CHAPTER-III
PROFILE OF THE STUDY AREA
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Profile of the Study Area

In order to familiarize and well acquaint with power sector area various historical and related laws, practices, developments, chronology are explained in detail.

3.1: Electricity Sector in India: A Historical Review

3.1.1: PRAYAS Energy Group (PEG) is working on electricity sector policies with an aim to protect and promote public interest in general and the interests of disadvantaged sections of society in particular. PEG have reviewed electricity sector developments in India in an impartial manner.

The PEG report on India’s historical review put it, that India has continued to achieve significant growth in the last 50 years. In the Constitution of India, electricity is a concurrent subject handled by both the central and state governments. Following this, the report say, a network of institutions are established at the state and central levels. The state electricity boards (SEBs) are created at the state level. These
boards, owned by the state government, were semi-autonomous bodies according to the law. They were entrusted with the responsibilities of electricity generation and its supply in the state, while remaining within the broad legal and policy frameworks designed by the state and central governments. Few landmark developments like Creation of Central Electricity Authority (CEA), NTPC Limited (NTPC), National Hydro Power Corporation (NHPC), etc to add thrust to the development to the electricity sector under the jurisdiction of central government. The report say that Generation capacity increased to 94,000 MW in 1998-99, Number of consumers grown to 7.85 crores, Agricultural pumps connected upto 1998-99 are 1.20 crores, length of Network 0.5 crore kilometers, number of villages connected to power in 1998-99 are more than 5 lakhs and a per capita annual consumption rose to 340 kWh or units. This is a commendable growth of the Indian electricity sector as a result of four broad policies. The first policy was government’s ownership and supply of capital from central and state budgets’. For many years, about one fourth to one fifth of the total plan allocation from the central and state governments’ budgets was directed to the electricity sector. The second major policy was development of ‘centralized electricity supply system’ and of ‘regional and national
electricity grids'. Under this policy, plants like Bhakra – Nangal, Singroli, and Koyana as well as the five regional grids were developed, Third major policy put ‘self-reliance in technology and fuels’. Accordingly autonomous but government-owned companies like Bharath Heavy Electrical Limited (BHEL) were created to manufacture technological capabilities in the power sector. Importance laid on use of the available energy sources like coal and hydro source in the country. Fourth policy of ‘cross subsidy’ or subsidy from within the sector was adopted with an objective to provide power at affordable rates to the deprived sections of society, especially farmers from backward, rural, and tribal regions. Higher rates of electricity were charged more than the average cost of supplying electricity and the surplus thus created was used to provide electricity at lower rates than the average cost of supply to the deprived sections of the society.

3.1.2: Crisis in the Sector:

PEG report states that above four policies have developed many distortions and perversions in the functions of the electricity boards and led to three crises in Performance, Finance and credibility. In
Performance low efficiencies, financial disorder, and lethargic administration and that these distortions in the functioning of SEBs are felt beyond improvement.

In the financial crisis that electricity boards are facing a severe financial crunch due to stagnant revenues, increasing expenditure, and increasing arrears. The state and central governments that, until now, provided funds to SEBs are also equally cash-strapped. International financial institutions, fed up with the functional anarchy in the SEBs gradually stopped providing them funds. In such a situation, it has become impossible for the SEBs to raise capital to construct generation plants and transmission and distribution (T&D) systems in order to fulfill the increasing demand for electricity. On credibility, functional anarchy in the administration of the SEBs has reached such a level that the electricity boards have completely lost credibility in the eyes of consumers and common citizens. Mis-understanding on the part of the sector –leaders has been largely responsible for further aggravating the crisis.
3.1.3: Economic Reform:

PEG report explains that the electricity sector already in a three-dimensional crisis, but all the actors were looking for a solution for the financial crisis alone. The economic reforms got underway gave an easy way out to resolve the financial crisis in the electricity sector, by inviting private capital and opening the closed gates of the sector to foreign investors. In the electricity sector, many fundamental and comprehensive changes were made in the laws governing the electricity sector, in the institutional structure, and in major policies and procedures. Three major changes are listed as illustrations. The first is the changes made in the Electricity Supply Act of 1948 to allow entry of private capital. Second, various policies and procedures were changed which resulted in severely curtailing the role and authority of the Central Electricity Authority (CEA) and were delegated to the electricity boards, state governments, and newly created independent regulatory commissions. Third, the fuel policy was changed in a major way to allow import of oil and gas. Beginning of the era of economic reforms-liberalization, globalization and privatization – gained ground the electricity sector.
First step in the ‘reform’ of the electricity sector was to allow the entry of electricity generating plants owned by private parties. To facilitate this, central and state governments made comprehensive and fundamental changes in various crucial aspects of governance such as laws, policies, institutions, and even in procedures. These changes had three important features. First, ‘obstacles’ such as permits and quotas were removed and SEBs and state governments were allowed to seek and sanction generation projects by dealing directly with private firms. These private firms owning power generation plants are known in the sector as independent Power Producers (or IPPs). Second, state governments and SEBs signed agreements with the private parties that gave guarantees of high levels of fixed revenue to the private firms, while shouldering almost the entire burden of various risks. Third, the central government started providing different types of assistance for these efforts by SEBs. For example, the central government gave the special status of ‘fast track projects’ to the eight IPP projects in different states and also gave counter-guarantees to these projects in the event of non-payments by the state governments and SEBs. The report explained that for more than 90000 MW capacity MOU’s were signed but only 8000-9000 MW would come on line in 2005. The IPP’s were faced with
high project cost, fuel supply, not getting timely payment from sick SEB's for the power purchased. The report said that undue secrecy on sanctioning projects and fuel, payment fronts created distrust and suspicion was created on the projects and led to political, legal controversies.

3.1.4: Influence of the World Bank (WB)

As per PEG report that the World Bank as a lender and development institution had pressed for SEB's improved function and now have resorted to canceling six loans and resorted to rigid position that privatization be the precondition for any financial assistance to SEB's. WB Way to save the electricity sector is to replace the SEBs by privately owned electricity companies. Failure to reform SEBs and economic developments at the international level has played a key role in shaping this position of the World Bank. Fall of the Soviet Union, the USA and other nations established a clear domination in the 'unipolar' world and the manifestations of this dominance is the wide-scale acceptance of liberalization, privatization, and globalization. World Bank and the international Monetary Fund have been the chief proponents and leading campaigners for LPG.
The PEG explains that the pressure due to the financial crisis faced by SEBs – and, on the other side, the World Bank, despite its previous bad experience of state governments, willing to enter into (possibly a temporary) compromise with the state governments for promoting its ‘LPG’ agenda. The first manifestation of this emerging coalition was in the form of the World Bank promoted comprehensive electricity sector reforms in Orissa. Therefore, the broad model adopted by the World Bank for electricity sector reforms in India is called the ‘Orissa Model’. Due to the immense political and economic power of this new coalition, the Orissa Model spread very fast in many parts of the country. Following this model, the Asian Development Bank (ADB) also started working with state governments in Gujarat and Madhya Pradesh for structural reforms in the electricity sectors of these states. By now, more than half the states in the country have adopted some variant of the Orissa Model for electricity sector reforms.

The report further explains that under the leadership of the late Mr. Kumaramangalam, who advocated reforms in the electricity sector, the Union Ministry of Power pushed for the spread of the World Bank’s Orissa Model in other states. In 1997, the first draft of the central bill...
for electricity sector reform was introduced. In 1998, after deleting these unacceptable provisions, this bill was passed and enacted as the “Electricity Regulatory Commissions’ (ERC) Act, 1998” The Act leaves two important issues to the discretion of the state governments- the timing of formation of the state regulatory commissions and the powers to be delegated to these commissions. However, the Act had provisions to give the boards substantial powers for determining electricity tariff to these commissions.

The report put it that the states of Orissa and Andhra Pradesh were in the forefront in implementing the World Bank’s mode. Different issues and problems have emerged in implementation. Other states can and need to learn many lessons from their experience. One of the most important lessons that emerged from Orissa’s experience is that the process of privatization of SEBs is a time-consuming process and the projected gains of privatization do not accrue fast. In Orissa, four years after the privatization process has been initiated, the transmission and distribution (T&D) losses have remained at the same level (more than 40%). As a result, the independent regulators did not find it appropriate to allow the tariff hike to be as high as demanded by the utility. As a
cumulative effect of the high T&D losses and low level of tariff hike, there was a serious financial crisis in Orissa’s electricity sector. To save their beloved progeny from this crisis, the World Bank and the Government of India had to chip in a few hundred crores of rupees to tide over unexpected cash flow problems.

In the process of privatization the study explain that, various structural flaws have also crept into Orissa’s electricity sector. For instance, while privatizing the distribution system, the state was divided into four regions. Distribution companies in three regions were sold to a single company, viz., Bombay Suburban Electricity Supply (BSES). Neither BSES nor any other company was ready to buy the government – owned distribution company in the fourth or central region. This was because that state government had already signed as agreement (called an escrow agreement) with an American electricity generating company called AES Inc. giving the company the first right to access revenue collected from the central region. As a result, nobody was ready to purchase the distributing company in the central region. In the end, the state government and the World Bank were compelled to sell the distributing company in the central region to AES.
Orissa and Andhra reforms are explained in the study that, to improve Orissa's electricity sector, the World Bank wanted to break the monopoly of the state and to bring in competition. In the process, it ended up thrusting private monopolies on the people of Orissa. In electricity distribution, BSES has established a horizontal monopoly over three-fourths of the state, while in the central region, AES has established a vertical monopoly in electricity generation and distribution in the region. The people of Orissa will have to suffer due to these structural flaws at least for the next few decades. This clearly demonstrates that the World Bank and state governments – who were initially promising that they would take utmost care to avoid unintended bad effects of privatization – in reality, are ready to compromise on their own principles for implementation of their agenda of privatization. This also indicates that, in reality, all the promises – made by supporters of privatization- of protecting public interest (through various safeguards), would be blatantly ignored to fulfill the objective of privatization of the sector, if necessary. In addition to such structural flaws, another crushing burden was placed on the common people of Orissa during the process of privatization. While selling the state-owned utilities to private firms, with the intention of earning maximum
possible profiles, the state government imposed an additional burden of Rs.2,000 crore on electricity consumers in Orissa by increasing the sale value of the SEB through the mechanism of ‘asset re-evaluation’. At least for the next two decades, the private companies will charge heavy tariff for recovering this additional price they paid to the government. Unfortunately, very little of this additional revenue was used to improve the sector.

The study review explains that in Andhra Pradesh, the then Chief minister and the World Bank started implementing reforms in a high-handed manner. Neither the Chief Minister nor the World Bank experienced any need to take the other ‘stakeholders’ into confidence. The opposition parties, people’s organizations, consumer organizations, employees’ unions, and farmers’ organization were systematically and purposely kept at bay. This coalition started using various pressure tactics for implementing electricity reforms. Members of the state legislative assembly (known as MLAs) belonging to opposition parties were summarily suspended when the electricity reform bill was passes in the state legislative assembly.
Unfortunately, the independent state regulatory commission created by the World Bank, which is being seen by some as a pawn in the hands of this coalition, seems to have lost all its credibility with the people and civil society organizations in the state. The commission is accused of neglecting even the mandatory provisions related to transparency, accountability, and participation in its proceedings. It is alleged that the commission allowed to keep secret the documents highlighting irregularities on the part of the state government and thus helped the politicians who were benefited by these deals. As a result, when the regulatory commission—that apparently has lost its credibility in the eyes of people—declared a tariff hike following the World Bank’s dictates, the entire state erupted in political turmoil. Despite all these developments, the World Bank, the American and other foreign governments, and some mainstream economists in India have been complaining that the state governments in India are not carrying out electricity sector reforms (which, means privatization) with the necessary vigor and speed.
3.2: Growth and Utilization of Power Sector:

V.S.Kulkarni (2004) empirically explained that our progress in the power sector has been remarkable in generation on one hand but at the same time the sector is engrossed with a number of problems. The growth profile shows that the installed generation capacity of power increased from the mere 1362MW in December 1947 to 106800MW in December 2002 of which 72% are thermal 25% hydro and 3% nuclear power. Between 1970-71 and 1999-2000 installed capacity has grown at an annual rate of 6.9% and generated power rose from 55.8 billion KWh to 515.3 billion KWh.

In first decade of post reform period the installed capacity has gone up from 4973MW to 9857MW between 1991-2000. There has been marked increase in domestic sector from 9% to 22% due consumer demand. The shift in consumer pattern is well explained by the study.

Pattern of utilization of power are as below (in percentage) as per GOI Economic Survey 2001-02 Tata Services Ltd Statistical outline of India 2000-01:
Table No: 1

Shift in Consumer Pattern:

<table>
<thead>
<tr>
<th>End-User</th>
<th>1970-71</th>
<th>2001-2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Industry</td>
<td>68</td>
<td>35</td>
</tr>
<tr>
<td>Agriculture</td>
<td>10</td>
<td>29</td>
</tr>
<tr>
<td>Railway Traction</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Public Lighting</td>
<td>10</td>
<td>11</td>
</tr>
<tr>
<td>Domestic Use</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

He explains that power utilization of Industry has come down from 68% to 35% between 1970-71 and 2001-02 attributed to a number of industrial units have setup their own power plants instead of depending on public utilities. On the other hand there has been an increase in agriculture sector from 10% to 29% largely on account of irrigation and government subsidies.
MAP OF INDIA
SHOWING
INSTALLED GENERATING CAPACITY
STATEWISE
(Including allocated shares in joint and Central Sector
(Map not to scale)
ALL INDIA CAPACITY 123667.81 MW
(As on 31.12.2005, Figures in MW)

ALL INDIA

<table>
<thead>
<tr>
<th>STATE</th>
<th>HYDRO</th>
<th>THERMAL</th>
<th>NUCLEAR</th>
<th>RES</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALL INDIA</td>
<td>31612.67</td>
<td>75314.90</td>
<td>3032.11</td>
<td>6158.32</td>
<td>116118.20</td>
</tr>
</tbody>
</table>

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3.3: Growth of Power Utilities an Overview:

3.3.1: Power sector’s preliminary Stages: Electricity supply begin in India by 1897 by constructing first Indian hydro power station in West Bengal at Darjeeling with an installed capacity of 130 KW, Calcutta Electricity Supply Corporation (CESC) Limited, Which was registered in London are granted License for 21 years to illuminate and power the area of present Kolkata and supplied power at one rupee per KWh on par with London’s tariff In 1899 1MW then Calcutta installed thermal power plant. Mumbai see light with the private company built urban power supply. Followed by this city of Ahmedabad, Surat is illuminated with power.

In 1902, 6x720 KW Shivasamudram hydro power station in Mysore state established along with worlds longest transmission line upto Kolar Gold Fields in Karnataka (Sankar and Ramachandra 2000).

From 1914 to 1926 Khapoli hydro power station are established at 48 MW and later increased to 72 MW. In 1924 Bhivpuri 72 MW hydro station and in 1927 Bhira hydro station of 110MW established by Tata Electric company and laid power foundations in India. The installations upto 1947 are at 1362 MW.
3.3.2: **State Electricity Boards/Utilities:** Majority of private companies are amalgamated to after independence into state owned companies. In 1948 Electricity Supply Act, formed on the lines of 1926 British Law. This has created state owned State electricity boards (SEB’s) with a responsibility to generate, transmit and distribute power (Chokroun2001). The SEB’s also acquired private owned services as their license expired gradually. They start invest on generations. In 1950 as the Indian constitution gave power in the concurrent list of the federal Indian set up. In this set up central authority override the states. The social elements of employment profits ploughed back as investment for growth of the field. SEB’s are interconnected by grids to enhance system reliability instead of earlier isolated services. These SEB’s are legally autonomous bodies of a state for the power management and are required to generate a profit along with 3% rate of return on the net value of its assets. Inreality the SEB’s internal accruals are insufficient for growth and depend on state for grants subsidies, soft loans.

3.3.3: **Public companies of central/ Central Utilities:**

The central government to assist states and to augment support establish a number of publicly owned companies for generation of power and transmission in many states during nationalization policy of the then
prime minister Mrs. Indra Gandhi in 1975 two companies namely, National Hydro Power Corporation (NHPC) and National Thermal Power Corporation (NTPC). The NHPC formed Hydro projects had the difficulty in project delays, and to be consulted with internal water resources, environmental, societal difficulties. NHPC had grown today with 32000 MW as on 2006 (CEA Data). Many monsoon seasons’ failure give a thought to develop to exploit Indian coal reserve in large power plants in many states, thus the formation of NTPC incorporated in 1975 and had grown as the world’s 6th largest power capacity with 24000 MW above. Both NTPC and NHPC are maintaining world standards and earn profit more than 12% returns on capital. The thermal major has aggressive expansion in future with power trading, consultancy, distribution, etc... To cover loss making SEP’s.

3.3.4: Transmission of Power/Transmission Utilities:

Transmissions of Power to feed SEB systems are facilitated with five regional synchronous grids with own regional electricity board and dispatch centers are established by NTPC to create an integrated national grid. In 1980 the government separated transmission assets from NTPC and formed Power Grid Corporation of India (PGCIL) with responsibilities for all interstate power transfers. Today PGCIL grown
as largest transmission company in the world with more than 40,000KM of transmission lines linking one third of India’s generating capacity to load. Presently the company profits more than 28% (Net Profit) which is very high for a transmission company.

The combined installation of state and central power utilities along with private utilities had crossed 1 Lakh MW in 1998. The supply of growth rate has not kept pace with the demand growth. India’s lowest in the world per capita consumption is only 3.4% of generation but having 17% of world population in 1998.

3.3.5: Distribution of Power/Distribution utilities:

Causes of financial sickness- Distribution system in various states have grown in an unplanned and haphazard manner without optimal network size and location of substations and adequacy of back up transmission. This has resulted in very high power losses, poor quality and reliability of power supply and in bad financial condition of SEB’s. The status of SEB’s are reasonably good upto 1975 and start deteriorated due to poor metering, heavy subsidies and free power schemes to consumers, highly subsidized flat rate tariff for agriculture, single point unmetered domestic customerism, persistence theft of power leading to more than 40% of power generated leading to heavy transmission and distribution
losses, high level of cross subsidy forced industry to switch over to captive power generation, larger manpower usage in the distribution leading to higher cost, lesser billing collection leading to revenue losses.

The energy lost during voltage transmission as well as transportation through transmission and distributions are technical losses. Power lost by theft and pilferage are non-technical or commercial losses. In the Indian power system, the billed portion of power over generated power is 55% only.

**3.3.6: Energy loss reduction strategy:**

Improvement of system and reduction of losses could be effectively achieved by conducting energy audit. The energy audit is attempted starting with areas known for excessive losses.

- Access overall energy loss in a specified area (sub-station or distribution center)
- Identify system elements passing excessive loss.
- Identify and establish causes of excessive loss (Technical or non-Technical factor)

Use of user friendly software packages to create a comprehensive system database and study a number of development options for
evolving least cost plants that can ensure economy, efficiency and security of supply.

3.3.7: Privatization of Distribution System:

About 75 to 80% of total work forces are involved in this area larger low voltage lines and cables are involved, larger energy tapping points are involved for a better performance.

➢ Load balancing and line loss management within reasonable limits to be managed.

➢ Checking unauthorized load and penalty for tamper of energy.

➢ Tackling pilferage, breakdowns, and voltage fluctuations.

➢ Ensuring safety and accuracy of millions of Energy meter.

➢ Prompt and timely attention on consumer complaints in breakdown, over billing, wrong meter reading, making alternative arrangement for uninterrupted power supply.

➢ Improved operating, capital investment deficiency to make technical financial and managerial competency.
3.4: Power Sector Reforms since 1991 – A Chronology:

Dr. Kulkarni in his Policies and Perspectives in Post-Reforms Period has explained that with the introduction of new economic reforms through New Economic Policy (July 1991) the government is looking for growth strategy through economic liberalization and privatization to achieve globalization. As part of this reform process the government has introduced sweeping reforms in industry, trade, and banking and in telecommunication sector. The reforms in power sector are part and parcel of the governments’ privatization process for a shift in pattern from state controlled to private, competitive, and independent regulations. Major reforms pursued by successive governments since 1991 are aimed at decontrol and de-bureaucratizing the power sector.

3.4.1 : The Electricity Laws (Amendment) Act, 1991- which replaces the earlier Indian Electricity Act, 1910 and Electricity Act, 1948, and aims at, (a) allowing private sector to set up coal, gas or liquid fuel-based thermal, hydel and solar/wind projects of any size (b) allowing foreign investors upto 100% ownership of power projects subject to government approval.(c) setting new price structure;(d) new power projects are eligible for a 5 year tax holiday and (e) Duties on import of equipments for projects have been considerably slashed.

3.4.2: 1992- 97 A high level team visits U.S, Europe and Japan to invite foreign investment in power sector. 1992-97 eight projects were given
“Fast Track” status in the form of Sovereign guarantees from central government. Seven projects reached financial closure. They are- Dabhol/Enron, Bhadravati/IS Pact, Vishakapatnam/Hinduja, Jegurupadu/GVK, IB Valley/AEs, Neyvel/CMS and Mangalore/Cogentrix.

3.4.3: 1995-96 Orissa Electricity Reform Act and establishment of OERC( Orissa Electricity Regulatory Commission) to monitor and control generation and distribution are introduced.

3.2.4: 1996 At the Chief Ministers Conference and its Common Minimum Action Plan for power recommendation to create state and central regulatory commissions - (SERC,CERC) with the CERC having responsibilities to promote competition, efficient and economy to improve quality of power supply, to promote investment, to advice government on removal of institutional barriers, to safe guard consumer interest etc. The SERC are given autonomy in their respective states in the matters like Licensing, planning determination of retail tariff, cross-subsidization, fuel adjustment charges, package of incentives and disincentives, inventory control, R&D, Project Management etc.
3.4.5: 1997 Liquid policy introduced for easy naptha allocations to private sector investors.

3.4.6: 1998 Mega power policy for the construction of and operation of 500MW and above hydro power projects and at least 1000MW of thermal power projects.

3.4.7: The Electricity Laws (Amendment) Act, 1998 and Electricity Regulatory Commission ordinance Notification – provides for (a) creation of central transmission utility, (b) Establishment of CERC and SERC (c) Rationalization of electricity tariff. (d) Policies on subsidies. (e) Promotion of efficient and environmentally suitable policies. Accordingly Power Grid notified as Central Transmission utility, Haryana Electricity Reforms Act, World Bank loan of US $ 600 million Adaptable Programmed Loans (APL), U.K’s (DFD) technical cooperation grant of 15 million pound for reforms are effected.

3.4.8: 1999 – Andhra Pradesh and Karnataka Electricity Reforms Act, World Bank loan of US $ 210 millions under APL, DFID’S UK grant of 28 millions as technical cooperation, and CIDA (Canada) technical assistance of Canadian $ 4 millions are effected.
3.4.9: 2000 – Power Ministers Conference and Electricity Bill 2000 (Draft) that focused on (a) Functional desegregation of generation, transmission, distribution to create independent profit centers and accountability, (b) Reorganization and restructuring of SEB’s with a freedom to state government to prepare model/plan, phasing and sequencing of restructuring, (c) States to decide extent and nature of privatization, (d) Central and State Regulatory Commissions on the lines of Electricity Commission Act 1998, (e) SERC need to function for equitable supply of electricity to rural areas and to weaker sections, (f) Stringent provisions to minimize theft and misuse.

3.4.10: 2000-01 Government initiation of Accelerated Power Development Programme (APDP) to provide financial assistance to the states for renovation and modernization of Hydro and thermal power plants and to strengthen transmission and distribution network.

3.4.11: 2001 - (a) Under the chairmanship of Montek Singh Ahluwalia an expert group formed to recommend one time settlement of past dues by SEB’s to Central power sector utilities (CPSU’s) and State Power Utilities (SPU’s) and the main recommendations include tapping of market borrowing and private investments to finance expansion and
modernization plans in the sector, waiver of loans to SEB’s and central assistance for bridging revenue gaps, meeting the costs of the workforce rationalization etc. (b) Energy Conservation Act 2001, to promote conservation of energy and to balance demand and supply to avoid power shortages, (c) The Electricity Bill 2001, introduced in parliament in August 2001 that replaces earlier three Acts and focuses on rural electrification, management of rural power by local authorities etc.

3.4.12: 2002 - The government initiate and focuses on an objective of providing "Power for All by 2012" with a “Mission 2012” in this direction.

3.4.13: 2003 The Electricity Act, 2003 has come into force from June 2003 with a roadmap for the electrical industry, and hopes to speed up economic reforms. It is an outcome of a series of commissions, national and international consultancy studies, seminars and conferences in the last three years, since the Draft bill 2000 was outlined.

3.4.14: 2004 Accelerated Electrification of One Lakhs Villages and One Crore house holds by merging rural electrification and Kutir Jyothi programme for providing 40% capital subsidy for rural electrification
projects and the balance as loan assistance on soft terms from Rural Electrification Corporation.

3.4.15: 2005 (a) National Electricity Policy are notified in Feb 2005 aiming at accelerated development of the sector, providing power supply to all areas with reliability and quality, protecting interest of the customers and other stack holders and at financial turn around and commercial viability of the sector. (b) The Electricity (Ammendment) Bill 2005 has been introduced in Loksabha on 23.12.2005. (c) Notification of Electricity Rules, 2005 that include consumer redressal forum, tariff of generating companies.

3.4.16: 2006-(a) National Tariff policy under Electricity Act,2003 Notified in Jan 2006. (b) Central government made the Appellate Tribunal for Electricity for hearing appeals against order of Regulatory Commissions /Adjudicating Officers. (c) Rural Electrification Policy with the states and other stake holder finalize in the committee of Secretaries in 2006. (d) 7 Ultra Mega Power Projects With capacity of 4000MW have been evolved and implemented in the capacity addition programme to actuate capacities.
3.5: RENOVATION & MODERNIZATION (R&M) PROGRAMME FOR THERMAL POWER STATIONS

3.5.1: Introduction of Renovation and Modernization:

According to Ministry of Power, in their 2001 Report, circulated, in order to bridge the gap between demand and supply, especially in the context of limited financial resources available, it has become imperative to look for the other options which are not as capital intensive as new capacity addition and which could be implemented in a comparatively shorter time frame. In this regard, optimum utilization of existing installed capacity in the country to maximize the generation, through Renovation & Modernization (R&M) of existing power plants in considered being the most cost effective option.

The report emphasis importance of R&M was recognized by the Government of India way back in 1984 when Phase-I R&M Programme for 34 thermal power stations in the country was launched by the Central Electricity Authority as a Centrally Sponsored Scheme. The Government of India has now accorded high priority to R&M and LE of old existing power plants. The funds, in the form of loan assistance at
confessional interest rates, are being provided by the Government through Power Finance Corporation (PFC) for R&M works.

3.5.2: HISTORY BACKGROUND OF R&M OF THERMAL POWER STATIONS

Many new units were installed after Independence. Up to 1980, the total installed capacity of thermal power stations was 14,250MW which comprised many imported units of sizes from 30 MW to 120 MW. The average Plant Load Factor (PLF) of thermal power stations during 1976-77 was 56%.

Table No: 2

Plant Load Factor (PLF) Year Wise:

<table>
<thead>
<tr>
<th>Year</th>
<th>PLF</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976-77</td>
<td>55.9%</td>
</tr>
<tr>
<td>1977-78</td>
<td>51.4%</td>
</tr>
<tr>
<td>1978-79</td>
<td>48.3%</td>
</tr>
<tr>
<td>1979-80</td>
<td>44.7%</td>
</tr>
<tr>
<td>1980-81</td>
<td>44.6%</td>
</tr>
</tbody>
</table>

Source: CEA & MOP 2001
However, due to various reasons, the PLF gradually started deteriorating as seen from the table given above. As a result, thermal generation fell short of the targets, leading to a power shortage of about 11%, as compared to the requirement at that time.

3.5.3: ROVING TEAMS OF THE CENTRAL ELECTRICITY AUTHORITY (CEA)

Ministry of Power formed a Task Forces/Roving Teams consisting of experts from CEA, BHEL and ILK were constituted, which went around various thermal stations with a view to identify the defects/reasons for poor performance and to prepare action plans to address the problems. Based on the reports of Roving Teams, many State Electricity Boards (SEBs) prepared schemes for attending to the problems identified and included them in their annual plans. However, lack of adequate funds with some of the States led to lower priority being given to such programmes though there was an urgent need to attend to the problems of the thermal stations.
3.5.4: CAUSES FOR POOR PERFORMANCE

The reasons identified for poor performance of thermal stations in the report include the following:

i) Design deficiencies, manufacturing and generic defects.

ii) The Operation and Maintenance (O&M) deficiencies causing prolonged and repetitive forced outages.

iii) Inadequate and non-timely availability of spare parts especially for imported equipment.

iv) Lack of resources with SEBs even for making payments to BHEL against supplies and services and for coal supplies to coal companies. Accordingly, they were not able to take up the renovation/modernization programme to the extent required.

v) The quality of coal being supplied had deteriorated as compared to the designed quality. Besides, the coal had high ash content and contained stones, boulders, shale and sand.

vi) There was excessive and inadequately trained manpower for the O&M of the plant.
3.5.5: STABILIZATION OF 200/210 MW UNITS

As a result, the performance of these units substantially improved and got stabilized. Because of these efforts, 200/210 MW units are now operating at a level comparable to that of the best in the world. At present, there are 153 units of 200/210 MW comprising 44% of the total thermal installed capacity in the company.

3.5.6: PHASE- I R&M PROGRAMME (7th plan programme)

At most of the States were not in a position to arrange adequate funds for R&M works, the CEA formulated a proposal called Phase-I R&M programme as a Centrally Sponsored Scheme for R&M of thermal power stations in the country. Accordingly, the Government of Indian approved the scheme and sanctioned a Central Loan Assistance (CLA) of Rs.500 crore to provide financial assistance to the SEBs for implementing the core R&M works/activities which could result in direct benefits in terms of generation. The funds for other activities were to be arranged by the states from their own resources. The R&M works relating to environmental improvement in the power plants were also accorded high priority and about 47% of the total investment was made on environmental pollution control measures. The 34 nos. of
thermal power stations in various states were covered under the Phase – I R&M Programme. The programme was successfully completed during the 7th Plan and much more benefits than anticipated were achieved.

3.5.7: THE MAIN FEATURES OF THE PROGRAMME:

i) Number of thermal power stations covered 34

ii) Number of thermal units covered 163

iii) Total capacity involved 13,570MW

iv) Average PLF of 163 units before R&M Programme 46%

v) Anticipated PLF after completion 53%

vi) Anticipated additional generation after Completion of R&M Programme 7,000 MU/annum

vii) Year of completion 1990-91

viii) Total expenditure incurred Rs.1066 crore

a) Central Loan Assistance Rs.402 crore

b) State Plan Resources Rs.664 crore

ix) Expenditure incurred on environmental activities 47%

x) Actual additional generation achieved after completion 10000 MU/annum

xi) PLF achieved after completion 56%
3.5.8: PHASE-II R&M PROGRAMME (8th plan programme)

Encouraged with the results of implementation of Phase-II R&M programme, the Phase-II R&M programme for 44 thermal power stations in the country was taken up in the year 1990-91 for completion during the 8th plan period. The CEA prepared the guidelines for preparation of R&M schemes by SEBs and the Roving Teams constituted for Phase-II of the programme visited various thermal power stations and assisted SEBs in the formation of R&M schemes. Power Finance Corporation (PFC) was assigned the responsibility to provide loan assistance to the SEBs for R&M works.

The Progress of work during the initial period remained rather slow, because of paucity, of funds with most of the SEBs, due to their poor financial health. Moreover, they were not initially eligible to avail PFC loans due to its various conditions. However, many SEBs later on became eligible to avail PHC loans after PFC relaxed the conditions. During the 8th plan i.e. by March 1997, about 50% of the work could be completed on all India basis. Some of the balance work was taken up during the 9th Plan and the implementation of some work, which could
be postponed for inclusion in the LE schemes planned at a later date, were deferred.

Table No: 3

Salient features of the programme-1:

<table>
<thead>
<tr>
<th>S.No</th>
<th>Particulars</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Number of thermal power station covered</td>
<td>44</td>
</tr>
<tr>
<td>2</td>
<td>Number of thermal units covered</td>
<td>198</td>
</tr>
<tr>
<td>3</td>
<td>Total capacity involved</td>
<td>20870MW</td>
</tr>
<tr>
<td>4</td>
<td>Estimated Cost</td>
<td>Rs.2383 crore</td>
</tr>
<tr>
<td>5</td>
<td>Anticipated additional generation after completion</td>
<td>7864 MU/annum</td>
</tr>
<tr>
<td>6</td>
<td>Total expenditure incurred upto March’97</td>
<td>Rs.862 crore</td>
</tr>
<tr>
<td>7</td>
<td>Total additional generation achieved after partial completion (50%) of work.</td>
<td>5000 MU/annum</td>
</tr>
<tr>
<td>8</td>
<td>Capacity taken up for Life Extension Work (Units : 1-4 of Neyveli TPS)</td>
<td>300 MW</td>
</tr>
</tbody>
</table>

Source: MOP 2001

3.5.9: R&M PROGRAMME DURING 9TH PLAN

Some of the pending R&M work of the 8th Plan and the additional work subsequently identified were covered under the 9th plan programme. This R&M work on 130 units was at various stages of implementation.
The economic designed life of the thermal power units is considered to be 25 years. 28 nos. of thermal units which had already completed their designed life were based on Residual Life Assessment (RLA) studied during the 9th Plan. The LE work on 19 units has been completed during the 9th plan and work on remaining units is under progress.

Table No: 4

Salient features of the programme-2:

<table>
<thead>
<tr>
<th>Particulars</th>
<th>R&amp;M</th>
<th>LEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Number of thermal power stations covered</td>
<td>30</td>
<td>7</td>
</tr>
<tr>
<td>ii) Number of thermal units covered</td>
<td>130</td>
<td>28</td>
</tr>
<tr>
<td>iii) Estimated Cost</td>
<td>17935 MW</td>
<td>1910 MW</td>
</tr>
<tr>
<td>iv) Total capacity involved</td>
<td>-</td>
<td>1981 MW</td>
</tr>
<tr>
<td>v) Average PLF of the units before R&amp;M/LE Programme</td>
<td>60.5%</td>
<td>48%</td>
</tr>
<tr>
<td>vii) PLF anticipated after completion</td>
<td>62.0%</td>
<td>75%</td>
</tr>
<tr>
<td>viii) Anticipated additional generation /annum</td>
<td>2350 MU</td>
<td>4500 MU</td>
</tr>
<tr>
<td>ix) Total expenditure incurred</td>
<td>Rs.651 crore</td>
<td>Rs.1028 crore</td>
</tr>
<tr>
<td>x) Unit on which LE works completed</td>
<td>-</td>
<td>19 (1343 MW)</td>
</tr>
</tbody>
</table>

Source: MOP 2001
3.5.10: NATIONAL PERSPECTIVE PLAN FOR R&M AND LIFE EXTENSION OF THERMAL POWER STATIONS

As a long term planning, the CEA formulated a National Perspective Plan (up to 2012) for R&M and Life extension of thermal power station wherein the thermal units required to be taken up for R&M/LE during the 9th, 10th and 11th plans were identified and a total investment of about Rs.22000 crore was estimated for the same.

3.5.11: R&M PROGRAMME DURING 10TH PLAN

The CEA has identified 106 thermal of SEBs/ State Generation Corporations for LE during the 10th plan so as to extend their economical life by another 15-20 years and to recapture/uprate their capacities by implementing comprehensive R&M Schemes based on RLA studies. Out of 106 units, RLA studied on 46 units have already been completed and further action is being taken by concerned SEBs/Utilities. In addition, another 35 units (6440 MW) which are comparatively new will also need some R&M work to sustain/improve their performance.
Table No: 5

Salient features of the programme-3:

<table>
<thead>
<tr>
<th>PARTICULARS</th>
<th>R&amp;M</th>
<th>LEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Number of thermal power stations</td>
<td>12</td>
<td>32</td>
</tr>
<tr>
<td>ii) Number of thermal units</td>
<td>35</td>
<td>106</td>
</tr>
<tr>
<td>iii) Estimated Cost</td>
<td>Rs.750 crore</td>
<td>Rs.9200 crore</td>
</tr>
<tr>
<td>iv) Total capacity involved</td>
<td>6440 MW</td>
<td>10413MW</td>
</tr>
<tr>
<td>v) Average PLF before R&amp;M/LE programme</td>
<td>58.5%</td>
<td>49%</td>
</tr>
<tr>
<td>vi) Anticipated PLF after completion</td>
<td>63.5%</td>
<td>75%</td>
</tr>
<tr>
<td>vii) Anticipated additional generation/annum</td>
<td>2800MU</td>
<td>23700MU</td>
</tr>
<tr>
<td>viii) Capacity expected after completion of LE work.</td>
<td>-</td>
<td>10747 MW</td>
</tr>
</tbody>
</table>

Source: MOP 2001

3.5.12: R&M PROGRAMME DURING 11TH PLAN:

During the 11th plan, 34 Units with a total capacity of 6000 MW are expected to be taken up for LE. Another 31 units with a capacity of 7090 MW would be taken up for R&M Programme to sustain their performance.
Table No: 6

Salient features of the programme-4:

<table>
<thead>
<tr>
<th>PARTICULARS</th>
<th>R&amp;M</th>
<th>LEP</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Number of thermal power stations</td>
<td>12</td>
<td>18</td>
</tr>
<tr>
<td>ii) Number of thermal units</td>
<td>31</td>
<td>34</td>
</tr>
<tr>
<td>iii) Estimated Cost</td>
<td>Rs.751crore</td>
<td>Rs.6000crore</td>
</tr>
<tr>
<td>iv) Total capacity involved</td>
<td>7090 MW</td>
<td>6000MW</td>
</tr>
</tbody>
</table>

Source: MOP 2001

3.5.13: IMPLEMENTATION OF R&M PROGRAMME

1) Comprehensive R&M/Life Extension Schemes are to be formulated based on RLA studies covering plant performance tests, non-destructive/destructive tests and engineering studies. Latest need-based technologies and improvements for more efficient and reliable operations may be introduced. The environment related activities will be essentially included in the scheme.

2) The benefits in terms of generation and improved technical parameters anticipated to be achieved after R&M/LE work needs to be
identified and incorporated in the bid documents. The schemes should be techno-economically viable.

3) The RLA studies may be got done through reputed agencies.

4) As far as possible, LE work where improved technical parameters are to be achieved and demonstrated by the bidder after completion of the work, contract for main plant needs to be awarded as a single point responsibility so as to achieve intended benefits.

5) Normal procedures of competitive bidding need to be adopted to ensure transparency in process and reasonability of prices.

6) The CEA is examining the R&M/Life Extension Schemes for their comprehensiveness, anticipated benefits and techno-economic viability.

7) The SEBs/Power Utilities, if required, may appoint reputed consultants having engineering background, who could advise them at various stages of the implementation of the R&M/LE Schemes.

8) The services of NTPC could also be availed by SEBs/Utilities in the field of O&M of the plants and in R&M work.

9) The Government of Indian is providing loan assistance through Power Finance Corporation (PFC) at confessional interest rates for
R&M work under AG&SP (Accelerated Generation & Supply Programme)

10) R&M is not a substitute for regular Operation and Maintenance (O&M) of the plant. There is a need to improve the O&M practices and carry out regular O&M as per schedules to sustain the improvement obtained through R&M. It should be ensured by the SEBs/Power Utilities that adequate and timely O&M funds are made available to the power stations.

11) In order to improve the overall work culture, modern management systems including ISO 9002 certification need to be adopted by the power stations. The man behind the machine plays a very significant role in the overall performance of the stations. Therefore, regular training to the power station personnel in the field of O&M and management practices has to be imparted.
3.6: Energy Conservation

3.6.1: Introduction:

Ministry of Power (MOP) in their agenda to prioritize energy as an important element of the infrastructure sector its availability has to be ensured on sustainable basis. On the other hand, the demand for energy is growing manifold and the energy sources are becoming scarce and costlier. Among the various strategies to be evolved for meeting energy demand, efficient use of energy and its conservation emerges out to be the least cost option in any given strategies, apart from being environmentally benign.

a) Efficient use of electricity and its conservation is the least-cost option to augment the gap between demand and supply of electricity.

b) Policy goals have to be shifted from "energy' conservation" to "energy efficiency" and from "energy inputs" to the "effectiveness of energy use and energy services.

c) Improved energy efficiency is the result of many decisions, including those of individual consumers as well as manufacturers and government officials. Gains in energy efficiency in the developed countries in the
last three decades were built on a combination of technological improvements, better management practices,

d) Learning to put these technologies and practices to their best use. In many areas the results have been quite impressive.

3.6.2: Importance of Energy Conservation

MOP in a scenario where India tries to accelerate its development process and cope with increasing energy demands, conservation and energy efficiency measures are to play a central role in our energy policy. A national movement for energy conservation can significantly reduce the need for fresh investment in energy supply systems in coming years. It is imperative that all-out efforts are made to realize this potential. Energy conservation is an objective to which I all the citizen in the country can contribute. Whether a household or a factory, a small shop or a large commercial building, a farmer or an office worker, every user and producer of energy can and must make this effort for his own benefit, as well as that of the nation.

3.6.3: Energy Conservation Act, 2001

Recognizing the fact that efficient use of energy and its conservation is the least-cost option to mitigate the gap between demand and supply, Government of India has enacted the Energy Conservation Act -2001
and established Bureau of Energy Efficiency under administrative control of Ministry of Power. The mission of BEE is to develop policy and strategies with a thrust on self-regulation and market principles, within the overall framework of the EC Act with the primary objective of reducing energy intensity of the Indian economy.

3.6.4: Bureau of Energy Efficiency

Bureau of Energy Efficiency have initiated various actions on the thrust areas and moved forward, in establishing institutional mechanisms and infrastructure facilities under the mandate of the EC Act and took steps to involve industries, equipment manufacturers, financial institutions and other stakeholders for implementing the provisions of the EC Act. Various activities undertaken by the Bureau of Energy Efficiency have initiated energy conservation in India.
3.7: Electricity Act 2003:

3.7.1: Introduction:

The first legislation on electricity enacted in 1887 for the protection of a person and properties from any risk or injury over the supply of electricity. This Act are repealed in 1903. An amendment to the Act comes in 1910 with basic legal frame work. 1948 enactment of the Electricity (Supply) Act, dealing with statutory powers and functions of State Electricity Boards (SEB’s) and Central Electricity Authority (CEA) and the generating companies. In 1998 Electricity Regulatory Commission Act, enacted to rationalize electricity tariffs for power generation and consumers, to bring in transparency in policy, promote efficient and friendly environment, and to involve private sector in generation and supply. In June 10 the new act enacted as “Indian Electricity Act, 2003”, aimed at ushering in competition and efficiency to usher second generation reforms. It consolidates laws on generation, transmission, distribution, trading and use of electricity. It repeal earlier three Acts of 1910, 1948 & 1998 and overrule all previous acts, thus giving clarity to regulators and judiciary. It creates more competitive market and removing many barriers with social interests. The Act is
backed up by two major policies- National Electricity Policy and Tariff policy which are being announce by the central government.

3.7.2: Features of the Act:

It is mandatory to establish state **regulatory commissions** SERC and central regulatory commission CERC with in six months from June 2003. If required joint regulatory commissions can be established for two or more states if involved. The functions of SERC/CERC include specifying grid code, supply code levy fees and trading margin in interested trading.

**Metering** of all electricity has been made mandatory within two years of a date notified by Government of India (GOI).

It is mandatory **unbundling** of SEB’s into separate corporate entities for generation, transmission & distribution.

**Generation** has been liberalized and de-licensed. The requirement of techno-economic clearance has been removed except in the case of hydro projects. **Captive plants** have been freed from controls. It has become easy to set up captive power plants and the definition of captive has been enlarged. Consumers also can form “Bulk purchasing groups”
and buy power directly from generating companies or from intermediaries such as traders and distribution companies.

The act mandated for non-discriminatory open access for transmission and distribution. The CERC duly acted on this and passed orders allowing open access at the national level. Now the states must introduce open access in their respective states in a phased manner. They were given a year’s time to decide when and how to introduce open access. States like Kerala allowed open access to its bulk consumer to buy cheap power from power trading corporation as the Indian Aluminum Industry wished to buy. Government has distanced from determination of tariff and tariff fixation has been vested in the CERC/SERC guided by national Electricity policy and Tariff policy. Power Purchase Agreements (PPA’s) entered earlier have not been explicitly saved or granted a protection from regulatory intervention.

Distribution has protected consumer interests through a consumer redressal forum (CRF) in a time bound manner and can approach ombudsman under SERC. It allows for multiple distribution licenses in one circle. The state commissions could grant licenses to two or more entities for distribution of electricity through their own distribution
system. The distribution licensee will be free to take up generation and generation companies will be free to take up distribution. Trading has been permitted as a distinct activity. The bill also allows local bodies to like NGO's, punchayats and user associations to undertake distribution of electricity in non-urban areas. A number of private players have shown interest in supply in power in select circles.

In **Rural Electrification** Generation / Distribution require no license in rural notified areas by state governments. Central government shell formulates a national policy in consultation with state Government & CEA.

**Trading** has bee recognized as a distinct activity. Earlier a transmission licensee was barred from trading. Now the trading of electricity requires a license from Central Electricity Regulatory Authority.

In **transmission** it has been segregated as a wire function without any trading to secure non-discriminatory access. State and Central utilities on transmission are deemed licensees. For efficient, economical and integrated functions National Load Dispatch Centre (NLDC) to coordinate and secure optimum scheduling and dispatch among
Regional Load Dispatch Centre (RLDC) and State Load Dispatch Centre (SLDC) shall integrate operation of power system in state.

The act mandates **Multi Year Tariff** (MYT) framework to be implemented by state utilities on the principles that would result in elimination of cross subsides. This requires detailed cost of service estimate and availability of data on consumption, system peaks, technical and commercial losses to implement a good (MYT) framework unquestionable under law.

**Anti Theft Provisions:** Power theft is the single largest issue that spoils the power sector. The current poor financial statuses of power utilities are the loss accumulation and the causes of political influence and connivance of Utility Employees with consumers to extract personal benefits at the expense of Utilities. Effective implementation of anti theft provisions are critical for the success of reforms process and being resisted by rested interest.

Generation **tariff**, transmission tariff have been formulated based on well conceived and historical costs that takes care of capital, depreciation, operation and maintenance expenses, return on investment, plant load factor, fixed and variable charges, use of
network, System operation, reactive power and surcharge for open access. Instead of government tariff fixation regulatory bodies involve in tariff fixation considering all stakeholders.

The Act talks of an **appellate tribunal** to hear complaints against the orders of central and state commissions and exercise supervision and control over the central and state commissions.

**Wheeling charges** for open access to consumers are computed taking into account projected unit sold and wheeled (Input End Quantity) through distribution licensee network in the ensuing tariff period. The normative distribution system loss to be borne by the consumer in case of wheeling transaction would be based on the voltage levels at which transactions are undertaken. The consumer availing open access would pay surcharge in addition to wheeling charges till cross subsides are eliminated.

The Act gives direction for an efficient, economical and competitive sector under regulatory regime for significant economic development and energy security of India and focuses on the consumer and national economy.
3.8: Accelerated Power Development & Reforms Programme

3.8.1: Introduction:
In the process of power sector reforms, government of India initiated a motivational programme to induce unhealthy and sick power state utilities (SEB’s), particularly the distribution sector to improve its technical infrastructure in a distribution circle to a profitable circle through assisting financially from a central fund. This programme is called Accelerated Power Development & Reforms Programme (APDRP). Renowned technical expert S. K. Patnaik made a study on the programme.

As per the study, India’s GDP is growing fast. A strong and healthy power sector is a prerequisite to the targeted GDP growth of 8% of the country in the coming years. SEBs are suffering losses primarily on account of high technical and commercial losses in the distribution segment. This segment, being the touch point with other sectors of the economy, needs intervention to improve the financial health of the power sector as a whole. A trim, healthy and vibrant distribution segment is the need of the hour. Reduction of AT&C losses is the mantra to improve the financial viability of SEBs/ Discoms, which in turn will provide the payment security to central CPSUs and ultimately
attract private investment in power sector at internationally competitive tariffs.

The study report explains that, among various distribution reforms initiatives, Accelerated Power Development Programme (APDP) was undertaken from the year 2000-01 for restoring the commercial viability of the distribution segment. It was subsequently rechristened as Accelerated Power Development & Reforms Programme (APDRP) during 2002-03 to provide access to the states to APDRP funds on the basis of agreed reforms program to narrow down losses.

While the Electricity Act 2003 paves way for open access for deriving economic benefit from available captive distributed generation available in the country to arrive at competitive tariffs, APDRP aims at turnaround of distribution utilities, with the ultimate objective of customer satisfaction as noted by the study.

3.8.2: Accelerated Power Development and Reforms Programme (APDRP)

The APDRP was operationalized by the Govt. of India with the following objectives as narrated by the author are:

i. Reduction of AT&C losses

ii. Bringing commercial viability
iii. Reduction of outage and interruption

iv. Improved customer satisfaction

Under APDRP, funds are provided through state governments to the SEBs/Discoms which have adopted the path of Distribution reforms for up-gradation and strengthening of the Sub-Transmission and Distribution (ST&D) system so as to achieve the objectives of APDRP. The study narrates, Funds are also provided as 100% grant under incentive component to the states as additional plan assistance. The state governments offer incentives up to 50% of the actual total loss reduction by the SEBs / utilities, as grant. The year 2000-01 is taken as base year for calculation of loss reduction. Losses are calculated net of subsidy, if any, given by the state government and revenue is considered on net realization basis.

During Xth plan, an outlay of Rs.40,000 crores as additional Central Plan assistance to SEBs/Discoms through State Government was planned, which was further divided as:

a) Rs.20,000 crores for strengthening and up gradation of Sub-transmission and Distribution Network under investment component to reduce AT&C losses and improve reliability of network and improved customer satisfaction. Though initially schemes were circle based,
subsequently the focus shifted to urban towns for quantification and showcasing results. Since FY 2006-07, Gol provides central plan assistance as 25% of project cost as grant and remaining 75% of project cost to be arranged by utility as loan from FIs like PFC, REC, etc. Earlier, 50% of the project cost was provided by Gol as grant (25%) and loan (25%), and the remaining counterpart fund was to be arranged by the utilities. Special category states (All North Eastern states, J&K, H.P., Uttarakhand and Sikkim) are entitled for 90% of project cost as assistance in the form of grant and have to arrange balance 10% from internal sources/ FIs.

b) Rs. 20,000 crores grant to the states for reduction in the cash loss by SEBs/Utilities under incentive component to motivate utilities to reduce cash losses through technical/administrative/commercial measures in order to encourage utility to move towards financial viability. Total incentive release by MoP to states of AP, Maharashtra, Gujarat, Rajasthan, Haryana, West Bengal, Punjab and Kerala amounted to Rs. 1536 crores till financial year (FY) 2005-06.

3.8.3: Memorandum of Agreement (MoA)

It put it that, utilities willing to reform are entitled to APDRP funds and has to enter into Memorandum of Agreement with Gol for taking up
Technical, Commercial and Administrative measures in a time bound manner to achieve financial turnaround with improved customer satisfaction. Primarily, the ingredients of a MoA are as under.

3.8.4: ADVISOR CUM CONSULTANTS:

As per the study, In 2001, Ministry of Power, GoI appointed NTPC and POWERGRID as the lead Advisor cum Consultants (AcC) and subsequently, brought CPR I and MECON under the charge of NTPC to bring in uniformity and consistency in approach amongst AcCs for 12 States (AP, Kerala, Karanataka, TN, MP, Maharashtra, Punjab, Uttaranchal, Haryana, Rajasthan, Jharkhand and Chattisgarh) with the following responsibilities:

• Advise and help SEBs/utilities in preparation of DPRs.

• Assist SEBs/Utilities in prioritization of schemes for urban areas in distribution circles and ranking of projects for improvement in revenue collection and increase in customer satisfaction.

• Assist the Monitoring Committee for review of techno economic appraisal of the DPRs prepared by utilities.

• Assist MoP in prioritization of available funds to be allocated to States/Utilities under APDRP scheme.
Monitor periodically the physical and financial progress of various distribution circles for which APDRP funds have been allocated and disbursed.

- Advice MoP in devising guidelines for uniformity of approach in preparation and evaluation of project proposals, and disseminating information on best practices under APDRP scheme.

- From financial year 2002-03, NTPC has taken the overall responsibility of implementation of GoI's APDRP scheme under the guidance of MoP.

NTPC to represent in Distribution Reforms Committee of states consists of members from State Government, Utilities and NTPC on behalf of MoP. Distribution Reforms Committee monitors implementation of schemes, reforms initiatives taken by the States.

The study concludes that the programme, calls for enthusiasm of field staff and commitment of top management in implementation of policies and guidelines besides bringing in reforms in distribution business process management for achieving transparency and efficiency. Speedier projects execution, administrative initiatives under Electricity Act 2003 and IT enabling business processes for reduction of
human intervention are ushering in enabling environment to turnaround Distribution Utilities.

Study explains that to impose culture of accountability and responsibility in staff, energy audit at DT level through time-stamped energy metering system with respect to GIS based indexed consumer and network data is the imperative need of the hour to identify loss pockets to determine baseline benchmark performance parameters and monitoring improvement of the same. APRDP is instrumental in turnarounds and substantial improvements in financial health of a number of utilities across the country. The study explain APDRP programme to sustain full benefits of power sector in long run.

3.8.5: Conclusion:

Primary financial disorder in power sector is long term tariff that are below actual cost of power supply. In the first phase of power reform process only 80% recovery on tariff was possible. Cross subsidy have been targeted to gain vote banks from domestic and agriculture consumers by politicians. Average cost of supply is 3.50 Rupees / KWh and average tariff is only 2.40 Rupees/KWh (Planning Commission 2002) leading to a huge SEB loss that are now over 1% of GDP. Parts of these losses on under charged tariff are provided from state budgets.
Total arrears to state owned enterprises from SEB’s on power purchase from generators are 340 billion (Ahluwalia 2001). When SEB’s sought expansion through internal accruals, debt or equity they ran dry of financials. Only government grant and debts were possible routes for expansion. At this stage power investments by state sector are in logger heads. Central government plans for reformation on distribution that set right revenues and cost of power for a good recovery to boast the power sector of good financial status.

The study elaborates further in Chapter – IVa for analysis and inferences.