992-1999 of which about half have been in Latin America. An in-house survey from the IFC/WB estimates that during 1992-1999, 12 developing countries carried out privatization of distribution in different forms through 74 transactions valued at \$ 38 bln.

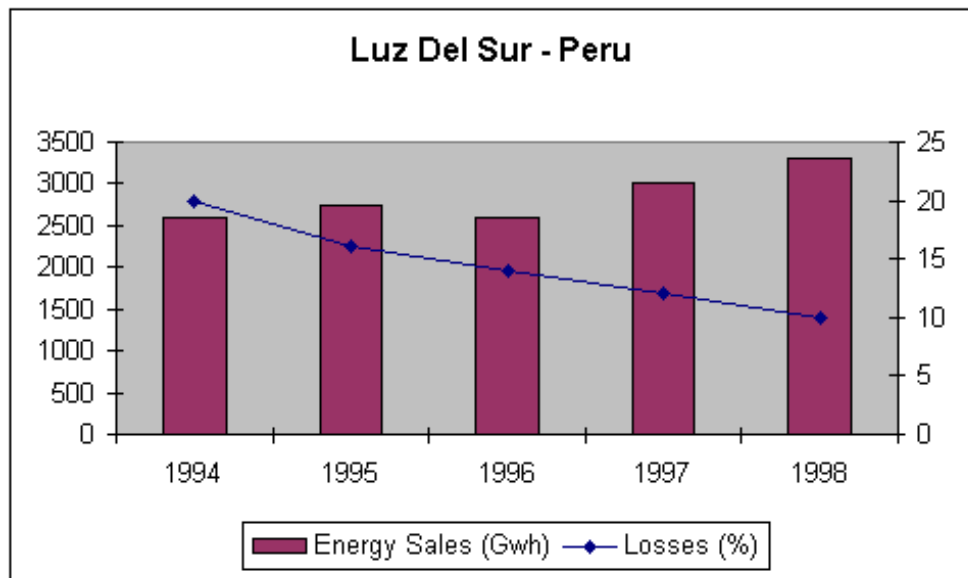
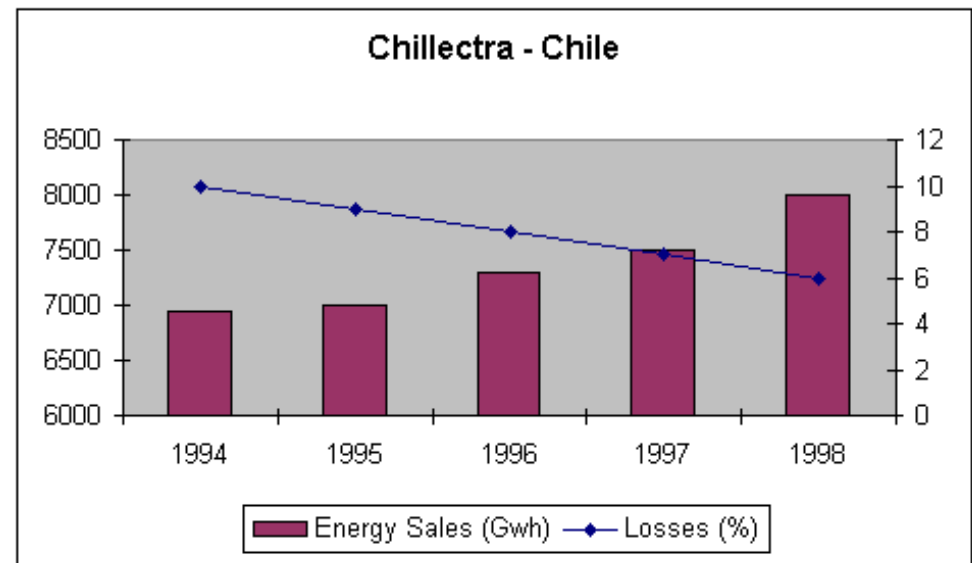
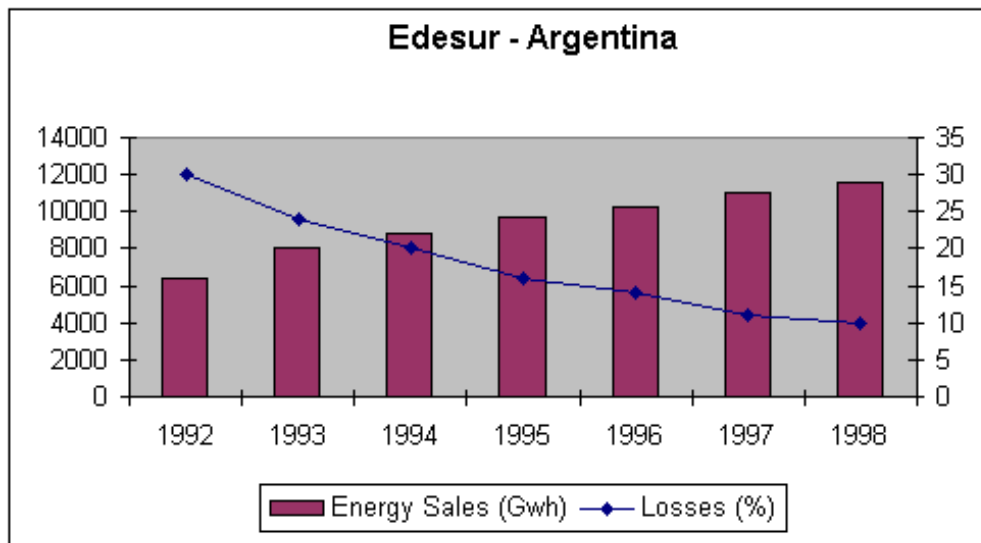
#### PRIVATIZATION OF DISTRIBUTION NETWORKS 1992-99

Country	Number of Sales	Range of Dates	Total Customers ('000)	Sale Amount (\$mil)	Sale Amount Present Value (\$mil)	Proceeds (PV) (\$mil)	Adjusted Proceeds (PV) (\$mil)	Adjusted Enterprise Value (PV)
Argentina	18	Sep 92-Jun 98	6,416.00	2,816.00	3,134.00	3,412.00	3,097.00	4,894.00

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Brazil	17	Jul-95 - Sept 98	26,871.00	18,141.00	19,041.00	20,784.00	20,205.00	36,780.00
Peru	9	Jul 94 - Nov 98	2,066.00	604.00	665.00	665.00	665.00	1,315.00
Hungary	6	Dec-95	4,965.00	1,100.00	1,207.00	1,230.00	1,230.00	2,618.00
Australia	5		1,990.00	6,257.00	6,888.00	6,888.00	6,888.00	8,224.00
India	4	Apr 99 - Sep 99	1,320.00	37.00	38.00	1,113.00	113.00	222.00
El Salvador	3	Jan-98	883.00	586.00	611.00	611.00	611.00	769.00
Colombia	3	May 97-Aug 98	2,890.00	1,953.00	2,041.00	2,672.00	2,672.00	4,857.00
Bolivia	2	Aug 95 - Dec 95	397.00	116.00	128.00	142.00	142.00	144.00
Domin.Rep	2	Apr 99 - Sep 99	812.00	321.00	325.00	349.00	349.00	698.00
Guatemala	2	Jul 98 - Jan 99	1,114.00	621.00	638.00	689.00	689.00	861.00
Panama	2	Sep-98	454.00	302.00	309.00	309.00	309.00	606.00
Georgia	1	Nov-98	370.00	26.00	26.00	84.00	84.00	113.00
Totals:	74	Sep 92 - Sep 99	50,549.00	32,880.00	35,050.00	37,950.00	37,055.00	62,102.00

Further, another IFC / World Bank (WB) study reports that energy losses in distribution significantly declined within 2-6 years following privatization in Argentina, Chile and Peru. Accordingly, increasing number of governments from the developing/developed countries are actively encouraging and seeking private sector participation in their respective power distribution operations.



As an illustrative example, we can look at the Argentina experience, which has been accepted as being successful. By the late 1980s, the electricity sector in Argentina was confronted with severe supply and financial problems arising from an inadequate and confusing legal / institutional framework, poor tariff policies, heavy debt burdens, reliance on contribution of the Federal (Central) Government, physical deterioration of facilities due to inadequate maintenance and upgradation and lack of consistent planning.

The Government of Argentina (GoA) launched a substantial restructuring and privatization program in 1991. Essential elements of the power sector reform included implementing tariffs necessary to recover costs, providing a new regulatory framework under which generation,

transmission and distribution functions were separated and initiating privatization of state owned agencies. The restructuring process in the country also saw the establishment of an independent regulatory body and finally the creation of a wholesale electricity market. Privatization commenced in 1992 with the sale of state owned assets in generation and distribution. Most of the initial privatization's resulted in the private sector owning at least 51% of the assets, with the GoA retaining no more than 39% and 10% set aside for employees. Subsequently, most of the GoA holding was reduced to less than 10% through further sale to international private players. Further, the bidding was done on the basis of multi year T&D loss reduction.

A good example of a distribution company success story is Edenor, one of the three distribution companies initially privatized in the Buenos Aires area. Edenor has a service area of 4,400 sq km with a serviceable population of about 7 million people. The situation of the company at the time of takeover by private sector was dismal. Total energy losses were about 30% and average financial losses were over \$13 million monthly. There were frequent power interruptions, a de-motivated workforce, oversized payroll, widespread internal corruption, social and political problems with users in poor neighborhoods (500,000 families) and low customer satisfaction.

The private company initiated a change in the corporate culture of the organization by partial employee reduction through negotiations with the unions, inducting performance evaluations, implementing new systems (for administration, billing, collection, customer management etc.), and tackling internal corruption strictly. A big challenge for the company was to deal with non-paying customers and illegal users in poor neighborhoods. It successfully managed to change 'illegal users' to 'customers'. This, coupled with an effective regulatory framework, ensured that the company could turn around its operations successfully.

Edenor managed to reduce energy losses from about 30% in 1992 to 11% in 1998. The total workforce was reduced from over 6,300 employees in 1992 to less than 3,000 in 1998. Operating costs were brought down by 50% in the same period. Frequency of interruptions decreased by over 65% in a span of five years.

It should be noted that although the market structure and regulatory framework in Argentina were well conceived and implemented, they were viewed with suspicion, by the public, in the initial years of the privatization program in 1992-93. However, after the transition period had passed and positive results started showing, the mood turned positive. Also, selling off state assets in Argentina was not totally cost free for the government. In order to enhance the success of the restructuring and privatization program, the GoA agreed to retain some of the debt from the state assets. This debt associated with privatization was offset partially by influx of foreign investment subsequently. Further, it should be assumed that the overall debt of the government would have been much higher without the privatization process, which reduced losses and brought about efficiency in the system.

#### Observations from international experience

The unbundling of functions of generation, transmission and distribution into separate entities is a general trend in most countries including several developing countries. Unbundling has helped in introduction of competition in the various segments of power industry and has facilitated the privatization process. Following privatization, in Argentina wholesale electricity prices fell about 60 percent from the pre-privatization level of \$60 per megawatt hour in August 1992.

Considerable preparatory work needs to be carried out prior to reforms. Argentina had to attract foreign players since the poorly developed Argentine capital market did not present alternative options, given the size of the investment to be made by the private sector. Also, there was a shortage of domestic operators with enough experience and financial strength. Preparation was done in two areas viz. conceptualizing a dynamic approach for private sector participation and result oriented marketing to potential investors. Business houses that could form viable, individual commercial entities were identified. Detailed information on technical, commercial, administrative, economic and accounting aspects was prepared and incorporated in the tender documents. The whole process was guided by a philosophy of transparency, in order to satisfy the needs of public opinion, legislative requirements and expectations of potential investors. Besides Argentina, other countries such as Guatemala and Panama, which had successful privatization of distribution companies also paid strict attention to how they communicated with potential investors. Investor uncertainty manifests itself in the form of reduced asset valuations and bids. These countries have used the most effective way of reducing uncertainty, which is through clear provision of information sharing.

The degree of private sector participation varies across countries. Typically, the ownership in generation and distribution was transferred to private players in a phased manner through a reduction in government stake. Transmission has remained a monopoly in most countries, mainly in the public sector. A significant point to note is that South East Asian countries have not experienced the fundamental restructuring seen in Latin American and European countries. Generally, the pressures to expand generation capacity in order to improve availability of supply has meant that South East Asian countries have focussed on generation first and then on distribution. This has led to lesser progress in the power sector as a whole as is the case in India.

The extent of competition varies across countries. To regulate monopolies (including transmission companies, distribution companies having service area monopolies and for upcoming generation projects / companies), an independent regulator has always been seen as a necessity. In cases where there has been a stable consistent, credible and independent regulatory framework, privatization has been very successful e.g. Argentina and Peru.

Countries, which have addressed employee concerns better, have had a greater level of success with distribution privatization e.g. Hungary and Argentina. Governments have addressed this challenge in many ways. Some of the mechanisms that have been employed are training programs, severance benefits, service contracts for organizing outsourcing arrangements with former employees, ownership programs including the provision of shares at deep discounts, and the placement of privatization proceeds into a fund providing support for displaced workers.

International experiences could at the most, serve as a guideline. In totality they may not be fully relevant as the conditions in India could be significantly different from those in these countries. Yet, these experiences could be useful in restructuring of the power industry in India.

## Annexure 2

### **10.2 Rural Electrification - International Experiences**

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The business of non-urban distribution is substantively different from that of electricity distribution in urban areas that have compact distribution systems and denser loads. This section presents the manner in which non-urban electricity distribution was provided in a number of countries, including the USA, Bangladesh, Thailand and also in Latin America, where a number of countries have recently privatized their distribution businesses. In all these cases, non-urban electricity distribution was not a part of the main distribution privatization, but a number of alternative approaches were adopted to ensure that the objective of rural electrification was achieved.

#### (A) Rural Co-operatives in Bangladesh

The Rural Electrification Board (REB) executes rural electrification projects in Bangladesh. It started its operation on January 1, 1978. Until then, the Power Development Board (PDB) was the only power supply authority. One of the main characteristics of REB's operation is to electrify rural areas not by itself but through Palli Bidyut Samiti (PBS), an independent users' association. REB is an organization that supervises, manages and extends financial support (including interacting with donor agencies) to all PBSs in Bangladesh. Beginning from the creation of a PBS, the REB provides extensive advice and help on technical, financial management, human resource development and other related activities. As a new PBS establishes its operation, the REB's role gradually reduces. As on October 1998, the government had approved 67 PBSs and 54 PBSs had started operation. The REB/PBS jointly have 96,000 km of distribution lines, 165 substations, and is estimated to supply power to 23 million residents in the rural area.

U.S. Agency for International Development (USAID) has supported the rural electrification project in Bangladesh from the onset. Of its own, the program has to date received sponsorship from 15 international donors, who have contributed over \$ 900 Mn. U.S.A. had carried out electrification in rural areas by introducing a co-operative method since 1930s and the National Rural Electrification Co-operative Association (NRECA), which is a central organization of rural electrification co-operatives in the U.S.A., was entrusted by USAID to extend technical assistance to REB. The REB's rural electrification projects show good performance. With a T&D loss ratio in FY1997 of 16.3%, much lower than PDB or Dhaka Electric Supply Authority (DESA), which was nearly 30%. The PBS's average tariff collection ratio was also high, at 95.2%.

#### Organization of the PBS

PBS is a co-operative organization and as such it is organized and managed by participation of beneficiaries. The organization is headed by end users of electricity, called "members" of a co-operative. Under the members, there is a Board of Directors, which consists of 12-15 directors who are elected from co-operative members. The board has a decisive power over all aspects of management of the PBS including investment plans and financial management. The directors are unpaid and their term of office is for three years. One third of the directors are re-elected every three years. Under the Board of Directors, there is a General Manager (GM) who is selected by the board and approved by REB whose term of office is for three years. The GMs manage the actual day-to-day business of PBS. If a GM acts dishonestly or achieves unsatisfactory results, REB or the Board of Directors can dismiss him, as has happened in the past.

The success of rural electrification, operated through users co-operative, largely depends on whether its beneficiaries, rural residents, can actively participate in the project. PBSs have special division for Member Education to apprise beneficiaries of the rights and obligations of co-operative members. In addition, the PBS for each village appoints a Village Advisor. Advisors are honorary posts and unpaid. Their duties are to provide village people with information on operational status and policies of PBS and provide basic education such as how to use electricity, to report to

PBS on the village's needs for electricity and promote early construction of distribution lines. Meetings are held for all village advisors at the PBS twice a year. GMs communicate with customers in every village via village advisors.

REB has its own training facilities at their premises and provides extensive training programs. Training for PBSs' staff are extended by REB as well as provided by each PBS itself. REB's training is given regularly at REB's training facilities and PBSs send their staff members to the facilities. As for the courses that require orientation or on-the-job skill training, the REB's instructors assist in PBSs' training courses. On-the-job training is an important component of the training for electricians and some PBSs install training electricity poles with a transformer and connector at their premises. Since availability of electricians is essential to electrify un-electrified areas, PBSs also give training to residents who want to be electricians. In addition, PBSs have, for its own staff, customized training courses designed to meet local needs and circumstances. For example, Satkhira PBS whose customers are agricultural users, organizes training courses for the maintenance of equipment that their customers often use, such as motorcycles, power generators, and water pumps.

### Construction of new lines

The REB is, in principle, in charge of supervising construction, with actual construction done by contractors. PBSs directly carry out minor construction. For example, installation of distribution lines of less than 400m or a new transformer is directly managed by a PBS, the installation of lines between 400m-2km is done by a contractor which a PBS can select, and the REB is responsible for planning, construction and inspection of lines more than 2km. PBSs are responsible for operation and maintenance. Each PBS has, usually in its territory, 5 to 7 zonal offices, each of which has a Complaint Centre that receives and handles various customers' requests. A zonal office has 4 to 5 technicians who deal with general technical issues. If it's too difficult for the technicians at zonal office, they request help from PBS headquarters, which is connected to each complaint centre by radio. Service requests beyond the ambit of the PBSs', such as interior wiring are referred to private electricians trained by the PBS. A list of electricians with their service coverage and unit cost is maintained for such referral. In addition, customer services are provided by establishing a House Wiring and Inspection Section, to test power leakage without charge and a One-Stop Customer Centre, where customers can come with all kinds of requests or problems. The Centre keeps a 24- hours repair crew ready to be dispatched within hours after a customer request, to repair snapping of wires. Distribution line maintenance workers check equipment following REB's specifications and, if necessary, do minor repair or installation. Special manuals for testing meters are also provided. In part, due to these quick and free-of-charge services, customers would not feel it necessary to bribe the staff for a special favour. Every PBS also has a small workshop where PBS staff checks equipment such as transformers, and undertakes simple repair jobs. The warehouses are well organized and sorted item by item. For example, at one PBS a checklist is posted at the entrance of the warehouse, used for checking inventory every month. REB/PBSs' operation system is designed so as not to centralize authority and to prevent inappropriate activities by ensuring that internal check and balances can work. A Typical PBS has five divisions under the GM, that is, General Service Division (GSD), Engineering Division (ED), Construction, Operation & Maintenance Division (COMD), Finance Division (FD), and Member Service Division (MSD). The Stock management is separate from COMD and placed under GSD. The consumer's complaint service and interior wiring/inspection is not under COMD but under MSD. Billing and collection, which tends to be susceptible to corruption, belongs directly to FD. The Tariff collection procedures in the Palli Bidyut Samities are well-planned to prevent dishonesty.

### Creation of a new PBS

REB's steps to start electrification in a new area begin with a government decision to electrify a rural area. The decision depends on potential demands for electricity in the area. If an area has electricity demands from industry or agriculture, higher priority will be given to the area. A priority list, based on several criteria, is prepared for each region. Technical conditions, such as whether PDB's transmission line is available or not or whether access (road) to the area is secured, also influence the priority. Following the government's decision, REB forms, within the organization, an ad hoc project team called Institution Development Team. The team usually consists of 6-7 staff. Before establishing a new PBS, the team is dispatched to a Thana, a rural administrative unit. The team explains the outline of electrification plan to the representatives of a union, a smaller village unit that forms a Thana. At the same time, the team provides education to potential beneficiaries about the importance and convenience of electricity. After representatives of a union reach an agreement to introduce electrification, the team visits each union to have consent from residents in the union. Those who want power supply pay a small sum, which pays for the right to have power supply as well as membership of co-operative. It usually takes about three to four months for the team to complete the above-mentioned process. The Institution Development Team then chooses a representative of the area, who is to be the first director of the electrification co-operative. The director should be politically neutral and is forbidden to belong to any political party. After three years of establishment of PBS, a new director is elected by direct votes by residents in the region.

Each PBS is requested by REB to prepare a master plan on regional electrification. In order to prepare a technically and financially sound electrification master plan, expert consultants are hired to assist the preparation. As a part of creating a master plan, the consultant team conducts an intensive survey of all households within the region on matters including social and economic aspects. Priorities of villages for electrification are determined by taking into consideration results of the survey.<sup>[i]</sup>

Even though a PBS is established in a village, not all households in the village are supplied with electric power. In Bangladesh, only 15% of all households have power supply on average. Perfect electrification (all households) is not an objective of REB. Customers must be prepared to spend 6-7 dollars as an initial investment on lead-in wires and interior wiring. Only a household that who can afford such initial costs and monthly electricity fees can be a PBS member. The tariff is the same for every residential customer in a region.<sup>[ii]</sup> Under the PBS system, several members form a community group within a co-operative. If a member in the group taps electricity illegally, all the group members must pay for the cost. This means that an entire group is subject to a penalty if they cannot prevent stealing electricity. If a member fails to pay for the fee, after a 30-day grace period, he/she will be ousted from the PBS and his meters will be taken away<sup>[iii]</sup>.

### Rural electrification program financing

One of the remarkable aspects of rural electrification program is the overwhelming co-ordination that has been achieved between a group of 16 international donors. Donor funds are normally targeted for specific projects negotiated to support the phased development of the overall rural electrification program. The REB acts as the conduit for all the donor funds invested, development of new PBSs, expansion of existing PBSs and improvements to the REB/PBS system. Loan are made through the Government of Bangladesh to REB and in turn are channeled to the target PBSs in the form of equipment, materials and construction contracts, all of which are managed by REB on behalf of the PBS.

Prior to approval for development, all new PBS services areas must satisfy revenue requirement standards. Feasibility studies are performed to determine if the revenue requirements are met, not only for the entire PBS but also for each service area within the PBS. Some communities may remain un-electrified for several years until population and the associated potential for productive user loads grow to that point that they will

qualify to be included in the PBS system.

The revenue requirements standards allow for financial losses referred to as negative margins, during the first several years of PBS operation, reflecting the fact that load growth may be gradual as the system infrastructure is being developed. The electrification program is designed to support the process of PBS development by providing cash flow support as well as low-interest loans with long repayment periods. The program support funds allow PBS operations to mature through the first five years after energisation. After this period of developing load, the PBSs are expected to reach financial stability. This program support funding, while available to all PBSs, is quite limited and is very closely monitored as will be described later in this section.

#### REB capital subsidy program supports PBS development

REB and the government of Bangladesh support PBS development and operations through two subsidy programs. The first and perhaps most important is through a co-investment of the central government in the program by extending low interest, long-term financing to PBSs through the REB. Loans are provided to the PBSs for thirty years at 3% interest. However, in the first five years of commercial operation, the PBSs do not make principle payments, and interest during this period is capitalized into the investment cost of their original loans. Moreover, the interest charges for the initial five-year period are assessed at a reduced rate of 0.75% rather than the 3% program standard.

REB receives loans from the donors through the government at 2%. One percentage point is added to loans made by REB to the PBSs to cover program management cost. Furthermore, the government forgives 33% of the loan charges to REB. So of the 3% interest charges, REB retains one percent to cover its own operating expenses and in addition it collects 33% of program income that does not have to be repaid to the central government.

While these interest rates may appear to be dramatically below market rates, they are very similar to interest rates that were applied in the REA program in the United States. Moreover, if one takes into account that many and perhaps most rural electrification programs in other developing countries have experienced very poor cost recovery, the rates are not that low in comparison to loans with terms that reflect more closely market conditions but that are in fact non-performing.

#### Cash flow support helps PBSs reach sustainability

In the design phase of the REB program, it was recognized that the PBSs would require substantial financial support to help them reach financial sustainability during the initial period of infrastructure development and load growth. Several measures were designed to provide the financial support required. These included the five-year grace period for principle and interest payments mentioned above. Perhaps of equal importance was a cash flow support program that was targeted to last a maximum of five years.

System loads often grow at a very slow pace and are subject to many factors that are beyond the direct reach and scope of the rural utility to influence. The rural electrification program therefore established a policy to support PBS cash flow needs during the initial years of operation. A portion of the cash flow support is provided as a direct subsidy to the PBSs. Recognizing that the PBSs will not be able to generate sufficient revenue in early years of operation, REB established a system whereby cash flow subsidies would be provided for a period up to six years with

annual reviews to determine the level of need of each PBS. This process allows REB to assess the degree of cash flow support required in each of the first six years of operation and to determine what measures can be taken to achieve financial maturity in the earliest possible time for each PBS.

Cash flow support subsidies are first evaluated by the PBSs and REB during the annual performance review process. Once the budget allocations for these subsidies have been prepared, this information is reviewed by the Ministry of Energy before final approval is granted. REB uses a standard method to evaluate the subsidies that are granted that takes into account how many years the PBS has been in operation, how many customers it serves, the system losses for the PBS, the collection rate, and other operational metrics as reported in the annual evaluation process. If the performance indicators show that the PBS is under-performing due to poor management, other corrective actions may be taken in addition to providing additional cash flow support. REB attempts to minimize subsidies as much as possible because limited funds are allocated for this purpose and because of program policy to move as quickly as possible to financial self-sufficiency.

The table given below highlights the revenues derived from tariffs applied, subsidies (including capital and cash flow subsidies), and shortfalls for 53 PBSs. Shortfalls reflect deficits that are internally financed by using depreciation allowance to cover that portion of the cost of service that is not recovered directly through energy bills and subsidies provided by REB.

	Revenue	Subsidies	Shortfalls
New PBSs (0-5 years)	74%	26%	0%
Maturing(6-10 years)	86%	11%	3%
Mature w/o margins	83.5%	0%	16.5%
Mature w/margins	100%	0%	0%

The data reflects reported performance for 53 PBSs energized upto September 1996. There were only six PBSs included in the “new group”, which included PBSs energized between 1995 and 1996. The group of “maturing PBSs included 8 PBSs, while the “mature” groups included those PBSs energized from the beginning of the program through 1990. Of the 39 PBSs in these two groups, 17 showed positive margins during FY 1998 and 22 did not.

It is interesting to note that the mature PBSs without margins is very similar to the group of 8 maturing PBSs, only that the subsidies that are applied to the maturing group are not available to the older PBSs. Therefore, any costs that cannot be recovered are now being financed from internal reserves (depreciation funds recovered through the tariff). This implies that the pattern is more or less set for many PBSs; unless tariffs are changed or loads can be increased, they will continue to lose money.

Lastly, it should be mentioned that one factor that has offset the impact of any artificially low residential tariff is the preferential bulk power rate that REB enjoys from BPDB. The BPDB price to industrial consumers on its system averages Tk 2.45 while REB has negotiated a system price of Tk 1.77. With the recent reforms in the power sector this is yet another risk factor that could significantly contribute to program stability; as new power providers begin to sell power to BPDB and thereafter, to the Power Grid Company of Bangladesh (PGCB), REB will begin to pay increasingly “real” prices for bulk power cost.

## Tariff philosophies and effect of cross subsidization

Tariffs for each PBS are set by REB in an attempt to balance the perceived ability of the PBS customers to pay for electric service and the need for the program to sustain itself economically. Tariffs are also influenced by REB's mandate to promote rural economic development through promotion of agricultural and rural industrial production as well as provide access to electric service to as many rural households as possible.

The general approach adopted has been to create a cross subsidy between industrial or commercial clients and residential or agricultural PBS members. This approach has proved to be problematic since growth in industrial load has been slow and as such is unable to compensate for the shortfall in cost recovery from residential cost of service. As a result, 36 of the 54 PBSs are yet to achieve financial viability. The lowest tariff charged from residential / irrigation pumpset consumers \$ 0.049 / kwh (Rs.2.3 /kwh) while the highest charge was \$ 0.071 (Rs.3.33 / kwh). The overall cost of service for all PBS averaged \$ 0.066 per kwh (Rs.3.10 / kwh) as against an average revenue of \$ 0.061 / kwh (Rs.2.86 /kwh) resulting in a loss of \$ 0.005 /kwh (Rs.0.23/kwh). An increase in residential prices by approximately 30% is expected to make the PBSs financially viable. Field surveys conducted in Bangladesh have indicated that 49% of electrified households would pay upto 25% more for the service they receive, and 7.9% would pay 10% more for electric service. (Nearly 56% of the consumers was ready to pay 10% more for service received). As such, tariff reform in future is also a necessity.

### (B) Rural Electrification in Thailand

The Provincial Electricity Authority of Thailand (PEA), established in 1960, is a government enterprise in charge of power distribution under the supervision of the Ministry of Interior. While the Metropolitan Electricity Authority (MEA) covers the metropolitan area, PEA covers the rural area (See Box ). It supplies power to an area of about 510,000 square km, that accounts for 99% of Thailand's landmass. It has 1,081 operation offices, about 30,000 employees and 10 million households as customers. The System loss ratio of PEA was only 5.5% in FY 1997. Village electrification ratio in the rural area reached 98.7% in FY 1997. More importantly, the household electrification ratio was a high 86.3%.

The PEA is headed by a Governor with eight Deputy Governors; each of whom is responsible for "technique/services", "planning/system development", "construction", "operations", "maintenance", "economics and finance", and "corporate services". The Internal Audit Office, Office of the Project Co-ordination, Corporate Plan Office and Human Resource Development Office are independent and directly report to the Governor. The Two Operations Divisions are further divided into four by region as northern, northeastern, central and southern areas. Operations divisions are in charge of local operations only and the headquarters handles design and construction.

The Project Co-ordination Office has only 15 staff, but they consist of experienced personnel and are mainly in charge of co-ordinating the interests of various stakeholders related to the project execution. Their main duties are to instruct PEA's local offices to begin acquiring the right of land use in order to proceed with construction, to consult with construction contractors and designers to acquire the right of land use, to organize a meeting for concerned parties when a trouble emerges during construction, to approve payment to construction contractors and inform the Accounting Division, to recommend, if necessary, to the Governor for an extension of period, changes in construction plan or contract value, to promote communication between PEA and construction contractors or designers, to co-ordinate with Ministry of Arts, Forestry, Railways, and Roads and to prepare a monthly report on above -mentioned responsibilities and submit it to related parties and Deputy Governors.

An Office of the Internal Audit at PEA serves as a separate and independent division and directly belongs to the Governor. The Office conducts regular inspection on Management, Personnel, Welfare and Engineering Divisions and submits a report directly to the Governor. A financial approval system is designed to allow internal cross-checking. For each project, budgets and actual results are compared monthly at each office. Also, total budgets and actual results are regularly checked. Since FY 1998, post-evaluation of projects has been conducted by an outside research institute, the National Institute of Development & Administration. They evaluate “quality of services”, “satisfaction of customers”, etc. One or two districts are selected from 12 regions in the country to conduct a sample survey for three months. A survey report is also submitted to National Energy Policy Office (NEPO).

Opinions of large industrial customers are directly heard through a regional office by inviting them to the annual general meeting of the office. In addition, arrangements are made to prevent dishonest activities in tariff collection. Meter readers are PEA staff and they input the data into a portable tele-transaction computer on the spot. If any input data varies from the past data by more than 20%, the computer beeps and warns an input error. Tariff collection is done not only by their staff but also by a private company or by the head of the village. In case of contracting out tariff collection, amount equivalent to 1.5 times of monthly collection is required as a deposit to PEA.

#### (C) The Chilean Programa de Electrificación Rural (PER)

In 1994, the Chilean government evolved PER (Programa de Electrificación Rural, i.e., Programme for Rural Electrification), at the initiative of President Frei, the new Chilean chief executive, with an aim to supply electricity to 100% of the electrifiable rural dwellings within a period of 10 years and to reach a coverage of 75% by the year 2000. The programme, designed to harness the benefits of competition among different utilities to lower the cost of providing access to the rural areas, was implemented by the Ministry of Planning (MIDEPLAN) and the Regional Secretariat of Planning and Coordination (SERPLAC, the MIDEPLAN’s local representative).

The PER promotes competition between the electric utilities by offering government funds to build new distribution systems or to finance the cost of renewable energy systems, but requiring the companies to bid on projects based on the lowest installed cost. In practice, every year, SERPLAC announces the funding that is designated for rural electrification from the annual allocation from MIDEPLAN, and calls for project proposals, which state the levels of subsidy required to connect a group of households. It also decides the maximum amount of funding it will provide per “solution” (that is, for each new connection) and seeks to maximize the number of solutions using the funding it receives. The winning bidder is awarded the project, provided the funding based upon the project design, and paid the agreed-upon cost upon initiation of project construction. Projects that provide new electric connections with the lowest demand for subsidy are funded progressively, until the subsidy funds for that year are exhausted. The electric utilities have an obligation to provide service to the communities that are electrified under this program for as long as they retain ownership to the distribution lines, so that even if the projects are not profitable, they must continue to serve these areas.

It is noteworthy that competition among utilities for subsidies occurs for strategic as well as operational reasons. For instance, the utilities bid on the projects even though the income from these projects, on average, is quite marginal, as they are looking for the benefits of locking in service territory rather than for the immediate returns expected from the projects themselves. In operational terms, one of the interesting benefits the utilities earn from building the projects is a tax credit from incurring the cost of construction. In the case of the PER projects, the utilities accrue tax credit for expenditure incurred in buying equipment or paying services, even though that expenditure is met through PER funds; in effect, the taxes are paid by the PER funds. In other words, the company nets a tax credit that has a direct financial value over and above the value of the

project itself.

This programme has been quite successful in reaching the goals set by the administration, and the service areas all pay for the full operating cost of the power provided since the state explicitly limits the subsidy to a maximum of the project's initial cost. In the initial years of the PER, a number of regulatory gaps were detected, which were subsequently addressed through suitable improvements as indicated below.

### Competition for subsidy funds in Chile

During the initial years of PER, the utilities tended to overestimate construction costs where they had little competition for a viable project from an economic perspective, but for which they would receive a subsidy through the PER process. To neutralize this problem, several regional governments collaborated to establish reasonable standardized costs for line construction projects. As SERPLAC and the regional governments have gained in experience, negotiations between them and the utility have intensified. Utilities are now increasingly being held to similar cost standards and contribute a greater portion of project costs, which has increased from 13% to 23%. Another method by which the utilities increased subsidy levels was by underestimating load growth, often by leaving out significant percentages of the potential users in the project area. To address this problem, CNE and participating regional government studied load growth over time for newly electrified areas and required that utilities included all residences in the project corridor in the project profile. PER also brought to light the need for advanced planning tools at the regional level. While a majority of projects proposed by the municipalities and utilities made sense from a system point of view, some did not. With the help of newly developed GIS systems, several regional governments were able to make sure that the portfolio of approved electrification projects fit into their broader development plan.

### (D) Rural Electrification in USA

Rural Electrification Administration (REA) was established in 1935 in the U.S.A. to start rural electrification projects through Rural Electric Co-operatives (RECs) as electrification in rural area was not expected to be profitable enough for private companies to take up the business. The REA invited rural communities to borrow for their own electrification projects and electric co-operatives emerged as the typical borrowers. Standard technical and operational criteria were established by the REA in addition to oversight and loan portfolio management. Construction and other services were contracted to private sector.

Today there are around 900-electricity distribution co-operatives and about 60 generation and transmission co-operatives for power supply to 34 million residents in the USA. Nearly 45% of power distribution networks are under the control of co-operatives in the U.S.A and the co-operatives collectively own over \$ 65 billion in assets. These co-operatives come in various sizes. However, nearly three-fourths of them serve less than 20,000 consumers.

Size (‘000 consumers)	0-5	5-10	10-20	20-30	30-40	40-50	50+
Share of Co-ops	24%	24%	26%	12%	6%	3%	6%

The National Rural Electrification Association (NRECA) is a national association of all RECs in the U.S.A. Its International Programs Division has been supporting rural electrification projects in countries like Bangladesh and Costa Rica, where they have met with significant success.

Annexure 3**10.3 Metering**

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For better system planning it is suggested that Tri-vector meters installed on 11 KV feeders and above up to 400 KV, should be replaced from electro-mechanical to electronics meters. The net work of electronic meters should be spread up to 100 KVA transformer level. The following benefits shall accrue by this exercise:

1. Print out of data can be obtained;
2. Simultaneous load flow can be computed in different circuits up to of 11 KV level and in individual transformer;
3. Effective system planning is possible with this data;
4. According to load flow the optimum utilization of the available system shall be possible without any visible investment;
5. The electronic meters of accuracy class 0.2 to 0.5 be used according to the level of voltage in the system;
6. Single ratio CT's be used for metering where the accuracy class of C.T. should match the meter accuracy;
7. Consumers with higher load should be provided with electronics meters with temper proof features;
8. To reduce delay and cost of data collecting use of remote meters be introduced depending upon the infrastructure available; and
9. Only temper proof meters be used to narrow the gap of chances of pilferage of energy by unscrupulous consumers shall help in reduction of losses.

**Meters – (Classification and use)**

The flow of electricity is measured at various points such as:

1. At generating station;
2. At receiving station of Transmission net work;
3. Distribution points at total intake point, 11 KV trunk feeders. 11 KV distribution feeders, distribution transformers, L.T. out going feeders and at the premises of individual consumer.

Equipment used is termed as electrical meters. Broadly meters are of two types:-

1. Whole current meters; and
2. C.T. operated meters.
  - a) KWH indicating C.T. meters.
  - b) KWH, KVAH, KVARH (Trivector) meters.

These can be electro-mechanical type and electronics type of meters. In the case of electromechanical type the parameters are the accumulated figures for particular period depending on the periodicity of billing cycle. With the development in the field of electrical measurement electronic meters with memory and recording of various parameters have been developed and are being used. With this development monitoring, and system planning has been made easy, and accurate system monitoring is possible with increased efficiency and reliability.

Since, the meters are required to record the consumption at various load centres such as (I).

single phase load

from 0.25 KW to 10 KW

three phase load

10 KW to 15 KW

15 KW to 50 KW

50 KW to 100 KW

100 KW to 1500 KW

1500 KW to beyond for consumers and from 1MVA to 1000 MVA and beyond for utilities at various voltage level.

Higher is the quantum of load to be measured better will be the desired accuracy of measurement. In view of this various accuracy class of meters are as follows:

<u>Quantum of load</u>		<u>Accuracy Class</u>
1. upto 10 KW	-	1.0
2. 10 KW to 50 KW	-	1.0
3. 50 KW to 500 KW	-	0.5
4. 500 KW to above	-	0.2

In case of C.T. operated meters, the C.T. ratio should be kept under constant watch and subject to periodical testing since any error in C.T. ratio shall have multiplying effect on the measured quantity. C.T. of fixed ratio only should be used to minimize the losses as compared to multiple ratios C.T. previously used.

Following type of meters are available for use:

- 1) Electro mechanical single phase whole current meters.
- 2) Electro mechanical whole current three phase meters
- 3) C.T. operated Electro mechanical meters.
- 4) C.T. operated Trivector Electro mechanical meters
- 5) Electronics meters of above category with mechanical display.
- 6) Electronic meters with digital display.
- 7) Electronic C.T. meters with facility of recording & retaining the following parameters:
  1. Current
  2. Voltage
  3. Power Factor
  4. Total Power flow at various times of the day
  5. Period of no use of supply

6. Temper in the meter i.e. to indicate any fiddling in the recording circuit.
7. Load current sensor, this can give indication of meter being by passed.
8. Memory for period varying 35 days and above for half hourly duration and provision of OFF loading the figures in print out form through SHRI I (meter reading instrument) for consumption and record.
9. Remote Meters – the above stated parameters can be obtained by remote mode and also some command can be give to switch off the supply in case of default of payment or otherwise.

The readings can be recorded by:

1. Communication through radio link
2. Communication through telephone line
3. Communication through power line.

10. Pre-paid Meters – When the consumer can purchase fixed quantity of electricity at prevailing rates and can further revive the card on additional payment, this will reduce the expenditure on reading and billing.

With the use of electronic meters following benefits can accrue:

1. Accurate billing.
2. Reduced time in process
3. Increase timely cash flow.
4. Reduce administrative cost.
5. Reduce consumer complains
6. Improve consumer relationship
7. Better system monitoring
8. Accurate planning for development

#### Annexure 4

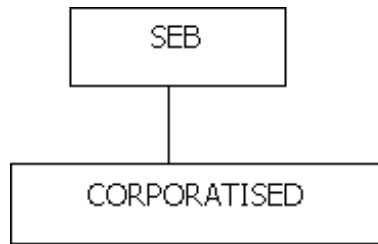
### **10.4 Feasible Models**

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It is clear that the distribution side of the power industry needs to be reorganized. The key issues that relate to the present structure are lack of commercial orientation, high T&D losses, management structure, the size of the distribution business (in case of some states) and the need to introduce competition. The objective would be to improve the system and provide better service to the consumers at a reasonable tariff. This in turn would provide the financial and commercial support for investments not only in the distribution infrastructure but also in generation, transmission and other related areas. There could be various possible options for the restructuring of the industry, some of which are described

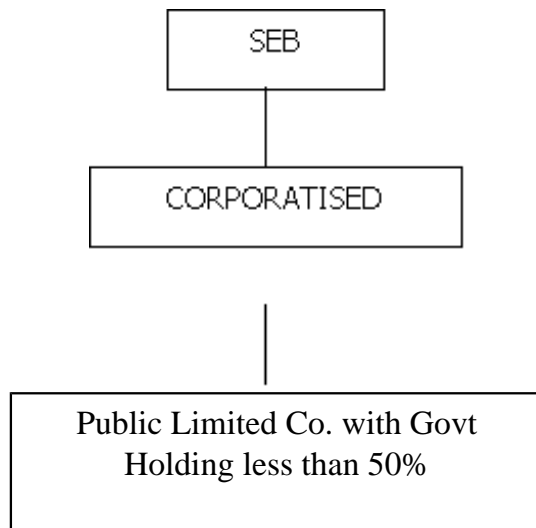
as follows:

**10.4.1**      ***Model no. 1***



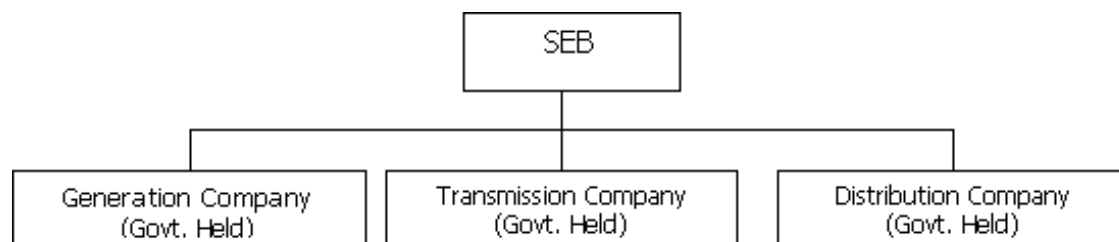
The SEBs have been formed under the ESA Act, 1948. In this model, the SEB is corporatised and would come under the Companies Act, 1956. However, this model does not offer significant advantages, as the problems of the previous structure would continue. The government would still control the Company, distribution size would still be unwieldy and there would be a lack of competitive environment.

**10.4.2**      ***Model No. 2***



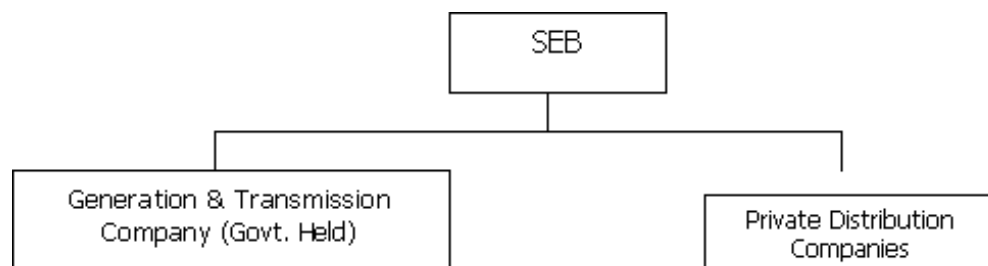
This model is a modification to model no.1, except that the holding of government is reduced below 50%. However, this model would still suffer from the lack of competitive environment and the problems of unwieldy size in case of large states. It may be considered as an option only for the very small states.

#### **10.4.3**      ***Model No. 3***

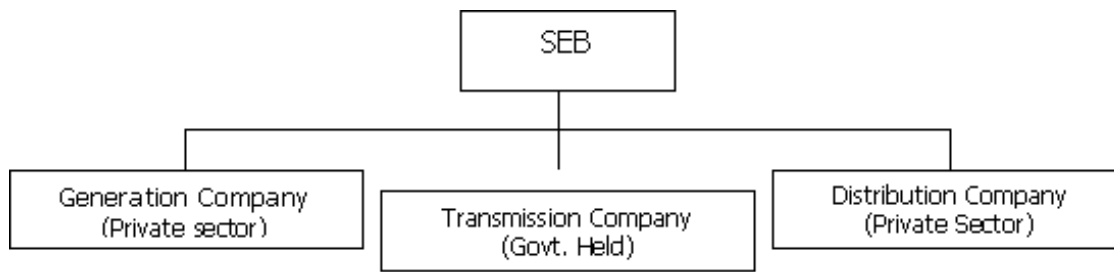


In this model, the SEB is corporatised and split up into the Generation Company, Transmission Company and distribution company. Though this model may bring in a focus according to the functions, it would suffer from the problems of government holding, unwieldy size and lack of competitive environment to the consumers. Further models can be developed based on the unbundling of the SEB and the pattern of management holding in these companies.

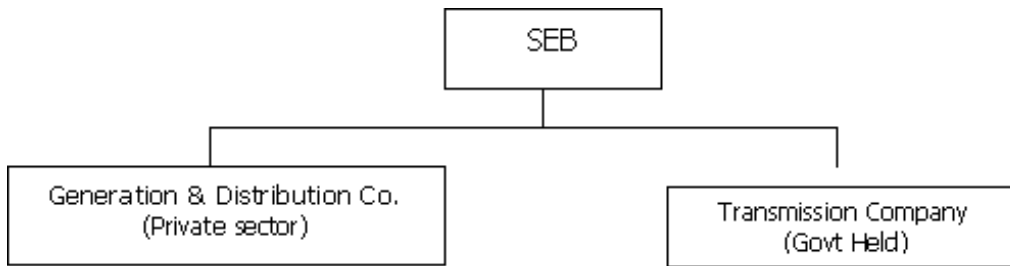
#### **10.4.4**      ***Model no. 4***



#### **10.4.5**      ***Model no. 5***



**10.4.6 Model no. 6**



**10.4.7**



**Model no. 7**



Zonal (Gen + Trans +Distribution)
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**10.4.8 Model no. 8**

Combinations of Models 4,5,6 and 7 all operating in the same state.

<ul style="list-style-type: none"> <li>• Gen + Trans. with Govt. or SEB</li> <li>• IPP</li> <li>• Pvt. Distribution Co.</li> </ul>	<ul style="list-style-type: none"> <li>• IPP's</li> <li>• Transmission with Govt. or SEB</li> <li>• Pvt. Distribution Cos.</li> </ul>
Pvt. Co. having all Gen + Trans + distribution	<ul style="list-style-type: none"> <li>• Pvt. Gen + distribution Co.</li> <li>• Trans. With Govt. Co.</li> </ul>

From the brief descriptions on various models presented above it could be seen that Model Nos. 1, 2 and 3 have state control in each of the three elements. They suffer from limitations of not creating a competitive environment for customers. Therefore, these models may not be the right models to work with. Model Nos. 4,5,6 and 7 envisage the distribution side of the industry to be placed with private players, which means that the service part of the industry is preferred to be under the private management. These models provide the advantage of creating a competitive environment in the state to enable the customers to compare the quality of services offered by various operating agencies. Although, the direct competition at the consumer level would be a distant prospect, at the HT level it may be possible. Further, indirect comparison based competition would be feasible especially for the regulators determination of performance and efficiency parameters for tariff setting. Model no. 8 is a combination of models 4,5,6 and 7. It is felt that this model may present the shape of industry in coming years in quite a few states.

State governments should not engage in purchase and sale of electricity through any entity that is controlled or owned by it – either directly or through guarantees. In order to foster a viable power sector, such transactions should be conducted on commercial considerations and the risk arising thereof should be borne by the selling firms (generating companies) and purchasing entities (distribution companies or major consumers). The new Electricity Bill provides explicitly for the Transmission Utility not trading in power.

In the various models highlighted above where private sector participation in distribution is envisaged a strategy could be in terms of, private distribution companies initially covering the towns and cities, under the existing provisions of Indian Electricity Act 1910 and Indian Electricity Supply Act, 1948 and gradually expanding to cover semi-urban and rural areas. The overall restructuring efforts may also continue. This model may have a better chance of success since the privatization initiatives would commence from areas more acceptable from the various

stakeholders point of view.

## Annexure 5

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### **10.5 Distribution privatization in Delhi**

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The methodology and the details thereof for inviting private section participation in Delhi is as follows :

#### **10.5.1**            *Valuation of assets*

The valuation of assets has been done by applying the Business Valuation method. By making reasonable assumptions on retail tariffs, efficiency improvements and expenses in the future, the assets are valued at a level which enables the electricity business to become self sustainable in a specified period of time. Business valuation has also been used to determine the quantum of liabilities which shall be transferred to each successor entity of DVB that can be serviced through reasonable tariff increases and efficiency improvements with the balance liabilities (total existing liabilities less serviceable liabilities) being parked in a holding company. The liabilities of DVB employees relating to Terminal Benefits up to the date of transfer scheme shall be funded by Government of NCT of Delhi (GNCTD)

#### **10.5.2**            *Notification of the transfer scheme*

The transfer of assets and personnel to the successor entities will be through a transfer scheme notified for the purpose under the Reform Act. The transfer scheme indicates the opening balance sheets of the successor entities. It is proposed that the time gap between corporation and privatization should be minimal/nil. This has been ensured by notifying the transfer scheme but postponing the date of its effectiveness to a date to be announced later.

#### **10.5.3**            *Mitigating uncertainty*

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The bulk supply tariff for the distribution companies may be set at a level that can be supported by the revenues. A backward calculation is proposed to be carried out for determination of Bulk supply tariffs wherein all the expenses other than power purchase expenses shall be deducted from the revenues to arrive at the power purchase cost. The per unit bulk supply price shall be determined by dividing the power purchase cost by

the projected units input. The revenues from sale of power and other income each year will be projected at existing and proposed retail tariffs on the level of Aggregate Technical & Commercial Loss (AT&C loss) committed by the selected investor for each year in the bid.

The resultant gaps if any, between the bulk supply tariff so determined and the actual cost of power for transmission company at the point of supply, shall be met through support from the GNCTD in the initial three years. This support shall be in the form of loan to the transmission company. The bulk supply tariff of the distribution companies shall in effect be lowered to the extent of the support, which in turn will ensure that the distribution companies are viable from day one.

#### ***10.5.4 Criteria for selection of successful investor***

Bids shall be invited on the percentage reduction in aggregate technical and distribution loss (AT&C losses) for each year for the years 2002-07, with the shares being sold at par value. The reduction in AT&C losses each year for the years 2002-07 in the bid will be on the opening levels indicated in the Bulk supply tariff order for 2001-02 issued by DERC and may not be lesser than the minimum levels indicated by GNCTD.

#### ***10.5.5 Incentives for achieving higher efficiency gains***

In case the distribution company is able to bring in efficiency improvements beyond the bid value, the distribution company may be entitled to retain a certain percentage of additional revenue.

#### ***10.5.6 Baseline data***

The Bulk Supply Tariff Order has been released by the Commission in response to the filing by DVB well before the last date of bidding by the bidders.

#### ***10.5.7 Treatment of receivables***

It is proposed that all the receivables except those corresponding to the current billing shall stand transferred to the Holding Company. In case the distribution company is able to recover such receivables, the same shall be shared in the ratio of 80 : 20, with 80 % going to the Holding Company and the balance to the distribution company.

## 10.6 Illustrative example for the Transition phase

With an objective to illustrate the benefits that would accrue on account of reduction in the Aggregate Technical and Commercial (AT&C) losses, two cases have been developed: one case in which reduction in AT&C losses has been assumed and another case wherein no improvement has been assumed. The figures indicated for various parameters are for illustrative purposes only.

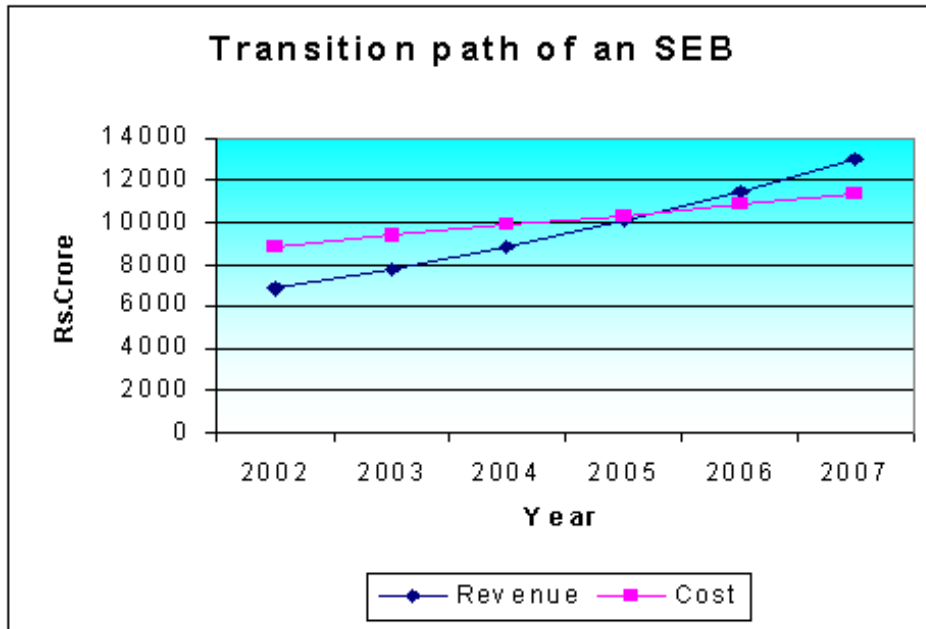
	Reduction in AT&C loss	No improvement
Case	1	2
AT&C loss in 2002	45%	45%
AT&C loss in 2007	35%	45%
Reduction per year	2%	0%
Tariff Hike (for 2002-07)	10%	10%
Subsidy required, Rs. Crore	10703	17522

With reduction in AT&C loss and improvements in collection efficiency, it can be observed that the subsidy commitment required from the government reduces by Rs. 6819 crores (with 10% tariff hike for 2002-2007) and Rs. 2847 crore (with 15% tariff hike for 2002-2007). It may be mentioned that in Case 2, government funding continues beyond 2007 and hence the difference in subsidy requirement between the 2 cases is actually higher.

Case 1 : Assuming reduction in AT&C losses

	2002	2003	2004	2005	2006	2007
Total MU available	60000	60000	60000	60000	60000	60000
AT&C loss	45%	43%	41%	39%	37%	35%
MU for sale	33000	34200	35400	36600	37800	39000
Tariff hike	10%	10%	10%	10%	10%	10%
Average tariff	2.25	2.475	2.72	2.99	3.29	3.62
Average Cost	2.70	2.74	2.87	3.02	3.17	3.33
Revenue, Rs. Crore	6831	7787	8867	10084	11456	13002
Cost, Rs. Crore	8910	9356	9823	10314	10830	11372

Surplus/ (Deficit)	(2079)	(1568)	(957)	(231)	626	1630
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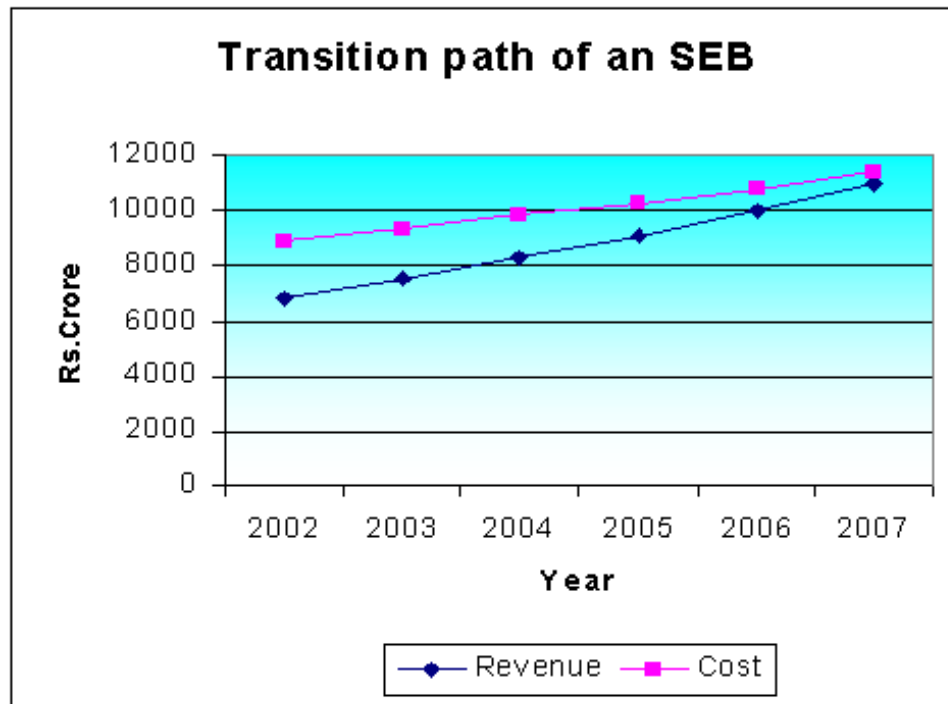


It may be noted that deficits reduce every year due to the recurring effect of the loss reductions carried out in the previous years and the increase in the average realization every year. Further, savings made by the SEB with reduction in loss would vary depending upon the size of the SEB operations.

Case 2 : Assuming Status Quo with no improvement or deterioration

	2002	2003	2004	2005	2006	2007
Total MU available	60000	60000	60000	60000	60000	60000
AT&C loss	45%	45%	45%	45%	45%	45%
MU for sale	33000	33000	33000	33000	33000	33000
Tariff hike	10%	10%	10%	10%	10%	10%
Average tariff	2.25	2.475	2.72	2.99	3.29	3.62
Average Cost	2.70	2.84	3.04	3.25	3.49	3.74

Revenue, Rs. Crore	6831	7514	8266	9092	10001	11001
Cost, Rs. Crore	8910	9356	9823	10314	10830	11372
Surplus/ (Deficit)	(2079)	(1841)	(1558)	(1222)	(829)	(370)



Annexure 7

### 10.7 Kanungo committee on power sector reforms in Orissa

10.7.1 Encouraged by the Government of India, assisted by the World Bank, and supported with grants from the Government of U.K. (DFID), Orissa took the initiative and became the first State to reform its electricity industry. The Orissa Electricity Reform Act, setting out the basic framework of the reform, enacted in 1995 came into force from 1 April 1996. The principal objectives of the reform were the following.

- (a) Restructuring of the electricity industry for rationalization of generation, transmission, distribution and supply of electricity.
- (b) Development of the industry in an efficient, economic and competitive manner.
- (c) To provide for avenues for participation in the industry of private entrepreneurs, attract private investment and reduce the need for government funding of the electricity sector.
- (d) To improve the quality of service to the consumer.
- (e) To enhance operational efficiency and reduce losses.
- (f) To provide for a transparent mechanism for development and regulation of the industry, including tariff fixation and dispute settlement, through an independent, statutory body; the Orissa Electricity Regulatory Commission.
- (g) To contribute to economic growth of the state by ensuring superior electricity supply.
- (h) To create opportunities for increasingly rewarding employment for technical personnel and provide a stable environment for career development in the electricity sector.

The objectives mentioned above at (a),(c) and (f) seem to have been achieved substantially. The other expectations have yet to be realized.

10.7.2 OERC has done pioneering work in our country in the establishment of a regulatory mechanism for the electricity industry. The Reform Act which has given the Commission a wide mandate, requires it to act effectively and independently. OERC's working in the last few years, however, has not been free from problems. To avoid these, we make the following recommendations.

10.7.3 To ensure that the Commission is fully functional at all times, Government must make prompt appointment of Commissioners. Action for filling up anticipated vacancies should start early so that recommendations of the selection committee are available to the Government at least two weeks before the vacancy occurs. In the event an appointment or a selection process is stayed by a court, prompt action should be taken to have it vacated by moving a higher court or a larger bench. Further, no one should be considered for appointment unless there is a clear possibility of his serving for five years. To attract persons of ability, integrity and standing, wide publicity should be given while inviting nominations for selection of Commissioners.

10.7.4 Budgetary allocations for the Commission should be adequate. Ordinarily, Government should not apply any budgetary cuts as long as the amount proposed by the Commission is within the limit of the license fees received. Accounting regulation for the Commission should be settled forthwith and budgeted outlays placed in a banking account at the disposal of the Commission for incurring expenditure in accordance with the accounting regulation, without further reference to Government.

10.7.5 The Commission should institute regular systems of monitoring to ensure that the prescribed standards of performance are actually adhered to in the industry.

10.7.6 The Government and the Commission should have purposeful inter-action on a wide range of issues of monitoring, problem solving,

planning and development of the State's power sector. For exchange of information and discussion on administrative matters of mutual interest, the Government should inter-act with the Commission's Secretary. There should also be a system of meetings with the Commissioners, at least once a year, taken at an appropriately high level to discuss and settle matters involving important issues of policy.

10.7.7 Conceptualization of reform was done under the guidance of the World Bank and the road map for implementation was set out in its Staff Appraisal Report (SAR). The assumptions in the SAR of growth in the demand for power in the State was highly ambitious, not only in terms of totals but in the composition also. The demand for industrial power (EHT Supply) which, subsidizes domestic demand (LT supply), was grossly under realized while domestic and commercial demand with high losses grew fast. T&D losses which were excessively high, and were targeted for substantial reduction, could not be brought down. Billing and collection efficiency under the privatized distribution companies (distribution companies) far from improving, actually worsened and rampant theft of electricity continued unabated.

10.7.8 The reform scheme was further vitiated by sharp, upvaluation of assets at the time of transfer to the utilities. This led to steep increase in the cost of power. Unrealistic assumption that GRIDCO would become profit earning from 1997-98 led to abrupt withdrawal of subsidy by the state government from 1996-97. There has been considerable increase in the average tariff at a cumulative rate of 15.5% annually over the last 9 years without any perceptible improvement in customer service. Cross subsidy has also been brought down, particularly in the post reform period, thereby casting a heavier burden on domestic consumers.

10.7.9 Unabated increase in tariff without perceptible reduction of Techno-commercial loss or improvement in customer service has led to growing public discontent against reform. This situation has worsened because of spiraling increase in costs and deteriorating the health of the utilities. The distribution companies and GRIDCO have been rendered utterly unviable as a result of their inability to reduce T&D losses, control rampant misuse and theft of electricity and contain costs. Distribution companies are unable to pay salary to their employees without defaulting on payment to GRIDCO towards purchase of power. GRIDCO also is unable to recover cost and is incurring heavy debt to finance losses year after year. In this situation, the generating companies are also facing problems of inadequate cash realization. The situation has become so critical that the private sector partner in one of the distribution companies, AES has abandoned the management of CESCO which is now being managed by a CEO appointed by the Regulatory Authority. We recommend that the CEO attends to CESCO whole time.

10.7.10 The key to revival of the sector is in improving efficiency and bringing down cost. By efficiency improvement not only customer services can be geared up but T&D losses, currently at an unacceptably high level, can be brought down substantially. The reform scheme had sought to address the problem of T&D losses through (a) capital investment to strengthen transmission and distribution system so as to reduce technical losses, and (b) privatization of distribution to bring in better management skills and practices for enforcement of accountability to reduce commercial loss. Neither of these have succeeded so far.

10.7.11 Large capital investments have been made but not a single project has been completed despite considerable time over-run. The delays in most cases are want of forest clearance, land availability or right of way. Since none of the projects has been commissioned, no benefit has been realized from the investments of over Rs. 600 crore out of funds borrowed from the World Bank carrying heavy debt servicing liabilities. Efforts need to be intensified to complete and commission the on-going works. No new works should be contracted until the majority of the on-going works are completed. With the commissioning of these works, there should be significant improvement of system reliability and reduction of technical losses which would have its beneficial impact on cost reduction.

10.7.12 As far as commercial losses are concerned, which are massive by any standard, the result achieved in the last five years is insignificant. T&D loss which was 46.94% in 1995-96 as shown by Audit is now 46.63% as reported by the utilities themselves. The loss is even more staggering in the LT segment at 68%. The distribution companies, in their projections, have proposed very little loss reduction. The rate of loss reduction that needs to be attempted and achieved in the next five years must not be less than an average of 5% which, in our view, is well within reach. Attainment of the goal would, however, call for determined, comprehensive and relentless efforts. The following are some suggestions in this regard.

- (i) A concerted drive to remove illegal connections such as hooking and effective measures to convert them into regular connections followed up by systematic billing and collection of energy charges.
- (ii) Should the distribution companies wish to have police escort for carrying out special drives to prevent unauthorized use of electricity, over and above the comfort of the Chief Secretary's circular to DMs and SPs asking for prompt intervention in the event of violence by anti-social elements, the Government should make available to the companies the requisite support on payment of costs.
- (iii) 100% consumer metering within a year and immediate metering at the low voltage terminals of step down transformers should be provided so that supplies into HT & LT systems can be quantified for purpose of proper energy accounting which is practically missing.

10.7.13 A major cause of sharp increase in the cost of power was steep revaluation of assets at the time of transfer to GRIDCO. It called for substantially higher provision for depreciation as well as return on capital. Neither of these could be met because of shortfall in revenue. In these circumstances it would be worthwhile keeping the revaluation in abeyance till the system is brought to balance. In fact there is a case for setting aside the revaluation of OHPC which is expected to be profitable in the years to come. In addition to this, the State Govt. may agree to allow a moratorium on debt servicing to the State except the amounts in respect of loans from the World Bank which the State Govt. would need to pay to the Centre. After applying these correctives and also taking credit for T&D loss reduction at an average rate of 5% per year, the revenue gap at the existing retail tariff would still be substantial though declining. The unavoidable revenue gaps would need to be financed from sources other than debt. Since the State Govt. themselves are passing through severe financial stress, it may not be realistic to ask them to make further sacrifice over and above what has been suggested already.

10.7.14 An exercise has been carried out estimating the annual shortfalls on cash flow basis without tariff hike but with the assumption that collection efficiency of the distribution companies would progressively improve from the present level of 76% to reach 95% by the year 2005-06 instead of ending up with a collection efficiency of 84% proposed by distribution companies. With a tariff hike of 18% in 2005 the entire cash deficit would disappear and the year 2005-06 would witness both an operational profit as well as a marginal cash surplus. The sector as a whole would turn around in 2005-06. The consumers could be called upon to pay higher tariff at that stage because by that time the utilities are expected to have given evidence of their concern for and efficiency in T&D loss reduction and improvement of customer service ; not otherwise.

10.7.15 To bring the reform back on rails, the World Bank and the DFID who helped Orissa initially, and hopefully have retained their interest in the reform, should come forward with a suitable package to fill the revenue gap in the intervening years . Without this interim financing estimated at Rs.3240 crore, there seems hardly any prospect of the reform coming to fruition. The Govt. of India should not only persuade them to do so but also extend a helping hand in sharing the responsibility of interim financing of the revenue gap.

10.7.16 Once a decision is taken on interim financing and its apportionment, the distribution companies and GRIDCO may be pinned down to specific performance parameters by desegregating the proposed T&D loss reduction distribution company-wise.

10.7.17 In the prevailing run down state of GRIDCO and Distribution companies, no durable rehabilitation is possible without interim financing of unavoidable losses. However, it needs to be emphasized that no amount of support from outside would succeed unless the utilities conduct themselves with greater sense of responsibility. Privatization was seen as a means to improve the performance of the distribution companies. The private sector partners need to bear in mind their crucial role which can not be performed satisfactorily unless they face the tasks as a challenge and an opportunity and take the industry forward in true spirit of partnership for mutual benefit.

10.7.18 The private promoters of the distribution companies neither brought superior management skill nor did they arrange financial support even by way of working capital for the companies, which are in dire need of capital, working capital in particular. Instead of using the good offices of BSES to secure working capital in terms of clause 8.1 of the Shareholders Agreement for the three distribution companies under their management, the distribution companies have persistently defaulted in payment to GRIDCO towards purchase of power. The outstanding overdues of GRIDCO as on 30 Sept. 2001 against these three distribution companies is Rs.680.72 crore including bonds issued by them in lieu of cash payments. So far as the other distribution company CESCO is concerned, the situation is worse. AES, the private sector partner never fulfilled its commitment to bring working capital. They were allowed to pile up unpaid power purchase bills amounting to Rs. 403 crore by time they walked away in August 2001. Now that AES have abandoned CESCO, GRIDCO seems to be left with hardly any other option except exploring legal remedy. As far as BSES managed distribution companies are concerned, the attitude of deliberate default in payment to GRIDCO must end. BSES should make all efforts to bring in working capital in terms of the Shareholders Agreement.

10.7.19 The system of Escrow put in place to secure regular payments to GRIDCO towards power purchase has not worked. With the package of financial relief recommended by us along with enforcement of the provisions of the Shareholders Agreement, the escrow mechanism should be made to work and strictly enforced.

10.7.20 There is an urgent need to develop mutual trust and goodwill between employees and the management. The vital role of the employees and their associations in building up the industry needs to be taken more seriously. While firm action against known miscreants is necessary to enforce discipline and accountability this can not be done without skillful handling of situations and willingness to mitigate genuine grievances. A specific matter in this connection relates to pensionary benefits. Employees apparently have found that the pension scheme preferred by them, and also adopted by the companies, has turned out to be disadvantageous, particularly for those who came over from Government in higher age group. In a matter like this neither the present employers nor the Govt. should take any rigid stand. The effort should be to find a solution which may not even be difficult to reach. Likewise, there is an apprehension that liabilities of Government / GRIDCO towards Pension Trust may not have been assessed correctly. This being a matter entirely of actuarial calculation, which may vitally affect the viability of the Pension Funds, there should be no reluctance to take a fresh look at the estimates.

10.7.21 Orissa has a rich endowment of natural resources, and now has the additional advantage of surplus power. This combination needs to be exploited to accelerate industrialization of the state through vigorous marketing of power by offering more competitive rates. By selling surplus power to industries, even at tariff lower than prescribed by OERC, not only would the State benefit from industrialization, the distribution companies themselves would also stand to gain as long as they recover cost at the margin. The tariff fixed by OERC should be treated as the

ceiling in each category, and utilities should have the freedom to supply power at lower rates in exercise of their commercial judgement.

10.7.22 With restructuring and privatization, there is a much greater need now for rigorous enforcement of safety norms in the electricity industry. However, care needs to be taken to see that there is no mindless expansion of the Electrical Inspectorate. Services of chartered engineers, under a strict system of empanelment and penalty in the event of misconduct, may be utilized for the purpose of supplementing human resources of a slim, well structured Inspectorate.

10.7.23 The services of local consultants as well as highly rated consulting firms of international repute were used extensively in the preparation of the blue print of reform, and to assist the utilities in developing internal systems of operation management, financial control, technical services, contract management, project implementation etc. The cost incurred so far is a staggering amount of Rs.306 cores. However, judging by the fate of the reform and the state of the utilities it is clear that the utilities, for whose benefit the consultants were engaged, could not assimilate much of their advice. The utilities, instead of developing inner strength with the assistance of consultants, tended to be excessively dependent on them leading to near atrophy of organizational strength. We suggest that this practice which weakens organizations rather than strengthening them and demotivates employees instead of improving their skill and confidence, should end as soon as possible.

10.7.24 Close attention should be given to strengthen the managerial competence of GRIDCO which is not only financially sick but also organizationally very weak. The following recommendations are made in this connection.

- a) The senior management of GRIDCO should be selected on the basis of merit and appointed for a fixed term of 3/5 years.
- b) The State Load Dispatch Center (SLDC) and its commercial counter-part the energy billing centre should be provided with the necessary staff whose skills should be substantially honed and upgraded by regular training.
- c) GRIDCO's Project Management Unit (PMU) should take over the responsibility of all capital works irrespective of the source of funding. It should also monitor capital works executed by the distribution companies in addition to managing and monitoring GRIDCO's own works.

10.7.25 The entire power sector needs top management of high caliber just as it requires an efficient workforce motivated to further the interest of the industry. The task before the management's is daunting. Appointments to the Boards of Directors of all the utilities need to be reviewed to ensure that professionals including administrators with competence, vision and commitment may enrich the utilities from the very top. The prevailing system of part time appointments to key positions in the sector, including the Chief Executive Officer of OHPC should end. The Chief Executive Officers of the distribution companies should be stationed at their respective head quarters.

10.7.26 The Committee did not get evidence of any innovative practice introduced in the management of the privatized distribution companies. However, in some of the distribution company areas, an experiment is in progress to involve village communities in streamlining power supply in rural areas. While the results seem to be encouraging the exercise, currently being conducted by consultants, can succeed in the long run and over large areas only if the programme is implemented by distribution company officials themselves.

10.7.27 It is recognized that Regulatory Commissions need to lay down norms for tariff determination which would enable the utilities to have a clear idea of the range in which tariff may move over a reasonable period. Multi-year tariff regime is therefore being advocated by experts.

OERC have also laid down norms in certain areas though much more needs to be done. But no purposeful result can be achieved in the matter of multi-year tariff unless there is a reasonable financial balance. Serious efforts are required to provide financial balance to the sector before multi-year tariff can be a reality.

10.7.28 Another idea often advocated by experts is multi-buyer model of power trading. Here again, attainment of financial balance is an essential pre-requisite to provide a basis for competition through various models of multi-buyers system as distinct from the single-buyer model adopted by Orissa as well as other States who have embarked on reform. In the prevailing situation of near bankruptcy of GRIDCO and disarray in the functioning of distribution companies, the sector should be spared any further trauma. Meanwhile, GRIDCO needs to strengthen itself to develop ability and skill to handle the power trading function which calls for, among other things, prompt exercise of commercial judgement. Urgent attention should be paid to develop this within the organization. It would be of advantage to develop within GRIDCO a well functioning trading unit which may eventually be turned into an independent trading organization as a step towards bringing in a competitive regime that would provide the consumer the opportunity to choose the source of his power supply.

10.7.29 Rural electrification seems to have unintentionally become the worst casualty of the reform process. With the restructuring of OSEB, and privatization of distribution companies, the rural electrification wing of OSEB was disbanded and it was left to the distribution companies to carry on with whatever schemes were in the pipeline. Since the activity is commercially not attractive, the distribution companies can not be expected to be very enthusiastic about rural electrification. The interest of distribution companies has further slackened because even the modest rural electrification work done by them has not been paid for in spite of the fact that an amount of Rs. 23 crore of capital subsidy due was certified by OERC several months ago. No fresh scheme of rural electrification seems to have been posed for funding support of agencies like REC, nor any scheme drawn up for the purpose. Another regrettable feature is the utter lack of concern for productive use of electricity for rural development through agriculture pumping. In terms of agricultural demand for power among states, Orissa is practically at the bottom. What is worse is that agricultural demand for power in the state has gone down from a meagre 6% in 1992-93 to a dismal 3% in 1999-00, compared with national average of 30%. No single department of the State Govt. is entrusted with the administrative responsibility to plan, promote and monitor growth and press for rural electrification for development of irrigation pumping which is vital for rural development. Under a high priority national plan, all villages are required to be electrified by March 2007. For a State like Orissa, with 40% of the population from weaker sections of scheduled castes and scheduled tribes living in remote areas, the leeway to be made is large. Kutir-Jyoti program needs to be pursued with vigour. It must however be ensured that the benefits of the subsidized electricity supply under this program flow to the targeted beneficiaries. The goal is unlikely to be reached unless determined efforts are made and an effective machinery is put in place for planning, execution and monitoring of rural electrification projects. The vacuum caused by abolition of the rural electrification wing of the OSEB needs to be filled up and an alternative system created. The following recommendations are made in this connection.

- a) A Rural Electrification Planning Organization (REPO) should be set up under the Government to provide focus and direction to this vital programme, to prepare specific schemes, pose them to funding agencies and over-see utilization of the funds procured.
- b) REPO should have under it four Rural Electrification Planning Units (REPU), each corresponding to a distribution company with which it would need to work in close coordination. These units would draw up, detailed schemes of rural electrification.
- c) Prioritization of villages for electrification should be done by REPUs in consultation with the Collector of the concerned district.
- d) Execution of the works would be the responsibility of the concerned distribution companies.
- e) REPUs would need to monitor the execution and report completion of schemes and the expenditure incurred thereon to the Collector of

the district and the State REPO.

f) On the basis of the Collectors' certificates of satisfactory completion, the state government should promptly settle subsidy payments admissible to distribution companies.

g) Government would need to provide distribution companies with capital subsidy; revenue requirements would, in normal course, be considered by OERC as a part of tariff exercise.

10.7.30 Our recommendations would help rehabilitate the utilities, bring stability and promote growth of the power sector only if these are implemented as a package and the implementation is managed and monitored closely. The reform adopted by Orissa may have been flawed, but mid-course corrections could have been successfully applied much earlier, and at less cost to the economy, had the reform been managed rather than its success taken for granted. The Committee's recommendations towards putting back the reform on rails would succeed only if the need for reform management is recognized and a system is put in place by the Govt. for regular monitoring, coordination and mid-course correction. It is interesting to know that of all the major parameters of reform laid down in the SAR, one of the few that proved realistic was tariff. Retail tariff has been fairly close to the SAR assumption in the first two years and substantially higher since 1998-99. Thus, consumers have not failed to provide support; they have made ample sacrifice in search of better quality of service which has eluded them so far.

10.7.31 Power sector reform would succeed if the utilities bring in efficiency, cut costs, reduce losses and ensure greater consumer satisfaction. It would also require strong enforcement to ensure that consumers of electricity pay for its use. All sections of the society, particularly those, who are in a position to influence public opinion, have the responsibility to provide the requisite support. Revival of the power sector would depend to a large extent on how fast a consensus is built in this vital area.

The State's power sector is now on the brink of a crisis. It is high time all agencies namely, the state government, the Central Government, the World Bank and the DFID, got together and took a holistic view on what can be done by each to rescue the reform. If electricity reform fails in Orissa, it would have its inevitable adverse impact on reform all over the country. What has taken place in the electricity industry of Orissa is only restructuring, privatization and establishment of a Regulatory Commission. The real reform, which brings in its wake benefits to consumers, strength to the industry and growth for the economy has yet to come.

## Annexure 8

### **10.8 Coelho committee on private sector participation in distribution**

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#### Conclusions

From the diagnostic study of the reforms process, it is revealed that there are no standard solutions to the problem of restructuring of the industry. Even in other countries in the world the approach to reforms has been different in different countries. These experiences differ in the world; the

approach to reforms has been different in different countries. These experiences differ in the timetable of reforms process, the extent of private sector participation, degree of competition introduced and scope of the regulatory agency. The emphasis in preparing this concept paper is to provide an analysis of the issues from the responses and experiences, which could lead to clear and identifiable action plan that could operate with credibility and confidence amongst all relevant interest in the power industry.

In focusing on the need for reforms in distribution sector of the power industry, the objective has been to ensure quality supply to consumer at reasonable price. Therefore, efficiencies have to be introduced into distribution, which can be possible through:

- Breaking up monolithic structure of SEB's distribution system into more manageable and valuable distribution zone;
- Restructuring the distribution system into corporate units, which could lend themselves more conveniently to a transition from public sector to private sector ownership;
- Creation of a regulatory mechanism which could set down the technical and financial parameters for performance and the guidelines for tariff setting and also function as a moderator to balance the interests of all stakeholders;
- Release the SEBs from the current stranglehold of government to enable them to function with greater autonomy and efficiency and accountability;
- Evolve a time frame and a modus operandi by which the private sector could be involved in restructuring effort;
- Identify and ensure a transparent arrangement by which private sector could be involved in restructuring effort;
- Progress from a cost-plus return on the capital base to a performance oriented return on investment; and
- It is hoped that this concept paper would help discussions on the relevant issues arising for consideration and meaningful approaches could be identified on the basis of which specific recommendations could be submitted for government's intervention.

### Annexure 9

#### **10.9 Status of reforms in states**

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Status as on March 2002

Sr.No.	STATE	STATUS OF REFORMS
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1.	Andhra Pradesh	<ul style="list-style-type: none"> <li>• SERC constituted, functional, two tariff orders issued.</li> <li>• Reform Law enacted, SEB unbundled.</li> <li>• Distribution privatization strategy being finalized.</li> <li>• MOU signed with the Government of India.</li> </ul>
2.	Arunachal Pradesh	<ul style="list-style-type: none"> <li>• SERC notified (yet to be constituted).</li> </ul>
3.	Assam	<ul style="list-style-type: none"> <li>• Single member SERC constituted</li> <li>• MOU signed with Government of India.</li> </ul>
4.	Bihar	<ul style="list-style-type: none"> <li>• MOU signed.</li> <li>• Tariff revised by SEB.</li> </ul>
5.	Chattisgarh	<ul style="list-style-type: none"> <li>• MOU with Madhya Pradesh adopted.</li> </ul>
6.	Delhi	<ul style="list-style-type: none"> <li>• SERC constituted, functional.</li> <li>• First Tariff order issued.</li> <li>• Reform Law enacted, DVB to be unbundled.</li> <li>• Committed to Distribution privatization.</li> <li>• RFP for Distribution privatization issued.</li> </ul>
7.	Goa	<ul style="list-style-type: none"> <li>• MOU signed</li> </ul>
8.	Gujarat	<ul style="list-style-type: none"> <li>• SERC constituted, functional, first tariff order issued.</li> <li>• Reform Law approved by Government of India and introduced in the State Assembly.</li> <li>• MOU signed with Government of India.</li> </ul>
9.	Haryana	<ul style="list-style-type: none"> <li>• SERC constituted, functional, two Tariff Orders issued.</li> <li>• Reform Law enacted, SEB unbundled.</li> <li>• MOU signed with Government of India.</li> </ul>
10.	Himachal Pradesh	<ul style="list-style-type: none"> <li>• One Member HPSERC constituted. Member appointed w.e.f. 6/1/2001</li> <li>• First tariff order issued.</li> <li>• MOU signed with Government of India.</li> </ul>
11.	J & K	<ul style="list-style-type: none"> <li>• G/o J&amp;K has appointed Administrative Staff College of India as consultant for conducting reform studies.</li> <li>• Reform Law has been passed.</li> </ul>

12.	Jharkhand	<ul style="list-style-type: none"> <li>• MOU signed with Government of India.</li> </ul>
13.	Karnataka	<ul style="list-style-type: none"> <li>• SERC constituted, functional, first Tariff Order issued.</li> <li>• Reform Law enacted, SEB unbundled</li> <li>• MOU signed with Government of India.</li> <li>• Distribution privatization to be completed by December 2001 as per MOA signed with Government of India.</li> </ul>
14.	Kerala	<ul style="list-style-type: none"> <li>• MOU signed with Government of India</li> <li>• SERC constituted.</li> </ul>
15.	Madhya Pradesh	<ul style="list-style-type: none"> <li>• SERC constituted.</li> <li>• First tariff order issued.</li> <li>• Reform Law passed by the Assembly and notified.</li> <li>• MOU signed with Government of India.</li> </ul>
16.	Maharashtra	<ul style="list-style-type: none"> <li>• SERC constituted, functional, two tariff orders signed.</li> <li>• MOU signed with Government of India.</li> </ul>
17.	Orissa	<ul style="list-style-type: none"> <li>• SERC functional, four tariff orders issued.</li> <li>• Reform Law enacted, SEB unbundled.</li> <li>• Distribution Privatized.</li> <li>• MOU signed with Government of India.</li> </ul>
18.	Punjab	<ul style="list-style-type: none"> <li>• SERC constituted, Chairman, Members appointed.</li> <li>• MOU signed with Government of India.</li> </ul>
19.	Rajasthan	<ul style="list-style-type: none"> <li>• SERC constituted, functional, First Tariff order issued.</li> <li>• Reform Law enacted, SEB unbundled. One generation, one transmission and three distribution companies created.</li> <li>• RFP for Distribution privatization to be issued by July 2002.</li> <li>• MOU signed with Government of India.</li> </ul>
20.	Tamil Nadu	<ul style="list-style-type: none"> <li>• SERC constituted.</li> <li>• MOU signed with Government of India.</li> </ul>

21.	Uttar Pradesh	<ul style="list-style-type: none"> <li>• SERC functional, two tariff orders issued.</li> <li>• Reform Law enacted, SEB unbundled.</li> <li>• Distribution Privatized strategy to be finalized.</li> <li>• MOU signed with Government of India.</li> </ul>
22.	Uttaranchal	<ul style="list-style-type: none"> <li>• MOU signed with Government of India.</li> </ul>
23.	West Bengal	<ul style="list-style-type: none"> <li>• SERC constituted</li> <li>• First Tariff order issued.</li> <li>• MOU signed with Government of India</li> </ul>
24.	Nagaland	<ul style="list-style-type: none"> <li>• Have shown willingness to constitute Joint Electricity Regulatory Commission.</li> </ul>
25.	Meghalaya	
26.	Mizoram	
27.	Manipur	
28.	Tripura	
29.	Sikkim	

### Annexure 10

#### **10.10 Status on Rural Electrification**

- Out of 5,87,258 total inhabited villages, 5,08,162 villages are reported electrified, leaving a balance of 78,598 villages unelectrified (As on September 30, 2001)
- Nine states viz. AP, Goa, Haryana, Kerala, Punjab, Tamil Nadu, Maharashtra, Gujarat, Sikkim have achieved 100 % village electrification.
- Another ten states viz. Nagaland, Mizoram, Karnataka, Himachal Pradesh, Jammu and Kashmir, M.P., Tripura, Rajasthan, Manipur and Chattisgarh have electrified more than 87 % (National Average) villages.
- The position of the remaining states is as follows:

Sr. No.	State	No of inhabited villages (1991 census)	Villages Electrified as on Sept 2001	Balance	%
1	Uttaranchal	15681	12488	3193	80
2	Uttar Pradesh	97122	77071	20051	79
3	West Bengal	37910	29624	286	78
4	Assam	24685	19019	5666	77
5	Orissa	46989	35232	11757	75

6	Bihar/ Jharkhand	67513	47938	19575	71
7	Arunachal Pradesh	3649	2206	1443	60
8	Meghalaya	5484	2518	2966	46

### Annexure 11

#### **10.11 Accelerated Power Development Programme**

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Ministry of Power after detailed deliberation with the experts, has identified for each circle certain short & long term measures which are broadly categorized into three measures considered essential to achieve distribution reform to be able operate these circle as profit centers.

a) Commercial

This includes installation of tamper proof meters at all levels of transformation of electricity and for all consumers; operationalizing energy audit & accounting up to LT feeder level; de-centralized, billing & collection. Commercial activities target reduction of commercial losses and improvement of revenue.

b) Technical

This involves augmenting/upgrading over loaded / failure prone network elements like transformer, feeder, capacitor etc. to minimize interruptions; moving towards LT less system with the aim of progressively achieving high voltage distribution system (HVDS); installation of small capacity energy efficient distribution transformers; reconductoring of over loaded lines; power factor correction; IT aided monitoring and control (MIS); GIS mapping etc. This requires detailed system analysis to evaluate cost-effective options for system upgradation and improvement, technical loss reduction and voltage profile improvements.

c) Organizational:

This involves reorganizing the manpower at the circle level from the Superintending Engineer to Junior Engineer and fixing duties, responsibilities and accountability at each level with a clear line of command. This will also involve integration of technical, commercial and administrative functions at the circle and 11 KV feeder level so as to enable circles and feeders to operate as profit centers and business units respectively. The Billing Collection mechanism will be decentralized to the feeder level. A system of incentives for the staff at the circle and the feeder level will be introduced for efficiency in billing and collection targets.

#### Capacity Building by Appointing Advisor-cum-Consultants

To assist State Electricity Boards (SEBs)/Utilities in technical and management skills to enable them to formulate and implement circle level

distribution projects, Ministry of Power have appointed National Thermal Power Corporation Ltd. and Powergrid Corporation of India Ltd. (PGCIL), as Advisor-cum-Consultants (AcCs). Their responsibilities are to assist in capacity building in the SEBs by focusing on the activities required for undertaking the commercial, technical & organizational measures required in the short terms & long terms. They shall also supervise project implementation.

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Statewise electricity distribution circles identified for upgradation of sub-transmission & distribution under Accelerated Power Development Programme

Name of the State	Name of the Distribution Circles
Andhra Pradesh	Eluru, Warangal, Tirupati
Assam	Dibrugarh, Jorhat, Guwahati
Bihar	PESU (Patna), Patna (Central), Muzzafarpur
Chattisgarh	Raipur, Bilaspur, Rajnad gaon
Delhi	2 Circles
Gujarat	Sabarmati, Himatnagar, Jam Nagar, Kutch
Goa	2 circles
Haryana	Karnal, Sonipat, Hissar, Faridabad
Himachal Pradesh	Solan, Nahan, Simla
Jharkhand	Hazaribagh, Dumka, Ranchi
Karnataka	Belgaum, Bijapur, Mysore
Kerala	Manjeri, Pathanemthita, Kasagode
Madhya Pradesh	Ujjain, Indore, Gwalior
Maharashtra	Osmanabad, Jalgaon, Ratnagiri, Sholapur, Sindudurg, Aurangabad
Punjab	Khanna, Patiala, Mohali
Rajasthan	Jhunjhunu, Alwar, Jodhpur
Tamil Nadu	Coimbatore, Villupuram, Pudukottai
Uttar Pradesh	Moradabad, Bareilly, Gorakhpur
Uttaranchal	Roorkee, Rudrapur, Dehradun
West Bengal	24 Pargana, Howrah, Bidhannagar,

### Annexure 12

#### **10.12 Need for review of the present SEB structure**

Annexure 13

**10.13 Six level intervention strategy**

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