CHAPTER I

Introduction and Design of Study:

Electricity is one of most important key inputs that contributes to the sustained growth of national economy. In the present day, without electricity no activity either industrial or commercial or domestic can be possible. The economic development of any country mostly depends on the availability of Electric Power. Accordingly the economic growth in India depends critically the development of power sector in India.

The framers of Indian Constitution who passed the Electricity Supply Act 1948, seems to have believed that, the duly elected political government in the states, must be given adequate powers in all policy matters pertaining state electricity boards, to enable them effectively discharge their social obligations of extending power supply to the totally neglected rural areas. They vested them all the powers to take policy decisions under section 78A of Electricity supply Act 1948. Section 18B of Electricity Supply Act 1948 imposes a duty on the state electricity boards to arrange for the supply of electricity that may be required within the states and for the transmission and distribution of the same in the most efficient and economic way with particular reference for those areas which are not for the time being supplied or adequately supplied with electricity.
Thus the Act throws, on the electricity boards, the social obligations of taking up the un-economic operation of electrifications of rural and tribal areas. At the same time it required them to ensure not only adequate, reliable and good quality of power supply but also operates the Boards in most efficient and economic manner.

The above responsibilities, can be discharged by state electricity boards only if the respective boards are run on sound commercial principles and commercially viable unit. It was with this end, in view that, that the state electricity boards were created under Electricity Supply Act 1948. The entire scenario have been completely changed now and much importance have been given to social obligations than the financial obligations. It is analysed that, social obligations tends to dry out financial obligations, as a result financial performance of State Electricity Board are very poor. This study will focus the above points in detail. Financial performance of any State Electricity Board is primarily concerned with tariff policy. Tariff policies have undergone significant changes over the years. Tariff means “a formula determining a price of supply of electricity”. The primary objective of any State EB is to provide adequate power and to promote rural development as well as the financial development of the state.

Formation of State Electricity Boards

The State Electricity Boards came into existence as per the Indian Electricity Act 1948 with the sole purpose of promoting the co-ordinated
development of generation, transmission and distribution of electricity within the states most effectively. Prior to independence, Electricity undertakings were governed by the Indian Electricity Act 1910, which was primarily meant to regulate the operations of licensees of electricity undertakings. As per the Electricity Supply Act 1948, Electricity boards were constituted in each state by the respective governments. Each board is empowered to generate, transmit and distribute electricity within the states. The following are dates for the establishment of state electricity boards in the respective states.

Table 1.1

Name of the Electricity Board and its Establishment

<table>
<thead>
<tr>
<th>Sl.NO.</th>
<th>Name of board</th>
<th>Date of establishment</th>
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</thead>
<tbody>
<tr>
<td>1</td>
<td>Andhara Pradesh</td>
<td>1-4-1959</td>
</tr>
<tr>
<td>2</td>
<td>Assam</td>
<td>1-6-1958</td>
</tr>
<tr>
<td>3</td>
<td>Bihar</td>
<td>1-4-1958</td>
</tr>
<tr>
<td>4</td>
<td>Gujarat</td>
<td>1-9-1960</td>
</tr>
<tr>
<td>5</td>
<td>Haryana</td>
<td>3-5-1967</td>
</tr>
<tr>
<td>6</td>
<td>Himachala Pradesh</td>
<td>31-8-1971</td>
</tr>
<tr>
<td>7</td>
<td>Jammu Kashmir</td>
<td>5-9-1972</td>
</tr>
<tr>
<td></td>
<td>State</td>
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</tr>
<tr>
<td>8</td>
<td>Karnataka</td>
<td>30-9-1957</td>
</tr>
<tr>
<td>9</td>
<td>Kerala</td>
<td>30-9-1957</td>
</tr>
<tr>
<td>10</td>
<td>Madha Pradesh</td>
<td>1-4-1957</td>
</tr>
<tr>
<td>11</td>
<td>Maharashtra</td>
<td>20-6-1960</td>
</tr>
<tr>
<td>12</td>
<td>Megalaya</td>
<td>21-1-1975</td>
</tr>
<tr>
<td>13</td>
<td>Orisa</td>
<td>1-3-1961</td>
</tr>
<tr>
<td>14</td>
<td>Punjab</td>
<td>1-5-1967</td>
</tr>
<tr>
<td>15</td>
<td>Rajasthan</td>
<td>1-7-1957</td>
</tr>
<tr>
<td>16</td>
<td>Tamil Nadu</td>
<td>1-7-1957</td>
</tr>
<tr>
<td>17</td>
<td>Uttera Pradesh</td>
<td>1-4-1959</td>
</tr>
<tr>
<td>18</td>
<td>West Bengal</td>
<td>1-5-1956</td>
</tr>
</tbody>
</table>

It has been observed from the table, that the first state electricity board established in India is west Bengal followed by Madhaya prades and Tamil Nadu.

Apart from the above, State electricity boards, 4 electricity departments viz., Durgapur project limited, Delhi electricity supply undertaking, Sikkim and
Tirupura functioning in India,. In addition to the above, central generating stations were also formed by the central government. They are

- Neyveli Lignite Corporation. (NLC)
- National Thermal Power Corporation (NTPC)
- Dept. of Atomic Energy (DAE)
- National Hydro Power Corporation (NHPC)
- Nation Hydro Electric Power Corporation (NHEPC)

However, most of the boards barring few exceptions are running into substantial technical and commercial losses. As a result, state electricity boards are not in a position to meet, commercial obligations to agencies such as NTPC, NLC, COAL India Limited, PFC, REC etc., besides these poor financial performance of the state electricity boards also have affected very much of availing assistance from international financial agencies for development.

The reasons for recurring losses in the State Electricity Boards may be mainly due to the following.

- Supply of power at highly unremunerative tariffs/Free Supply to the agricultural sector as a state policy for which Boards are not at all, or not adequately compensated.
- Adverse Capital structure –all capital expenditure being financed through interest bearing loans.
Interest during construction being treated as revenue expenditure and funded out of the Boards’ revenue.

Not revising tariffs in due time and/or to the extent needed, and tariffs even for non agricultural consumers remaining below cost.

Low Plant load factor, high transmission distribution losses, over staffing, accumulation of arrears of revenues.

**Recommendations of the various committees on power.**

The poor Financial Performance of the SEBs has been continuous to be the matter of great concern for the Central as well as State Governments. Various committees have been constituted in the past and these bodies have made many recommendations to improve the operational and financial performance of the Electricity Boards.

A working group set up by the Planning Commission in 1963 on pricing policy of the State Electricity undertakings had recommended that the SEBs should earn a return of 12% (including Electricity Duty) on capital investments after providing for operating expenses and depreciation. The capital base was to be calculated on the basis of definition in the Electricity Act 1948.
Venkataraman Committee

The Venkataraman Committee had recommended that the State Electricity Boards should earn a return of 11% on the capital employed if not immediately at least within a period of 10 years. This return was to be computed after providing for operating cost and depreciation but included receipts, from Electricity Duty which were estimated to be about 1.5% of the capital. The net return was about 3% after providing for interest charges (6%) transfer to general reserve fund (0.5%) and after excluding receipts from electricity duty (1.5%) representing the revenues to the State Governments. The Committee was in favour of capitalization of interest charges during the construction period if the Board was not in a position to meet full interest liability.

Shri V.G. Rajashyaksha committee recommendations

The Rajadhyaksha committee on power was appointed by the Government of India in the Ministry of Energy vide Memo No.31(33)-88dt27-12-88 and the committee was constituted mainly to examine the State Electricity Boards, financial performance and tariff structure and suggest appropriate steps for improving the SEBs.
The Rajadhyaksha committee on power set out the financial and tariff policy objectives that should guide the working of the SEBs. in future. Recommendations are summarized below:

1. Dependence on external finance.

2. Tariffs should be related to costs and the consumers capacity to pay.

3. Tariffs should discourage waste and promote only justified use of power and increase capacity utilization by flattering the demand.

A distinction should be drawn between the role of utility as outlined above and the policy of state to grant subsidies to special categories and levy duty on others as part of a wider socio-economic objectives.

Other important recommendations of the Committee are elucidated below:

1. No single class of consumers should be charged by the SEBs a rate less than the cost of providing them power i.e., at most the 15% rate of return could be waived.

2. If the State Government feels that a particular consumer group needs special subsidies which require the State Electricity Board to sell power below cost a specific instructions should be issued to the Board and a subsidy equivalent to the loss that Board will suffer be
given to the Board and provided for as a separate item in the State Budget.

3. Group which could qualify for such subsidies are Small and Marginal landless labourers and slum dwellers.

4. Subsidies for electrifying remote sparsely populated areas should be gradually tapered off as demand picks up. Steps should be taken to see that subsidies do actually reach the intended beneficiaries.

5. Peak hour tariffs should reflect the cost of incremental additions to capacity.

6. The capacity of the consumers to pay should be taken into account fixing tariffs

7. For bulk consumers, who take loads of 1 M.W. and above, the differentiating meters should be provided.

8. Domestic and commercial consumers should be charged inverted block tariff i.e, rate should be increased as the quantum of power taken increased.
9. Tariffs should encourage conservation by being raised to levels at which investment and effort in conservation become economically viable.

10. Agriculturists and rural consumers as a class do not need subsidies and subsidies should be confined to the rural and urban poor.

11. There is no case for subsidising the power intensive industries and they should be charged at least full cost of power plus the prescribed returns.

12. Inter-State competition by State to attract new industries to these states by offering concessional tariff should cease.

13. To prescribe such norms a Bureau of Electricity Costs and Prices (B.E.C.P) should be set up. Its role should be advisory.

14. The Bureau of Economic Costs & Prices (B.E.C.P) should advise State Electricity Boards on tariff policies.

15. Flat rate of tariff should be discontinued and replaced by metered supplies.

16. The commercial wing of the State Electricity Board will need to be gradually strengthened.
17. The Central Electricity Authority should evolve detailed guidelines and performance with these ensured by making suitable changes in the Electricity Act.

There are three basic policy aspects which are peculiar to the SEBs and have substantial bearing on the profitability and financial viability of the SEBs viz;

- Absence of equity participation
- Supply of power to the Agricultural sector at tariffs which are highly unremunerative and the Boards being not at all adequately compensated for the consequential loss of revenue
- State Governments realizing substantial revenues through Electricity duties although the SEBs tariffs are below break even level resulting in losses

Indian electricity system is at present characterized by the following;

1. Most of the utilities i.e State Electricity Boards have been charging tariffs an average revenue which was much below the average cost of supply throughout the years, this has led to the SEBs incurring substantial losses;
2. Even with about 19% of plan investment going into the power sector, there has still been a considerable gap between supply and demand.

3. The quality of power supply has also not been upto desired levels, supply in most utilities is characterized by large voltage fluctuations, load shedding, peak hour restriction etc.

The national council or power utilities (N.CP.U.) analysis revealed that the SEBs are being made to sell electricity to certain category of consumers at prices much below their cost of production. Under such conditions, no amount of improvement in Plant Load Factor of thermal stations and reduction of transmission and distribution losses will help the SEBs to come out of red.

For improving the performance of the SEBs, Shri. Vasanth Sathe then union minister for power had advocated three tests as discussed below.

1. Are the SEBs meeting power requirement of the country.

2. What is the quality of power supply SEBs are making.

3. Are the Electricity Boards supplying power to the consumers at a reasonable price.
If the SEBs can fare well in the above tests, the image of the SEBs in public mind is bound to improve substantially.

The study of Financial performance of SEBs has revealed that tariff policy is constantly affected by crisis crossing economic factors and there are several other factors responsible for frequent revision of Tariffs in India and the following factors however are characteristically important.

1. Rapid growth of demand.
2. Increase in coal and oil prices.
3. Dwindling capacity of Hydro Electrical resources.
4. Expansion of power system in rural areas
5. High unit cost
6. Increase in purchase price.

Although it is intended that SEBs should function as viable commercial undertaking earning a small profit after meeting their expenses, in actual practice due to various reasons they have not been able to function as such. As a result, the financial performance of the various SEBs are very poor. This research study attempts to improve the Financial performance of T.N.E.B.
Electricity Supply Act

The Electricity Supply Industry in India is presently governed by three enactments namely the Indian Electricity Act, 1910, the Electricity (supply) Act 1948, the Electricity Regulatory Commissions Act 1998.

The Indian Electricity Act 1910 created the basic framework for electric supply industry in India which was then in its infancy. The Act envisaged growth of electricity industry through private licensees. Accordingly, it provided for licensees who could supply electricity in a specified area. It created the legal frame work for laying down of wires and other works relating distribution of electricity.

The Electricity (Supply) Act 1948 mandated the creation of a State Electricity Board. The State Electricity Board has the responsibility of arranging the distribution of electricity in the State. It was felt that electrification which was limited to cities needed to be extended rapidly and the State should step in to shoulder this social responsibility through State Electricity Boards. Accordingly the State Electricity Boards through the successive Five year Plans undertook rapid growth expansion by utilizing Plan Funds.

Over a period of time, the performance of SEBs has deteriorated substantially on account of various reasons. For example, though power
to fix tariffs vests with the SEBS they have generally been unable to take decisions on tariffs in a professional and independent manner and tariff determination in practice has been done by the State Governments.

Cross subsidies have reached unsustainable levels. To address this issue and to provide for distancing of government from determination of tariffs, the Electricity Regulatory Commission Act was enacted in 1998. It created the Central Electricity Regulatory Commission and has an enabling provision through which the state government can create a State Regulatory Commission. Sixteen States have so far created State Regulatory Commissions.

These reforms have involved unbundling of the State Electricity Boards into separate Generation, Transmission and Distribution corporations through transfer schemes for the transfer of the assets and staff into successor corporations.

Orissa, Haryana, Andhra Pradesh, Karnataka, Rajasthan and Uttar Pradesh have unbundled their SEBs into companies, Delhi and Madhya Pradesh have also enacted their reforms Acts which inter alia, envisages unbundling/corporations of SEBs. With the policy of encouraging private sector participation in generation, transmission and distribution, the need for harmonizing and rationalizing the provisions in the Indian Electricity
Act 1910, the Electricity (Supply) Act 1948 and the Electricity Regulatory Commission Act 1998 in a self-contained comprehensive legislation arose. Accordingly it became necessary to enact a new legislation for regulating the electricity supply industry in the country which would replace the existing laws, preserve its core features and the responsibilities of the state government with respect to licensing. There is also a need to provide for newer concepts like power trading and open access. The Electricity Bill 2003 has been finalized after heated discussions and conclusions with the states and all other stakeholders and experts.

The main features of the Bill are as follows;-

- Generation is being delicensed and captive generation is being freely permitted. Hydro projects would however need approval of the State Government and clearance from the Central Electricity Authority which would go into the issues of dam safety and optimal utilization of water resources.

- There would be a Transmission Utility at the Central as well as State level, which would be a Government company and have the responsibility of ensuring that the transmission network is developed in a planned and coordinated manner to meet the requirements of the sector. The load despatch function could be
kept with the Transmission Utility or separated. In the case of separation the load despatch function would have to remain with a state government organization/company.

- There is provision for private transmission licensees.

- There would be open access in transmission from the outset with provision for surcharge for taking care of current level of cross subsidy with the surcharge being gradually phased out.

- Distribution licensees would be free to undertake generation and generating companies would be free to take up distribution licensees.

- The State Electricity Regulatory Commission may permit open access in distribution in phases with surcharge for

  1. Current level of cross subsidy to be gradually phased out along with cross subsidies; and

  2. Obligation to supply.

    - For rural and remote areas stand alone system for generation and distribution would be permitted.
• For rural areas decentralized management of distribution through Panchayats, Users Associations, Cooperatives or Franchises would be permitted.

• Trading as a distinct activity is being recognized with safeguard of the Regulatory Commissions being authorized to fix ceilings on trading margins, if necessary.

• Where there is direct commercial relationship between a consumer and a generating company or a trader the price of power would not be regulated and only the transmission and wheeling charges with surcharge would be regulated.

• There is provision for a transfer scheme by which company/companies can be created by the State Governments from the State Electricity Boards. The State Governments have the option of continuing with the State Electricity Boards which under the new scheme of things would be distribution licensee and the State Transmission Utility which would also be owning generation assets. The service conditions of the employees would as a result of restructuring not be inferior
• An Appellate Tribunal has been created for disposal of appeals against the decisions of the CERC and State Electricity Regulatory Commission so that there is speedy disposal of such matters. The State Electricity Regulatory Commission is a mandatory requirement.

• Provisions relating to theft of electricity have a revenue focus..

The Bill seeks to replace the Indian Electricity Act 1910, the Electricity (Supply) Act 1948 and the Electricity Regulatory Commission Act 1998 and the Bill seeks to achieve the above objects.

Act of 2003

The Electricity Bill having been passed by both the Houses of Parliament received the assent of the President on 25th May 2003. It came on the Statute Book as Electricity ACT 2003.

NEW LEGAL AND POLICY FRAMEWORK

Electricity ACT 2003

Electricity ACT - 2003 was notified in June 2003 with competition, protection of consumers interests & power for all areas, as objectives. The ACT provides liberal framework for power development and creates competitive environment to facilitate private investments. It has de-licensed generation
and in rural areas, stand alone generation and distribution has been de-licensed. It provides for multiple licensing in Distribution and stringent provisions for controlling theft of electricity. It obliges states to restructure Electricity Boards. The Regulatory Commissions will determine tariffs. It provides for open access in Transmission from outset and open access in distribution to be allowed by State Electricity Regulatory Commissions (SERCs) in phases. The cross subsides will have to be gradually phased out. Trading has become a district licensed activity to promote development of electricity Market. Electricity ACT 2003 provides for notification of National Electricity Plan by Central electricity Authority for short term of 5 years while also projecting a 15 year perspective.

DISTRIBUTION REFORMS

In the power sector reform process, the significant initiatives during 10th plan are enactment of Electricity ACT 2003, notification of National Electricity Policy, Tariff Policy and Rural Electrification policy. Distribution segment was identified as the key area for reform for putting the sector on the right track. Distribution Reforms involve System up-gradation, Loss reduction, Theft Control, Consumer orientation, Commercialization and adoption of IT.

Six Level Invention Strategy

In order to achieve commercial viability, Ministry of Power has formulated a six level intervention strategy that encompasses initiatives at national level, state
level, SEB/Utility level, distribution circle level, feeder level and consumer level as part of distribution reforms. These are:

i) National level intervention – Relates to policy, legislation framework, uniform standards, energy conservation, accounting etc.,

ii) State level intervention-Formation of SERCs, issuance of regular tariff order, providing legislative support, removal of Tariff anomalies, subsidies and budgetary support.

iii) SEB level intervention-Restructuring, accountability, commercial accounting, Integrated MIS, benchmarking of parameters, Grid discipline and TOD metering.

iv) Distribution Circle level intervention- in the billing, reducing energy handling cost, circle to function as independent business unit.

v) Feeder level intervention – 100% metering at 11KV feeder, total accounting of energy & quality power supply.

vi) Consumer level intervention-Mandatory metering including billing, consumer satisfaction & energy conservation.

**Energy conservation Act 2001**

Energy Conservation Act was enacted on October 1, 2001. the Act lays down concrete measures to ensure efficient use of energy and its conservation. The ACT comes into effect on March 1, 2002. The Bureau of Energy Efficiency (BEE) has been set up to make wide ranging regulations to further the
objectives of the ACT. The Central and State Governments have been empowered to facilitate and enforce efficient user of energy and its conservation.

Policy initiatives

In compliance with provisions of the Electricity ACT 2003, National Electricity Policy, National Tariff Policy and National Rural Electrification Policy as have been notified by the Ministry of Power.

National Electricity Policy (2005)

The National Electricity Policy aims at laying guidelines for accelerated development of the power sector, providing supply of electricity to all areas and protecting interests of consumers and other stakeholders. The policy envisages multi-year tariff; private sector participation in distribution, open access in distribution, segregation of technical and commercial losses through energy audits, standards for reliability and quality of supply in line with an international practice by year 2012, implementation of modern information technologies system on priority basis with special emphasis on consumer indexing and GIS mapping, promotion of HVDS system, sub-station automation and effective implementation of anti theft provisions of Electricity ACT 2003.

The National Tariff Policy (2006)

The National Tariff Policy has been notified in January 2006. As per the policy all future requirement of power needs to be procured competitively by
distribution licensees except in cases of expansion of existing projects or where there is a State Controller/owned company developer. It provides framework for performance bases cost of service regulation in respect of aspects common to generation, transmission as well as distribution. Multi-year tariff framework is to be adopted for tariff to be determined from April 1, 2006. The policy envisages suitable performance norms of operations with incentives and disincentives along with appropriate arrangements for sharing the gains of efficient operations with the consumers. Electricity is to be made available for 24 hours particularly for those consumers who are willing to pay tariff which reflects efficient costs. The policy emphasizes giving subsidy in transparent and targeted manner and the cross subsidies for different consumers should be brought within the range of +20% of average of the supply by the end of the year 2010-2011. The tariff fixation should ensure sustainable use of ground water resources. The cross subsidy surcharge to be computed in a way so that open access becomes a reality.

**Rural Electrification Policy (2006)**

The Rural Electrification Policy envisages provision of access to electricity to all households by the year 2009 and minimum lifeline consumption of 1 unit per household per day as merit good by year 2012. Promotion of decentralized distribution generation, rural electrification plan by State Government s to achieve the goal of providing access to all households, setting up of the District Committees, Implementation of Franchisee system as mandated by RGGVY for
distribution management, If state Government /SERC decides to permit licensee to user assets created with subsidy the benefit of capital subsidy to be passed on to consumers. Government of India to evolve model schemes in consultation with NABARD and RBI to encourage widespread participation by lending community, Energy efficiency, to be promoted as mass campaign in rural areas. Government of India should evolve programmes for encouraging use of economically viable energy efficient farm equipment – irrigation pumpsets and use of IT for supply of Electricity should be encouraged.

**Integrated Energy Policy (IEP)**

Some of the important recommendations relate to the following areas:

- Transparent and targeted subsidies:
- Improved efficiencies.
- On the power sector the key high priority recommendations of the energy policy relate to power sector reforms to focus on controlling aggregate technical and commercial losses of the transmission and distribution utilities. In order to reduce AT&C (Annual Technical & Commercial) losses the Committee recommended APDRP to be restructured to ensure energy flow auditing at the distribution transformer level.
• Automated meter reading, Geographical information System (GIS) mapping of the network & consumers and separation of feeders for agricultural pumps.

• Investment in developing a Management Information System (MIS) that can support a full energy audit for each distribution transformer is essential for reduction in AT&C losses. This will also fix accountability and provide a baseline which is an essential prerequisite to management reform and/or privatization.

• Introduce time-of-day pricing with shift to electronic meters.

• For all loads above say 50kWh, introduce intelligent mates that permit real time and remote recording of data and allow remote control over the power supplied by each meter. This would help effective management of connected load and the reported pilferage by large consumers.

• The improvements listed above and the base line date generated as a result would bring greater transparency in the process of privatization (if pursued) and provide a better estimate of the transition funding needs under outcome driven privatization models that seek to restore the viability of distribution.

• All central assistance to state Governments for the power sector must be linked exclusively to loss reduction and improved viability.
• The restructured APDRP (Accelerated Power Development Rural Programme) can, in the very least, help create an authentic base line. The revised APDRP will provide incentives to State Electricity Boards (SEBs) that are linked to performance outcomes and will also include incentives to staff for reduction in AT&C losses.

• The committee also recommended that liberal captive and new captive regime foreseen under the Electricity ACT 2003 be realized to derive economic benefits from availability of distributed generation. It will also set competitive wheeling charges to supply power group to captive consumers. The will pave the way for open access to distribution networks. To achieve these objectives, the committee feels that it is essential to separate the cost of pure wire business carriage to energy business content in both transmission and distribution at different voltages. The wire business within the distribution segment is also a natural monopoly and must be regulated.

• The Committee recommended introduction of availability bases tariffs(ABT) for intra-state sales and upgradation of state load dispatch centre to the technical level of regional load dispatch centre.

• Committee recommended that gross subsidy surcharge; wheeling charge and back-up charges are set properly to make the utilities viable after high value paying customers migrated to new suppliers due to Open
Access. These charges need to be periodically revised and independently regulated.

- Committee recommended that the regulators should set Multi year Tariff.
- To make RGGVY (Rajiv Gandhi Grama Vidyat Yojana) sustainable the committee recommended that, a business plan with a viable revenue model needs to be elaborated. A clear pricing and subsidy and the mission’s target to be announced soon and the franchisees should run the local network.
- The committee suggested generation of electricity through gasified or by burning surplus bio-gas from the community bio-gas plants. Such distribution generators may be able to take electricity to villages sooner than the grid and tariff should be formulated for such distributed generation for both household and productive uses including agriculture.
- The committee has emphasized energy efficiently and demand side management. The committee feels that, with an aggressive pursuit of energy efficiency and conservation, it is possible to reduce India’s energy intensity up to 25% from the current level. Some of the recommended initiatives of the Committee for quick yield returns are as follows:
  - Regulatory commissions can allow utilities to factor EE/DSM expenditure into the tariff.
  - Each energy supply company/utility should set up an EE/DSM cell.
• All utilities should introduce TOD (Time of the day) tariffs for large industrial and commercial consumers to flatten the load curve. Utilities should support load research to understand the nature of different sectoral load profiles and the price elasticity of these loads between different time periods to correctly assess the impact of differential tariffs during the day.

• Enforce mandatory purchase of electricity at fixed prices from co-generators (at declared avoided costs of the utility) by the grid to encourage cogeneration.

• Improving efficiency of industrial, municipal and agricultural water pumping.

• Instituting an efficient motors programmee. The initiative should focus on manufacturers / rewarding shops and target market transformation, by providing incentives to supply energy efficient motors.

• Instituting an efficient boiler programmee.

• Promoting Solar Hot Water Systems. This programme should aim at both industrial and household needs of Hot Water.

• Undertaking efficient lighting initiative.

• Making energy audits compulsory for all loads above 1MW. Should discourage waste and promote only justified use of power and increase capacity utilization by flattering the demand curve.
Other recommendations of the committee are illustrated below:

1. No single class of consumers should be charged by the SEBS a rate less than the cost of providing them the power.

2. If State Govt. feels, that the particular consumer group needs special subsidies which require the SEBs to sell the power below cost, specific instructions to be issued to the Board and the subsidies equivalent to the loss to be given to the SEBs, and it should be provided as separate item in the State Budget.

3. The group which could qualify for such subsidies are small and marginal landless labourers and slum dwellers.

4. Steps should be taken to see that, the subsidies do actually reached the intended beneficiaries.

5. Peak hour tariff should reflect the cost of incremental addition to the capacities.

6. The capacity of the consumers to pay should be taken into account for fixing the tariffs.

7. For bulk consumers, who take load of 1MW and above the differentiating meters should be provided.

8. Domestic and Commercial consumers, should be charged inverted block tariff ie. Rate should be increased as the quantum of power increases.
9. Tariff should encourage conservation by being raised to levels at which investment and efforts in conservation become economically worthwhile.

10. There is no case of subsidizing the power intensive industries and they should be charged at least full cost of power plus prescribed returns.

11. Inter state competitions by states to attract new industries to this states, by offering concession tariff should cease.

12. To prescribe such norms a bureau of Electricity cost and prices (BECP) should be setup. This roll should be advisory.

13. BECP should advice state Electricity board and tariff polices.

14. Flat rate tariff should be discontinued and replaced by metered supplies.

15. The commercial wings of state Electricity Board will need to be gradually strengthened.

16. The CEA should evolve detailed guidelines and performance on how the accounts are SEBS and utility should be kept and compliance with these ensured making suitable changes in the Electricity Act.

Three basic policy aspects which are peculiar to state Electricity. Board and have substantial bearing on the profitably and financial viability of SEBS. Viz.,

a. Absence of equity participations
b. Supply of power to agricultural Sector. – Free supply which is highly remunerative and Boards being not at all adequately compensated for the loss of revenue.

c. State Govt. realizing substantial revenues through electricity taxes although state Electricity Tariff are below break even level resulting in losses.

**Promoting Open Access & Trading**

The key of the Electricity ACT 2003 for promoting competition and providing choice to the consumers are open access in transmission from outset and for phased introduction of open access in distribution. Most of the State Electricity Regulatory Commissions (SERCs) have notified open access regulations and many of them have also notified cross-subsidies surcharges.

Open access in distribution would become a reality only if certain pre-requisites are met. These are availability of power beyond long-term PPAs, adequate transmission facilities and an appropriate transmission tariff.

To make available adequate power for open access consumers, there is a requirement of having an enabling policy framework for merchant power plants which could be in the size of up to 1000MW. This size is considered appropriate from the viewpoint of greater possibility of financial closure without long term PPAs and also of making available transmission corridors for such merchant power plants. We could target a merchant capacity of about
10,000 to 12,000 MW by the end of 11\textsuperscript{th} Five Year plan. Working Group recommends that coal linkages should be made freely available for power project developers to come forward to set up such merchant power projects. In case captive coal blocks are considered to be given to such merchant power plants, it should be a mandatory condition that such a power project developer would not compete in competitive bidding for long-term PPA based power procurement in order to avoid unequal competition (because only few developers should have such coal blocks and others would not). For allocation of both coal linkage or coal blocks for merchant power plants, an additional condition should be that captive coal mining must begin within a period of three to four years failing which the allocation should be cancelled.

For providing transmission corridors for such merchant power plants, the working Group recommends that adequate redundancy should be built at the state of transmission planning with the approval of Appropriate Regulatory Commission. The National Electricity Policy already provides that prior agreement with the beneficiaries should not be a pre-condition for network expansion and that CTU/STU (Central Transmission Utility / State Transmission Utility) should undertake network expansion after identifying the requirements in consultation with stakeholders and taking up the execution after due regulatory approvals. There is a need to identify the major load centre who would be drawing power from such merchant power plants and the required redundancies could be planned. The cost of providing such redundancy should
be absorbed in the transmission tariff by the concerned region / Zone and should be shared by all the beneficiaries.

A rationale transmission tariff framework is essential for facilitating optimum network use and promoting power trade. Presently, the pricing principles applied to the transmission systems have differentiated between the inter-regional, regional and state level flows with such tariffs applied for each component of network used. This has led to ‘pancaking’ of the network. Realizing this problem fully, the Tariff Policy envisages a National Transmission Tariff Framework which is sensitive to distance and direction and related to quantum of power offered.

Regarding the regulation of tariff of merchant power, the Electricity ACT 2003 provides regulation by SERC of cost of power purchased by the licensees under section 86 (1) (b) of the ACT. The Act further provides that in case of open access is availed by the consumer, the price would be as mutually agreed by the consumer and the supplier. However, there is an urgent need for regulations for providing grid connectivity to the merchant power plants.

**Sector Over View**

**Generation**

The power generation industry in India is poised for a major structural change due to increased private ownership and greater diversification in the fuel mix. Investor interest in generation is quite significant with investment flowing for manufacturing. Advanced technology and merchant power. Further,
the decision of the Nuclear Suppliers Group (NSG) to allow its members to engage in civilian nuclear technology trade with India might lead to an exponential increase in the share of nuclear fuel in the fuel mix.

India’s installed capacity (excluding captive plants) as of March 2009 was 147.965 MW. Thermal continues to have a dominant share, at 63.34 per cent or 93.725 MW, followed by hydro (24.93 per cent) renewable (8.94 per cent) and nuclear (2.78 per cent). Sector-wise, the state sector has a majority 51.44 per cent share or 76.115.67 MW of capacity, followed by the central (33.09 per cent) and private (15.46 per cent) sectors.

Slow down in capacity addition and Twelfth Plan targets finalized The key concern generation has been the sector’s liability to add capacity commensurate with the increase in power demand. Despite the poor past achievements, another ambitious target of 78.700 MW of conventional capacity has been set for the Eleventh Plan period.

However, the trend under performance continued during the first two years of the Eleventh Plan period. The sector added 9,263 MW of conventional capacity in 2007-08 (against added 16,335 MW) and 3,454 MW in 2008-09 (against the target of 11,061 MW). The key reasons for underachievement include inadequate equipment capacity and per cent shortages of in fuel and manpower.

The good news through is that orders for the remaining capacity for the plan period (65.983 MW) have already been placed and these are at various stages
processing. Further, equipment manufactures both of main plant and balance of plant are tamping up their capacity. All of this may not be available for the current plan period. Nevertheless, this would secure future capacity addition plants from the equipment standpoint. The technical thrust is to move to supercritical and other efficient technologies.

Meanwhile, the Central Electricity Authority (CEA) has sated working on Twelfth Plan targets. It has already prepared the Twelfth Plan hydro document identifying projects totaling 30,000MW. It is now finalizing a report on Twelfth Plan thermal projects for which it has already selected projects with capacity aggregating 70,000 MW.

**Rising private sector contribution.**

The private sector contribution to the total installed capacity has been rising consistently since the passage of the Electricity Act, 2003. It has risen from 8.66 per cent March 2003 to 15.46 per cent in March 2009. This share is expected to increase further, given that independent power producers (IPPS) private projects aggregating over 1,00,000 MW are at various stages of development. Of the 26,000MW of Twelfth Plan thermal capacity that is under execution, 15,000 is in the private sector.

The ultra mega power projects (UMPPs) are expected to bring in huge private investment. Two out of the four awarded UMPPs have achieved
financial closure and involve a total investment of Rs 364 billion. However, the current financial downturn may adversely impact several IPPs that are awaiting financial closure of their projects. Based on the progress of projects that have already initiated construction work, the private sector target for the Eleventh Plan was revised upwards to 15,000 MW at the end of 2007-08 from 10,500 MW initially. The CEA expects an addition of over 21,000 MW by the private sector by 2012. This is a tenfold increase compared to around 2,000 MW contributed by the private sector during the Tenth Plan period. The trend in the private sector is to reserved a part of the installed capacity for merchant transactions in the market.

Need for productivity improvement.

Although the productivity of power plant has been improving serious efforts are required to accelerate and sustain improvements in productivity. The plant load factor (PLF) of thermal plants has improved from 72 per cent in 2003 to 77.22 per cent in 2008-09. This is however lower compared to 78.62 per cent in 2007-08. In 2008-09 the central and private sectors, which have been consistent performance, had average PLFs of 83.3 per cent and 91 per cent respectively, while the state sector had 71.8 per cent. The state sector have been recording lower PLFs mainly due to the operation of many old plants, which require renovation and modernization (R7M) or retirement.

The terms of power generation, the sector recorded a mere 2.68 per cent growth I 2008-09 to reach 717.894.52 MUs from 699.191 MUs in 2007-08. In
comparison, generation recorded a growth of over 6 per cent during the previous two years of the total generation 2008-09 thermal source contribution the maximum share at 82.17 per cent followed by hydro (15.74 per cent) and nuclear (2.04 per cent).

ULTRA MEG POWER PROJECTS PROGRESS (UMPP)

The total of UMPPs, mooted by the government in 2005 to add huge coal-based projects (4,000 MW each) quickly and cost effectively through private investment, made significant progress. In February 2009, the fourth UMPP, Tilaiya in Jharkhand, was warded to Reliance Power Limited (RPL), which had already won two UMPPs earlier. The projects is expected to come online by 2015. In April 2009, RPL achieved financial closure for the Sasan UMPP in Madhya Pradesh. The units of this project are expected to be commissioned between December 2011 and April 2013. For the imported coal based Krishnapatnam UMPP in Andhra Pradesh, RPL acquire three coal mines in Indonesia and is currently in talks with equipment manufactures. Meanwhile, Tata Powers Mundra UMPP in Gujarat, the first UMPP off the black, is on track and is scheduled for commissioning in 2012.

In 2008, the power ministry approved the next four UMPPs in the Kudgi in Karnataka, Bedabahal in Orissa, Chyyur in Tamil Nadu and Munge in Maharashtra. The financial meltdown does not seem to have aggregated to power sector the successful award of the Tilaiya UMPP and financial closure of the Sasan UMPP are positive indications. Nevertheless there remain issues such as delays in securing clearances and
commitments from state utilities for power purchase, resistance from environmentalists or demand for free power by states that need to be appropriately addressed with respect to all projects, and not only UMPPs.

**Tariff benchmarks discovered through competitive bidding**

Long term tariffs, discovered through competitive bidding during the past year, have been in the range of Rs. 1.77 to 2.97 per unit. For instance, the lowest levelised tariff quoted by RPL for the Tilaiya UMPPs was Rs. 1.77 per unit. Among the other projects that have been awarded through competitive bidding during the past year, the lowest tariff discovered was Rs. 2.45 per unit for supply of 1,241 MW (under Case I bidding) in Madhya Pradesh (RPL), Rs. 2.84 per unit for the 1,980 MW Talwandi Sabo Project (under Case II bidding) in Punjab (Sterlite Industries), Rs. 2.86 for supply of 500MW (under Case I bidding) in Haryana (GMR) Rs. 2.94 for supply per unit for supply of 1,424 MW (under case I bidding) in Haryana (Adani) and Rs. 2.97 per unit for the 1,320 MW Karchana project (under Case II bidding) in Uttar Pradesh.

**Nuclear capacity set to increase significantly**

The signing of the Indo-US nuclear deal in October 2008 following a waiver from the NSG opened up a plethora of opportunities for India to engage in international civilian nuclear trade. India has entered into similar agreements with France, Russia, Kazakhstan and Canada. The Indian nuclear power market is estimated to be worth $100 Billion. It is estimated that 40,000 MW of
nuclear capacity may come up by 2020. The Government has set a target to increase the share of nuclear power from around 3 per cent currently to 25 per cent by 2050.

The Nuclear Power Corporation of India, the country’s only nuclear power generation company, has set itself a target of increasing its installed capacity to 20,000 MW from the current 4,120 MW in the next five years. To achieve this, it has entered into agreements for importing fuel and reactors with various international companies. The Government is keen on attracting private investment in manufacturing nuclear plants and components. Several private players have evinced interest in the sector. For instance, Larsen & Toubro has entered into agreements with international companies like Westinghouse Electric, Atomic Energy of Canada Limited and Atomstroy export for provision of nuclear equipment and other related services. Similar agreements have been entered into by other domestic players.

**KG basin gas to boost generation**

The availability of gas from Reliance Industries Limited (RIL) D^ block in the Krishna – Godavari (KG) basin will have a positive impact on the power sector. For 2009-10, the power sector has been allocated 18mmscmd of Gas. This is expected to lead to an additional generation of 3800-4000 MW from stranded capacity during the year. This may increase further in case the fertilizer sector (which gets first priority) downs not usage all the gas allocated to it as it would then automatically come to the power sector (which gets second priority for the
existing assets). The availability of spot gas at a cheaper price of $5 - $6 per mmbtu will also boost gas –based generation from both utility/IPP plants and captive plants. The power ministry and the CEA, however, are taking a cautious approach in planning new gas based capacity. This is mainly due to the fact that new power projects would get the last priority for gas allocation as per the Governments gas allocation policy.

**Share of Hydro**

The central planners have acknowledged that the share of hydro will remain at around 25 per cent in the long run. In fact, by 2030-31, when the installed capacity is expected to increase to over 800,000 MW, the share of hydro capacity is expected to fall likely below 25 per cent level even if the sector is able to fully exploit the potential of 150,000 MW. During the first two years of the Eleventh plan period, 3,392 MW was commissioned against the target of 3,848 MW. The remaining projects aggregating 12,235 MW planned during the current plan period are under construction. By the end of the current plan period, the share of hydro is expected to fall marginally to around 22 per cent if all the capacity is commissioned as planned.

**Growth in captive generation**

There has been dramatic increase in the number of captive plants since the passage of the Electricity ACT 2003. Today, captive power contributed around 55,000 MW of capacity, which is over a quarter of the installed base. The key reason has been the steep growth in industrial project production coupled with
rising shortages in many states. The slowdown in the industrial growth in some segments in recent months may have given rise to surplus captive capacities. While the concept of open access and trading promises captives opportunities for disposing of surplus power, there are implementation issues that need to be addressed. A key development that is expected to result in increased gas based captive production is the availability of gas from RIL’s KG basin block. With the expanding city gas distribution networks across cities and with greater assurance of gas supply to these networks, the potential for several captive plants within city limits to switch from liquid fuels to natural gas is much higher.

**NAPCC lays emphasis on renewable energy**

While Thermal fuels are still dominant, with the announcements of the National Action Plan for Climate change (NAPCC) in June 2008, the government has set itself an ambitious target of diversifying its energy mix to lower carbon intensity. Among the key strategies outlined in the action plan is the goal of increasing the installed generation capacity based on renewable sources, with a special focus on solar power. The target is to increase the renewable installed capacity to over 25,000 MW by 2012 from the current 13,242 MW. The NAPCC calls for about 5 percent of the national generation to be based on renewable sources. In comparison, the current share is less than 2 per cent. Solar energy, the current grid – connected capacity of which is little over 2MW,
has received a significant boost with the NAPCC’s target of 1,000MW of grid –
connected solar thermal power by 2017. So for, wind energy has made
significant strides by registering robust growth of around 1000 MW to 1700 MW
annually since 2004 to reach 9,756 MW in March 2009. Other renewable
sources, though not currently growing at the same pace as wind, are also
catching up.

**Transmission**

Power transmission has begun to be taken more seriously – particularly in the
past year or so- by planners and investors (both the public and private sectors)
alone since the Electricity ACT 2003 was passed. It has been recognized that a
strong and adequate transmission infrastructure is a prerequisite for ensuring
free flow of power to where it is required, either through short term or long
term contracts.

The introduction of modern concepts like open access, trading and merchant
power, and the growing importance of captive power, renewable sources of
energy and nuclear power in the overall power mix, have all led to new
requirements in transmission investment, planning and operations.

To handle growing complexities in market operation involving multiple players
and to provide these players with fair access to the network, system operators
need to be adequately empowered. Thus there is a move towards separating
the load dispatch functions from the transmission utilities to ensure a level
playing field for new entrants as recommended by the Gireesh Pradhan Committee.

As of March 2009, the state transmission utilities (STUs) and the central transmission utility (CTU) which are responsible for intra-state and interstate transmission networks respectively, together owned and operated a complex transmission system comprising around 220,800 Ct.KM of lines and over 286,600MVA and 14,000 MW of substation capacity at voltages above 220KV.

During 2008-09, transmission, lines totaling 12,742 ct.KM and transformation capacity totallying 19,229MVA were added at voltages above 220KV, both in the central and state sectors. The rate of growth of the transmission network (at 220KV and above voltages) during the past decade has been only about 6-7 per cent. The government has set a target of 10 per cent growth in network length and 14 per cent growth in capacity for the Eleventh Plan period, which should go a long way in addressing capacity constraints.

While the current financial scenario may marginally impact investments in the power sector, raising resources for transmission projects should not be difficult as such because these are usually debt market customers whose debt needs are met largely by public sector financial institutions.

For instance, Power Grid Corporation of India Limited (PGCIL) the country’s CTU, spent Rs. 66.15 billion in 2007-08 and Rs. 80.95 billion in 2008-09, On Transmission projects. It is confident of achieving a capital expenditure target of Rs. 120 billion during 2009-10 of the Rs. 550 billion it has planned for the
eleventh plan period. It proposes to spend Rs. 200 billion in the development of transmission system associated with the ultra power projects.

At the State level, the STUs spend around Rs. 68.17 billion during 2007-08 alone. This amount comprises 33 Per cent of the total utility during the year. The STUs target a spending of Rs. 650 billion for the Eleventh plan period. The momentum in spending both at the central and state levels needs to be accelerated and sustained to ensure that transmission bottlenecks do not stall growth.

The Development of the National Grid by PGCIL is an effort to ease transmission constraints. Progress on the national Grid project has resulted in interregional transfer capacity increasing to 19,800 MW in March 2009 compared to 16,200 MW in March 2008. The target is to take this to over 37,700MW by 2011-12 and to 58,700MW by 2014-15.

Another significant development has been the operationalisation of the long-awaited National Load Dispatch Centre (NLDC) – the apex body in the hierarchy of the national grid system – in February 2009. NLDC’s full-fledged operation had become imperative with the emergence of two power exchanges for which it is mandated to act as the nodal agency, according to the Central electricity Regulatory Commission’s (CERC) latest open access regulations. In fact, the launch of the NLDC has set the stage for synchronous operation of the national grid on a real-time basis and for smooth power transfers across regions.
Continuous changes in technological standards have raised concerns of obsolescence, impelling transmission companies to undertake massive renovation and modernisation work.

One area where some activity has started taking place in the past year and a half is private sector investment in transmission. Attracting standalone private investment in the power transmission segment has been tough despite its opening up way back in 1998. The only public-private partnership project – the TATA Transmission system – has been operational since May 2007.

Awarded in October 2007 and being implemented by Reliance Power Transmission Limited, the first independent power transmission company project has made some progress since and is expected to be completed by 2010. There are a handful of transmission systems associated with private generation projects that are being developed by private players either independently, or in joint venture with PGCIL or an STU.

Meanwhile, the much-anticipated 14 transmission project identified by the power ministry for 100 percent private investment have also made some headway with the approval of all standard bidding documents in 2008. The bidding process for the first three projects has already been initiated and nodal agencies – the Power Finance Corporation and the Rural Electrification corporation – have received between 13 and 16 requests for qualification for these projects.
With respect to tariff, the central regulator, CERC, has the mandate to determine a national transmission tariff framework. Rationalisation of transmission tariffs continues to be a long-standing concern and is crucial for attracting investments in the sector. Prospective investors clearly look for competitive bidding and distance – and direction – based transmission tariffs as envisaged by the National Tariff Policy, 2006. The CERC is currently working on these regulations and is expected to come up with draft regulations shortly.

Meanwhile, in March 2009, CERC issued draft regulations for differentiated and non-discriminatory medium – and long-term access to the interstate grid. The objective is to make the terms of long-term grid access more flexible and allow medium-term transmission system usage (3 months to 3 years).

The rapid transformation of the segment has thrown up many issues and challenges before policy-makers. These include inadequate equipment manufacturing capacity, fast changing technology leading to obsolescence, problems in right of way, delays in clearances, inadequate margins in the system, grid indiscipline, lack of basic infrastructure and uncoordinated planning.

Despite additions, interregional power transfer capacity continues to be limited in comparison with the requirement. Transmission corridors are always chock-a-block with transmission traffic, leaving little or no free capacity for trading. The emergence of the two power exchanges

(1. Indian Energy Exchange limited, operating on June 27, 2008 and
2. Power Exchange of India Limited, Operational on Oct 22, 2008) and more traders on these platforms is expected to put greater pressure to create redundant transmission capacities.

The Synchronization of four regional grids has increased grid indiscipline, particularly in the northern region states, which have been overdrawing despite the CERC’s stringent measures. A key tool for maintaining grid discipline at the interstate level has been the availability-based tariff mechanism. However, the sustained success of the mechanism would depend on regular payment of unscheduled interchange changes, which some states are not paying.

There are concerns about the slow progress made by state transmission companies in strengthening and augmenting networks. While some unbundled utilities are making an effort to upgrade their transmission infrastructure and improve their efficiency by moving towards higher voltage levels, other need to catch up to ensure that a lack of adequate transmission networks does not become a bottleneck. This uneven development is also a hindrance to implementing modern concepts like open access and developing power markets.

Net, greater attention is being paid to power transmission in recent times as reflected in the huge investment plans of the CTU and STUs, the government’s intent to attract private investment, and the regulator’s efforts to rationalize transmission tariffs.
Distribution

Power distribution is the final and most crucial link in the electricity value chain as it directly affects the consumer who pays for the supply. Distribution starts at the 33 Kv substation and ends at the consumers’ doorstep, and involves navigating a maze of distribution lines, transformers, switchgears, capacitors and other equipment. India’s distribution infrastructure includes more than 6.76 million ct. km of lines and over 282,000 MVa of distribution transformer capacity as of March 2008. It is assumed to be growing at an annual average growth rate of around 3 per cent and 7.5 per cent respectively.

On an average, India loses about 32 per cent of electricity as aggregate technical and commercial (At&C) losses, which is a more accurate measure than simple transmission and distribution losses. The target is to reduce At & C losses to 15 per cent by 2012 under the Restructured Accelerated Power Development and Reform Programme (R-APDRP). Even though AT & C losses continue to remain high (ranging from 12 per cent to 68 per cent), there has been a decline in At & C losses in almost all DISCOMS. On the other hand, T&D losses registered a decline from 32.54 per cent in 2002-03 to an estimated 26.91 per cent in 2007-08.

There are an estimated 160 million electricity consumers today, growing at an annual rate of 4.5 per cent. The average per capita consumption was about 704 units in 2007-08 and is expected to cross 1,000 units by 2011-12. Electricity supply has not been able to keep pace with the growth in demand.
Power shortages have risen on an average basis from 9.8 percent in 2007-08 to
11.1 percent in 2008-09, indicating that demand has grown much faster than
supply. However, peak power shortage has come down from 16.6 per cent in
2007-08 to 11.9 per cent in 2008-09 primarily due to better grid synchrosiation
and the power trading market development.

The distribution system is plagued by deep – rooted legacy problems of high AT
& C losses triggered by rampant power thefts and technical issues corruption,
subsidised or free power dilapidated networks, inadequate metering, poor
recovery of dues, lack of consumer orientation and poor operation and financial
management.

This is partly due to the fact that distribution was a neglected area until the late
1990s when the thrust on privatization of generation failed to take off due to
the lack of creditworthy buyers. This resulted in greater focus on the revenue
end of the power chain and government instituted distribution reforms.

**Distribution reforms: Union government assistance**

The union government launched the APDRP in 2002-2003 with the objective of
encouraging reforms, reducing AT &C loses, and improving power supply
quality and consumer satisfaction.. Under the APDRP, reform-driven projects
were given assistance. System upgradation, metering, energy audits and
consumer services were the key areas covered. The Rs.400 billion APDRP
under the Tenth Plan had two components – an investment component and
incentive component – each with an allocation of Rs.200 billion.
As of March 2008, a total of 571 projects were sanctioned under the APDRP involving an investment of Rs. 170.34 billion. Of the total investments, the Government of India component was around Rs. 87.2 billion, of which around Rs. 74.7 billion was released. The total utilization until March 2008 was Rs.119.02 billion, well short of the targeted Rs.200 billion. Under the incentive component, the government has so far approved around Rs.29 billion and released the entire amount. This is also well short of the Rs.200 billion targeted level of grants.

The maximum number of projects were undertaken in Andhra Pradesh (100 projects) followed by Kerala (52) and Madhya Pradesh (48). Further, around 74 per cent of the works were completed under the APDRP as of November 2008.

The program so far has created islands of excellence, which most utilities were not able to replicate in non-APDRP circles. The programme met with moderate success but succeeded in bringing a focus to badly needed distribution reforms. Subsequently, the power ministry has related the R-APDRP which is larger in scale than the original programme at Rs.515 billion. As of February 2009, Rs.19.47 billion has been sanctioned by the power Finance Corporation to 25 discoms covering 598 towns under the R-APDRP.

The Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) aimed at rural electrification, is also providing focus and funds to the rural distribution system. As of April 16, 2009. 562 projects under the RGGVY have been sanctioned with a total cost of Rs.262.06 billion. Of which Rs.135.56 billion has been released
So far, 6.34 million rural households have been provided with electricity connections and over 59,000 villages have been electrified under the RGGVY.

**Privatization of distribution: Preference for franchisee models.**

Privatisation of distribution has been slow to take off. Orissa, the first state to privatise distribution, was unable to reap the entire benefits of privatization initially. The discoms suffered due to lack of government support and absence of transitional subsidy to absorb the financial losses. However, the privatization experience in Delhi has been better as discoms have been able to bring down AT&C losses and generally improve customer services.

The franchisee model holds promise for the future as it is perceived as a “softer” approach in involving private players in distribution. It seems to be politically more acceptable, since it is not an out-and-out sale.

The first franchisee operation was launched in Maharashtra (Bhivandi circle to Torrent Power in October 2007) with the state utility transferring the rights to supply, maintain and recover electricity dues in certain circles to private players. The success of the Bhiwandi franchisee model has served as a benchmark for other states to follow. In recent months, the Uttar Pradesh government has moved ahead to introduce input-based franchisees in urban areas for power distribution. Torrent Power Limited has been awarded the letter of intent for the Agra and kanpur franchisee in Uttar Pradesh for a period of 20 years. Other states such as Haryana and Orissa are also planning to take the franchisee route.
Role of reforms and regulation

Reforms and regulation have played a key role in the distribution turnaround. The formation of 25 state electricity regulatory commissions (SERCs) in 28 states has led to tariff rationalization as industrial tariffs are being progressively reduced. While tariffs for agricultural and other categories are being increased to levels closer to the cost of supply.

Besides, most SERCs have also passed the final regulations on performance standards for distribution licensees. Which specify the overall and guaranteed standards with respect to complaint handling, quality of power supply and system reliability, safety, restoration of power supply, existing and new connections, metering and billing issues, among other things.

Open access, a catalyst to help the captive segment and energise power trading, has taken off for bulk consumers in some states. Other consumer categories would gain access in a phased manner. Almost all the SERCs have passed final regulations. As of March 2009, 116 approvals have been awarded in 10 states.

The splitting and unbundling of state electricity boards (SEBs) has also helped a great deal. So far, 15 SEBs have unbundled and statistics show that unbundled SEBs have a lower cost of supply than vertically integrated utilities. A few states are still unwilling to take the political decision to unbundles.
The level of metering has shown improvement. This is partly due to the APDRP. At the 11 KV feeder level, 100 per cent metering has been achieved in 23 states and 100 per cent consumer metering has been achieved in nine states. While metering at the feeder and consumer levels has shown considerable improvement, DT metering needs attention.

Another positive development is that both sale of power and state utility revenues are showing a steady increase every year. Revenue from the sale of power increased from Rs.982.86 billion in 2004-05 to Rs.1,217.91 billion in 2006-07, registering an annual growth of 11.32 per cent. There was a higher growth in revenue from the sale of power vis-à-vis energy sold, indicating improved realization by utilities through higher tariffs. Cash collections are improving, particularly in states implementing APDRP works, receiving subsidies in time, and where anti theft laws have been passed. A few utilizes/SEBs have registered an improvement in cash profits. These include Maharashtra, Kerala, Karnataka, Jharkhand, Bihar, Orissa, Rajasthan, Haryana, Delhi and Chhattisgarh. However, states like West Bengal, Punjab, Uttar Pradesh, Madhya Pradesh and Tamil Nadu, have shown a deterioration on the financial front.

**Growing focus on IT and consumer centric approach.**

IT is increasingly playing a prominent role in the transition. More and more distribution companies are adopting sophisticated IT systems to improve operations and customer service. Spot billing, call centres, remote meter reading, automated billing and energy accounting are among the IT
mechanisms incorporated. However, the budgets for new investments are still inadequate and the utilization of existing investments is still poor. Some distribution companies continue to display a lack of strategic approach to systematic development.

A turnaround in the distribution segment is critical to make the power sector commercially viable and to deliver reliable power supply at reasonable cost. The governments thrust on reforms and implementation of policy objectives through regulatory efforts has started to bring an increased focus on profitability and efficiency. However, sustained long-term efforts will be required to lead to permanent changes.

**Major Play of SEBs / UTILITIES**

The SEBs and their unbundled utilities continue to control the majority of India’s power infrastructure. Together, they hold over half of the total generation capacity and around 90 per cent of the transmission and distribution infrastructure.

As of March 2009, the SEBs and unbundled generation companies collectively owned 76.115MW of installed capacity and 140.000 ct. km of transmission
lines. The state sector owned 6.7 million ct. km of distribution lines as of March 2007.

In the Eleventh Plan period, the state sector is expected to contribute 26.783 MW or 34 per cent and 31.997 ct. km or 11 per cent of the targeted generation and transmission capacity addition. However, in the first two years, it has managed to add 7,094 MW or 26 per cent and 89,645 ct. km or 28 per cent of the target. In 2008-09. Of this, the state sector achieved 1,820 MW or 49 per cent of the target, a PLF of 71 per cent against the target of 75 per cent, and 5,637 ct. km or 70 per cent of the targeted 8,043 ct. km. AT&C losses hovered at 32 per cent for the states.

In 2007-08, state utilities spent Rs.206 billion, of which 48.5 per cent was on generation, 33 per cent on transmission and the remaining 18.5 per cent on distribution.

In terms of the financial viability of state power utilities, the total commercial losses (excluding subsidy) stood at Rs.288.24 billion in 2006-07, which translates into a rate of return (RoR) of -24.01 per cent. The Economic Survey estimates the commercial losses (excluding subsidy) to be Rs.257 billion and Rs.264.6 billion for 2007-08 and 2008-09 respectively. Correspondingly, the RoR is estimated to improve to -18 per cent in 2007-08 and -14.3 per cent in 2008-09.
A decade after the launch of power sector reforms, some states are yet to embrace the changes wholeheartedly. Seven states have not unbundled their SEBs yet. That said, reforms have certainly helped to increase accountability and transparency in states which have taken up unbundling. States like Tamil Nadu and Himachal Pradesh are planning to take the plunge shortly. The Chhattisgarh State Electricity Board unbundled its board into separate entities earlier this year.

Since state utilities have been unsuccessful in bringing about a complete turnaround in their performance, several states are encouraging greater private sector investment through the franchisee route in the distribution sector to improve their financial health.

The first franchisee in India. Torrent Power, has been able to substantially reduce distribution losses and improve operations in the first year of its presence in the Bhivandi circle in Maharashtra. Taking heart from this success, nearly 50 cities in states like Bihar, Uttar Pradesh and Maharashtra are planning to adapt the franchisee model in the next two to three years.

To meet growing electricity demands, state utilities have redirected their focus on developing interstate as well as intra-state transmission and distribution networks. The union government’s Rs.515 billion APDRP is expected to aid the efforts of state utilities to establish modern and automated management
systems. Which will bring about greater efficiency in daily operations and enable sustained loss reduction.

**Reforms and Regulations**

With the benefit of hindsight, we can see how power sector reform was vital for the resurrection of an industry on the verge of collapse. It has already reversed a scenario of increasing losses and if may have enabled the sector to turn the corner.

But the reform agenda is far from complete. The sector still suffers from the inevitable entwining of political compulsions with economic merits. However, the institutional structures established in the early stages of reform should stand the sector in good stead during the process.

**Restructuring SEBs**

A major step was unbundling the state electricity boards (SEBs). This brought in the much-needed business focus to each segment, that is, generation, transmission and distribution.

The most recent case of unbundling is that of the Chattisgarh State Electricity Board in the beginning of 2009. Seven states have not yet unbundled their respective SEBs. This list of laggards comprises Kerala, Tamil Nadu, Bihar, Jharkhand, Punjab, Himachal Pradesh and Meghalaya. The power ministry has set June 30, 2009 as the final date for unbundling SEBs. The Tamil Nadu
government has already taken a decision to split the Tamil Nadu Electricity Board into two separate entities – one for transmission and the other to oversee generation and distribution. Other states have also initiated official procedures.

**Regulatory authority**

The Central Electricity Regulatory Commission (CERC). Established in 1998, took into the interstate issues which impact the power sector as a whole. The state-specific issues are dealt with by the state electricity regulatory commissions (SERCs). As of May 2009, 27 states have notified their respective SERCs including a joint Electricity Regulatory Commission for Mizoram and Manipur.

The CERC’s recent key orders include unscheduled interchange, congestion charges, interstate trading, tariff regulations and the Indian Electricity Grid Code (Amendment), 2009, Notable progress has been made in areas such as grid stability, tariff rationalization, open access and power trading, among others, As a quasi-judicial authority, the CERC’s contribution has also been significant in adjudicating on disputed issues in policy.

The SERC’s mandate lies in ensuring implementation of the reform process at the state level, while also supervision state-specific power sector issues. The major thrust areas include open access by the distribution utilities, elimination of cross-subsidy surcharges, tariff rationalization, restructuring of SEBs, availability-based tariff regime and renewable power purchase obligations, Not
all SERCs have met with equal success in addressing these issues. Their role is, however, crucial for orderly operation at the state level.

**Other reform measures**

The power distribution segment has been a major recipient of union government support. Recently, the government revamped its flagship scheme, the Accelerated power Development and Reform Programme (APDRP). The Restructured APDRP now controls a bigger outlay of over Rs.500 billion including grants and loans for implementation during the Eleventh Plan. The scheme now has an achievement-oriented incentive structure with a particular emphasis on creation of baseline data by the utilities. The thrust continues to be on reducing aggregate technical and commercial losses. Which have remained stagnant at around 35 per cent.

Private participation has been another route for infusing efficiency in distribution. But so far, privatization has been limited to Orissa and Delhi. Instead, state governments are increasingly taking the franchise route. The distribution franchisee model is being identified as a softer approach than private ownership. This model is mandatory in the government rural electrification programme. Over 9,800 franchisees are in place in 15 states, covering 92,069 village.
Rural electrification as such constitutes a major challenge for the power sector. While the government targets 100 per cent rural household electrification by 2012, the implementation process does not show an encouraging picture. Under the Rajiv Gandhi Grameen Vidyutikaran Yojana, as a January 2009, 5.43 million rural households had been provided access to electricity. Which signifies 47 per cent coverage. Village electrification has made better progress. With 488,926 connected villages showing 82.3 per cent coverage.

Despite all constraints, the reform process has delivered significant benefits. Utilities are now geared towards undertaking upfront capital investments and have done so in inducting technological innovations, Advanced metering systems, etc. Sustaining the pace of reform is the key for future progress. For this, it is important that institutions function efficiently and independently. At the same time, policies should be flexible in adapting to the emerging scenario.

**FINANCE**

The current financial crisis had a wide-ranging impact on the Indian economy. The liquidity crunch has hurt capital constrained companies which are finding it tough to raise long term capital. Although the government has initiated a number of steps such as a cut in key interest rates to ease capital, investors continue to be cautious. Experts believe that such steps will gradually have a
positive impact on the economy. Presented below is a brief synopsis of funding trends in the power sector along with the impact of the financial crisis

**Debt.**

Domestic commercial banks continue to be the biggest financiers. The enabling policy framework for investments, focus on moving towards competitively bid projects and the economic growth have led banks to take higher exposure in infrastructure, especially in the power sector.

As on March 2008, the gross bank credit to the power sector stood at Rs.938.99 billion, accounting for the highest share at 46.4 per cent of the total outstanding to the infrastructure sector. The gross credit outstanding to the power sector has grown at an annual rate of about 29.1 per cent since 2003-04 to reach Rs.938.99 billion at the end of March 2008. During the same period, bank outstanding s to the industry also grew by around 29.2 per cent.

Most of the lending by banks and non-banking finance companies (NBFCs) has been skewed towards generation projects. However, with the opening up of the transmission and distribution segment, commercial lending is expected to improve in such segments particularly as private sector players come in.

Another reason for large exposure by commercial banks is the fact that a number of smaller banks, which do not have sufficient experience in project financing. Also enter through loan syndications and thereby share the credit risk with other lenders. Commercial banks no longer insist on government
guarantees and counter guarantees. Security mechanisms followed today typically include creation of escrow/trust and retention accounts and charge over cash flows from the project.

The lending rates are linked to prime lending rates (PLRs) and are in the range of 12-13 per cent with interest rate resets after one to three years and average maturities of 13-14 years. In a few hydro projects, commercial banks have extended tenors to about 20 years as well. In the recent past, PLRs reached as high as 14-15 per cent, making private investment in infrastructure projects less profitable. Although interest rates are steadily coming down, banks have been reluctant to bring down interest rates in line with the cut in key rates by the Reserve Bank of India (RBI) as banks continue to adopt a cautious stance.

Commercial banks exposure to the power sector is restricted by RBI’s sectoral caps, group exposure norms, etc. and by issues of asset-liability mismatch.

Specialized NBFCs such as the power Finance Corporation (PFC) and Rural Electrification Corporation (REC) are also active in funding power projects. However, their disbursements have been skewed towards state utilities. Disbursements by PFC have grown at an annual rate of 19 per cent since 2004-05 to reach Rs.210.54 billion in 2008-09. REC’s disbursements have registered an annual growth of 27 per cent to reach Rs.163.03 billion as of 2007-08.

The bond market for funding has been primarily resorted to by central sector undertakings such as NTPC Limited, PFC and REC. The bonds are generally subscribed by provident and pension funds, gratuity trusts, insurance
companies, mutual funds, individuals, etc. Interest rates on such bonds have been between 6 and 7 per cent with tenors of seven-eight years.

The underdeveloped bond market is characterized by lack of liquidity. The limited long-term issues hampers the ability of private sector companies to raise funds. Typically, there is an absence of investment grade paper, resulting in high cost of funds. Moreover, funds mobilized have to be utilized immediately in order to optimize costs and no flexibility is allowed in prepayment.

As per Prime Database, there were seven bond issues in the power sector during 2007-08. raising about Rs.34.7 billion. This accounted for about 19 per cent of the total amount mobilized through the bond route in the infrastructure sector.

Insurance and pension funds have been investors in the sector. Their investments are governed by their respective regulatory bodies- the insurance Regulatory and Development Authority and pension fund Regulatory Development Authority. The long-term nature of such funds generally fits the requirement of longer-tenor funds for power projects.

The biggest life insurer investor has been the life insurance corporation of India. During 2007-08, it invested Rs.70.22 billion by way of loans and debentures to the power sector against Rs.96.15 billion in 2006-07. It is generally felt that in order to increase long-term funds to the sector, insurance
and pension funds should come into the sector in a more robust manner and take exposure through take-out financing and other measures.

Overseas financing in the form of external commercial borrowings (ECBs) has come under stress following the current financial crisis and failure of banks in the US. Although RBI has undertaken a number of policy reforms for infrastructure companies raising funds through the ECG route, the amount raised through ECBs/foreign currency convertible bonds (FCCBs) in the power sector declined to $2.27 billion in 2008-09 as compared to $2.70 billion raised in the year 2007-08.

However, the amount raised through ECBs has grown at an annual rate of 17 per cent during the period 2004-05 to 2008-09. This is due to the fact that ECBs have been a relatively cheap source of finance in comparison to domestic bank credit as overseas loans are usually linked to Libor.

Multilateral institutions such as the world Bank, Asian Development Bank (ADB) and International Finance Corporation have provided assistance in the form of loans, grants and technical assistance to aid reforms. For instance, the World Bank has funded state reforms in Orissa, Haryana, Uttar Pradesh, Rajasthan and Madhya Pradesh. In March 2008, both the World Bank and ADB provided $600 million worth of loans to power Grid Corporation of India Limited for its expansion projects.

Export credit agencies (ECAs) provide financial assistance to power companies for acquiring equipment and supporting expansion. The ECAs normally provide
cover up to 85 per cent of the value of imported equipment, and finance import of equipment from their home country. For instance, in April 2008, the Export Import Bank of Korea agreed to lend $500 million for the Mundra ultra mega power project (UMPP). Further, Chinese Exim Banks have also committed to lend up to $1 billion for the Sasan UMPP. In addition, the US Exim Bank has extended a $2.45 billion credit line to India for import of capital equipment from the US for infrastructure projects including power.

**Equity**

Private equity (PE) investors have shown active interest, particularly in the generation and equipment segments. According to India Infrastructure Research, during the period January 2004-May 2008, the sector witnessed more than 25 private equity deals. Each over Rs.100 million in value terms. Some of the key deals were 31 Groups stake in Adani power where the former acquired 8 per cent stake in the latter for Rs.9 billion, and the investment of LN Mittal Ventures and Farallon Capital in India bulls power where LN Mittal Ventures acquired 28.6 per cent stake for Rs.15.79 billion.

The Current downturn has impacted valuations adversely. According to industry experts, valuations have come down from about Rs. 40 million per MW to about Rs.1020 million per MW. Further, falling valuations have resulted in a gap between the expectations of promoters and investors. The expectations of both parties need to align for deal flow. With hindsight, the fall in valuations
also presents an opportunity for private/project equity investors to invest at lower valuations as demonstrated by rising PE investments. PE investments in the power sector have risen from Rs. 1.87 billion in 2006, to reach Rs. 17.55 billion in 2007 and further to Rs. 39.52 billion in 2008.

The booming stock markets of the past few years have led to a number of companies across all segments of the power sector to raise funds through initial public offerings (IPOs). According to Indian Infrastructure Research, during the period January 2004-July 2008, 19 power companies raised a total of Rs. 270.2 billion. Of the total amount raised, 69 percent was in the generation segment, 11 per cent in the transmission segment and about 20 percent in the equipment and financing sectors.

In the present scenario, raising funds through IPOs has become a remote possibility as investors have become risk-averse and the fall in valuations has impacted the fund-raising potential through stake dilution. Not surprisingly, companies such as NHPC limited, Adani Power and Jaiprakash power ventures have put their IPO plans on hold due to adverse market conditions.

Power companies have also raised funds through qualified institutional placement (QIP) issues; QIP is a faster mechanism as it involves less disclosures and does not involve a pre-issue filing with the regulator. The companies that raised funds through QIPs include PTC India Limited, GMR infrastructure limited and Suzlon Energy limited. Together these companies
raised about Rs. 79.39 billion during 2007-08. Raising funds through QIPs is primarily dependent on market conditions. A revival in the equity markets will help.

On the whole, the crisis has led investors to adopt a cautious approach. But well-structured projects backed by promoters with a strong background continue to attract funding as demonstrated by the financial closure of the Sasan UMPP. However, investors such as insurance and pension funds need to enter in a larger way for the availability of long-tenor funds along with the development of domestic bond markets and take-out financing structures. This will bring in much more funding options for project developers and liquidity for project equity investors.

**Objective Of the Study:**

Specifically, this study attempts to critically review the financial performance in the following areas viz.,

1. Examining the trends in income and expenditure.
2. Review impact of sources and application of funds.
3. Compare the creation of assets and liabilities.
4. Review the impact of free supply to agricultural Sector.
5. Identify the main factors responsible for poor financial performance of TNEB
6. Finally to suggest the appropriate policy measure based on the findings to devise, ideal policy for the improvement of financial performance of Tamil Nadu Electricity Board.

**Period of Study**

This research study covers the period of 1998 to 2008.

**Scope of the Study**

This research study is to examine the financial performance of Tamil Nadu Electricity Board from 1998 to 2008.

**Methodology and Research design**

The area of the study is confined to Tamil Nadu Electricity Board.

**Sources of Data**

For a research study data is very essential, in fact data are backbones of the thesis.

In research milieu, there are mainly two types of data, viz, primary and secondary. The conclusion are driven after the analysis of various data. The data can be collected thru’ primary and secondary sources. The primary data are those which are collected directly from the organizations by personal interviews or from the staffs etc., The secondary data will be collected from the books, records, publications, annual reports etc., In the present thesis, the researcher has used secondary data available from various reports, publications etc.,
Sources of secondary data may either be published or unpublished. The present study has drawn its secondary data mainly from

1. Administrative reports of Tamil Nadu Electricity Board
2. Statistics at a Glance of Tamil Nadu Electricity Board

The additional data required for the study were collected from

1. Annual reports of the working of SEB’s and electricity undertakings published by planning commissions.
2. The report of the working group on power for 11th plan (2007-2012) published by the Ministry of power, Govt. of India.
3. The reports of CEA, are also used for the purpose this study.

In addition, Electricity supply act 1948, and electricity act 2003, and recommendations of various committees on power constituted by Govt. of India will also analyzed.
The studies from National council for power utilities were also taken into account.

Other sources of information such as documents, publications, books, journals, circulars from time to time by Tamil Nadu Electricity Board have also been made use of wherever necessary.

**Chapterisation**

This study has been organized into five chapters. Accordingly Chapter 1 deals with introduction and design of the study. Chapter II explains about review of literature. Chapter III concentrates on financial performance of Tamil Nadu Electricity Board. Chapter IV discussed the findings and Chapter V gives recommendations.