CHAPTER - III

POWER SECTOR REFORMS IN INDIA AND A.P.
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Economic reforms deliberate some radical changes in the economic policies that have altered the organizational forms, ownership pattern and domain of operation. The present generation world wide economic reforms originally started in USA and Europe in late 1980's, when developed countries badly suffering from an alarming crisis, their export oriented foreign trade faced negative balance of payments, and developing countries faced the problems of unemployment, financial crisis and started reforms influenced by LPG system. Reform out comes should thus be related not only to public action but also several factors. The success of reforms will depend on political acceptance and democratic process.

The economic reforms, which began in India in 1991 heralded a major change in economic conditions and have affected its whole social fabric and changed. In the first phase, reforms took place in an environment where there was a well-developed consensus among economists about the first order problems which then affected Indian economic policy. Today, as we contemplate the second phase of reforms, it is important to place the economic policy problems in the context of the problems and opportunities for economic growth in India.

Power sector reforms are a long process and impacts would be known after a long time. Through it is difficult to predict the outcome of the process, the power sector reforms depend on some aspects in India like structure of administration, institutions legal frame work and importantly political participation in democratic process. Indeed advocates for the power sector reforms argue that the proposed changes will bring better quality of power at lower rates with positive effects on economy and society large.
Pre reforms period

State Electricity Boards (SEBs) and State Electricity Department play a crucial role and responsible for generation, transmission and distribution usually within their own states and territories. As a result of 1948 Industrial Policy Resolution, the Govt. enacted the Electricity (supply) Act, 1948. This Act facilitated SEBs to become the main agencies for supplying power throughout India. The Industrial Policy Resolution of 1956 reserved the generation and distribution of electricity almost exclusively for the states' letting, and government enterprises. As a result the public sectors operate electricity installed capacity in the utilities increased from 37% to 89% (30% Central Power Utilities) during 1950 - 1991. At the same time private sector operate electricity installed capacity decreased from 63% to 11%.

Role of Legislation

According to Seventh Schedule of India's Constitution, "Electricity" is a concurrent subject (SI.No 38 of list-III) there by implying that both the parliament of India and state legislatures are empowered to make laws on the subject of Electricity. With Independence, the principle that both the Central Government and the states should able to legislate on power was embodied in the Constitution. Shortly after this, legislative authority was more formally divided in the Electricity Supply Act, 1948. The Act provided for the establishment of Central Electricity Authority (CEA) and State Electricity Boards. The SEBs were autonomous bodies responsible for the development and operation of generation transmission and distribution in the "most economical and efficient way". The Industrial policy Resolution of 1956 reserved the generation and
distribution of electricity almost exclusively for the states letting, existing private licensees, however, to continue. This led to SEBs became the main agencies for supplying of power through India and domination of the electricity sector.

**Financial performance before Reforms**

Since SEBs account for almost 80% of commercial electricity sale in the country, the financial performance of the entire sector, including that of central sector agencies, is heavily dependent on the performance of SEBs. But SEBs financial performance is very poor as their commercial losses are rising year by year. In 1991-92, without subsidy, commercial losses were recorded at Rs. 4117 crore. The poor billing and collections are due to because of incorrect reporting and billing and inadequate collection efforts, tampering with meters and misreporting etc.

**Shortage of Electricity Generation**

The main problem of Indian power sector is shortage of electricity. According to the working of State Electricity Boards and the Electricity Departments annual report 2001-02 in the beginning of the ninth plan the energy shortage was 11.5% and peak deficit was 18%. Because, of poor productivity, low and lack of training for upgradation and low motivation levels. This situation led to electricity shortages in most of the states in India.

**Technical performance**

In 1991-92 the PLF is low in State sector (54.1%), Central sector (62.7%) and Private sector (58.8%) and the transmission and distribution loss is estimated at 22%, power supply shortages 11.5%, and peak deficit 18%. So the high transmission and distribution losses are substantially higher than normal technical standards with a high technical component on non-technical losses.
Cross Subsidy

Due to cross subsidy the electricity tariff of industrial sector has been increasing from time to time. So the Industrialists set up their own captive power generation. As a result industrial consumption dwindled from 69% to 44% during the period from 1960-60 to 1990-91. Power industry bureaucrats and staff, planners and some classes of consumers became increasingly frustrated with the functioning of the sector. The main complaint of SEBs was that the managers were government appointed officials. Who were frequently transferred out of the sector and they did not have sufficient experience and lack of knowledge of this sector. All these factors worsened the power sector performance.

Reasons of Reforms

Government initiated the reform process due to the following main reasons:

❖ the ever-widening gap between the demand and availability of electricity,
❖ the poor technical and financial performance of the State Electricity Boards and
❖ Inability of the Central and State Governments to finance and mobilize resources for generation capacity expansion projects, making third party investment in power sector imperative.

Reforms Period

I. Reforms in Generation

(i). Independent Power Producers (IPP)

The first phase reforms began with the introduction of Independent Power Producers (IPP) paradigm. The initial step in this direction has been the amendment of legislation governing the electricity sector in 1991. The Indian Electricity Act, 1910 and the Electricity (Supply) Act, 1948 were amended to attract private investment in power generation.

Policy on Private Participation in Power Sector achieved the following:

❖ it allowed the private sector to set up thermal projects, hydroelectric projects and wind/solar energy projects of any size. Generators were invited to submit unsolicited proposals to SEBs for the purpose;

❖ it allowed the private sector to supply and distribute energy in a specified area, ... (even without ownership of) a generating station;

❖ foreign ownership up to 100% was allowed;

❖ The contract between the generator and the SEB would be a long-term power purchase agreement (PPA) offering a guaranteed return on equity of 16%. Foreign investors would receive exchange rate protection up to the benchmark return and for servicing the costs of foreign debt.

This facilitated the tapping of domestic and foreign capital markets, provided assured returns on investment and reduced legal hassles to allow the private investors to set-up generation capacities or operate as licensee in distribution segments, which were hitherto a monopoly of the SEBs. Private power initiative in generation banked on long-term power purchase agreements. However, the distribution was not privatized. Further,
the policy did not have any provision aimed at improving the fiscal health of SEBs, which is a prerequisite for the viability of the PPA. The National Development Council set up in 1993 was the first official body to steer the reform process.

The Committee recommended the following:

❖ the industry should be re-oriented to be accountable to the consumers;
❖ foremost reform needed in the state power sector is to restore the autonomy of the state power utilities;
❖ The State Government must distance itself from the management of the SEBs to enable the latter to have necessary technical, managerial and financial autonomy;
❖ In the long run, the SEBs should function as corporate bodies;
❖ Minimum tariff should be gradually be increased so that it is not less than 50% of the average cost of generation and distribution of electricity during the year;
❖ Objective of the scheme of private sector participation in the power sector should be to attract domestic and foreign investment in a competitive environment so that the consumer of the retail may get power so generated at the least cost; and
❖ Stringent measures for unauthorized use and theft.

(ii). Mega Power Policy

Mega Power Policy was introduced in November 1995 for providing impetus to development of large size power projects in the country and derives benefit from economies of scale. Where-by plants above 1000 MW capacity would receive additional incentives in the form of a 10 year tax holiday anytime during the first fifteen years, exemption of customs duty for imports, reduced hassles for clearances, etc. This also provided for the setting up of Power Trading Corporation (PTC) to Act as an intermediary
between the private developers of mega projects and the SEBs. These guidelines were modified in 1998 and 2002 and were last amended in April 2006 to encourage power development in Jammu & Kashmir and the North-Eastern region. However, in the wake of several important statutory and policy level changes in the power sector, this Ministry revisited some of the provisions of the present Mega Power Policy and brought them in line with the National Electricity Policy, 2005 and Tariff Policy, 2006. The modified policy, as brought out in December, 2009, seeks to rationalize the procedure for grant of mega certificate and facilitate quicker capacity addition. The mega power policy would have positive impact in the form of lower generation cost and resultant cost of power purchased by distribution utilities. These measures were further strengthened by a Mega Power Policy. Though independent power producers (IPPs) evinced interest for adding generation capacity for about 95,000 MW, only 6500 MW was added during the eighth and ninth five year plans (1992–2002). Further, out of a targeted capacity addition of 17,588 MW from the private sector during the ninth Five year plan (1997–2002), a mere 5061 MW only materialized.

The Ministry of Power organized discussions between the Centre and the States in October and December 1996, from which emerged the “Common Minimum National Action Plan for Power” (CMNAP). The CMNAP recommended:

- That the SEBs be corporatized, initially within the existing framework of public ownership followed by gradual privatization;
- That the SEBs focus on improving efficiency in both generation and distribution via reorganization, efficient metering and energy audits;
- The creation of independent State Electricity Regulatory Commissions (SERCs), answerable only to the state High Court;
❖ That tariffs be set—"with immediate effect"—to earn a return on capital employed of at least 3%;

❖ Cross-subsidization be continued provided that no user pays less than 50% of its average costs. A 3-year phase-in was allowed for farmers only, who would immediately pay at least Rs 0.50/kWh;

❖ Simplification of procedures, including that adjustments for changes in fuel charges be "automatically incorporated" in the tariff structure as a pass-through cost. This concept was incorporated in the June 1997 guidelines for private sector participation in generation.

(iii). The Accelerated Generation and Supply Programme

The Accelerated Generation and Supply Programme (AG&SP) initiated during Ninth Plan (in the year 1997-98). It provided incentives in the form of interest subsidy to SEBs/states and central power utilities. This has helped in carrying out power development activities particularly in the state sector. The capacity addition in the state sector achieved was around 88 per cent of the target, in which the contribution of AG&SP was around 55 per cent. The scheme has also given boost to the renovation and modernisation (R&M) programme during the Ninth Plan period. The additional generation due to the incentives given through AG&SP is estimated to be about 10,000 MU/annum.

The scheme covers the following activities

❖ R&M and life extension/rehabilitation.

❖ Ongoing generation projects.

❖ Missing transmission links and system improvement.
Grant for studies.

The Ministry of Power provides a grant from its budget to fund an interest subsidy of 4 per cent on normal lending rates of the PFC to SEBs/State Generation Corporations (SGCs). R&M schemes costing less than Rs. 100 crore are currently also being financed under APDP. It is proposed that in the Tenth Plan, all R&M schemes would be financed under AG&SP only and no financing would be made through APDP.

(iv). Ultra Mega Power Projects

The Central Government has accordingly taken the initiative for the developing of few Ultra Mega Power Projects (coal based) and established in pithead, coastal areas. These are very large sized projects, approximately 4000 MW & above each involving an estimated investment of about $4 billions. These projects will be awarded to developers on the basis of tariff based competitive bidding rout using super critical technology on Build, Own and Operative (BOO) basis. These projects will be taken up to fulfill the power shortages and growing (electricity consumption) needs of the economy, generation capacity is to double itself in every ten years in next three decades at least. As such there is need to develop large capacity projects at the national level to meet the requirement of different states.

Status of Projects

Four UMPPs namely Sasan in Madhya Pradesh, Mundra in Gujarat, Krishnapatnam in Andhra Pradesh and Tilaiya in Jharkhand have already been Awarded. One unit of 660 Mega Watts sasam and two units of 800 Mega Watts Each of the Maharastra projects are expected to be commissioned in the XI five year plan. Sarguja district in Chattisgarh, all the requested for qualification (RFQ) activities have been completed. In Sundhergarh district, Orissa most of the pre-requisites for issuing the
section are already in place except issuing of Section 4 notifications. Tamil Nadu project site has been finalized at Cheyyuru. The second project in Andhra Pradesh site also be finalized at Nayunipalli, Prakasham District. In Karnataka, Maharastra, Gujarath and Orissa the land availability and water linkage are being examined.

(v). Renovation & Modernization

Renovation & Modernization (R&M) is a structured programme and it is seen as a cost effective option to maximize generation from the existing thermal power stations and better asset management. It is one of the major achievements of the power sector and there has been a significant increase in availability and plant load factor of thermal power stations especially over the last few years. This programme’s Phase-I was taken up in September 1984 and Phase-II in 1991-92. Due to this there had been significant improvement in the plants performance resulting in increased generation.

The Seventh Plan covered 163 thermal units with a total capacity of 13,570 MW at 34 selected power stations. The programme was successfully completed in 1991-92 with a total cost of Rs.1, 066 crore. An average additional generation of 10,000 million units (MU)/year was achieved as against the targeted benefits of 7000 MU/year after completion of the programme, 44 thermal power stations comprising 198 units with a total capacity of 20,870 MW. The programme was estimated to cost Rs. 2,383 crore and was scheduled to be completed during the Eighth Plan. An additional generation of 7,864 MU/ year was expected on completion of the programme. However, many utilities could not implement their R&M schemes on schedule due to the non-availability of funds. As a result, by the end of the Eighth Plan, only around 50 per cent of the works could be completed, yielding an additional generation of 5,000 MU/year. During the Ninth Plan period 153 thermal units are at various stages of completion. Life Extension Work on 28 units (with a total of 1,981 MW) is likely to be completed. The life of the units covered
by the programme is likely to be extended by 12-15 years. In the 10th Plan period life extension works on 11 units (985 MW) at an approximate cost of Rs. 948 crore were completed. There was additional generation of 2000 MU per year from these units. In addition, R&M works on 57 units (14270 MW) to sustain/improve their performance at an estimated cost of Rs. 1080 crore were taken up and works on 14 units (2460 MW) were completed. 53 numbers (7318 MW) out of which 33 (4524 MW) in state sector and 20 (2794 MW) in central sector have been identified for taking up life extension programme during 11th Plan. Similarly for R&M works, a total number of 76 units (18965 MW) out of which 27 units (6015 MW) in state sector and 49 units (12950 MW) in central sector have been identified for implementation during the 11th Plan.

The R&M and Life Extension Programmes face various constraints. These include:

❖ Non-availability of timely and adequate funds due to poor financial health of most SEBs/utilities.

❖ Delay in obtaining loans from the Power Finance Corporation (PFC) due to non fulfilment of loan conditionalities.

❖ Procedural delays in the formulation of schemes and finalisation of orders by SEBs/utilities.

❖ Reluctance on the part of the SEBs to undertake renovation and modernization since this leads to the units going out of the system temporarily, thereby lowering generation.

(vi). R&M and Uprating of Hydro Power Stations

R&M Phase-I Programme

Recognising the benefits of the R&M programme, Govt. of India set up a National Committee in 1987 to formulate strategy on R&M of hydro power projects. Based on the
recommendations of the National Committee and subsequent reviews, a programme for renovation, modernization and updating of Hydro Power Stations was formulated by Central Electricity Authority in which 55 schemes were identified with an aggregate capacity of 9653 MW. The total cost of these schemes was estimated as Rs.1493 Crore with expected benefit of 2531 MW.

**R&M Phase-II Programme**

As per the hydro policy of Govt. of India, declared in 1998, renovation & modernization of Hydro Power Plants accorded priority. Accordingly, 67 hydro R&M schemes having an aggregate capacity of 10318 MW were identified to be undertaken under Phase-II programme till the end of Xth Plan to accrue a benefit of 3685 MW at an estimated cost of Rs. 2161 Crore.

**National Perspective Plan**

CEA formulated the National Perspective Plan for hydro power stations in the year 2000 and incorporated R&M proposals under Phase-II programme along with the left out schemes as recommended in phase-I programme of National Committee. The left out schemes were those which were either under implementation or were yet to be implemented. This Perspective Plan was for IXth, Xth and XIth Plan with 117 schemes having an aggregate installed capacity of 19370 MW with the benefit of 7755 MW at an estimated cost of Rs.4654 crore.

**II. Structural Reforms**

Reforms next step was restructuring of the organization. The CMNAP formed the basis for the June, 1997 guidelines on generation in power sector. However, the 1996/97 reforms were not comprehensive as it had altogether neglected the reforms in the distribution sector which were essential to improve the fiscal health of the SEBs.
Reforms at the central level were initiated in 1998. The Government of India enacted The Electricity Regulatory Commission Act, 1998. This has provision for setting of Central/State Regulatory Commission at central and state levels. Some of the states have undertaken several measures of reforms in the power sector (1) to overcome the fund shortages and (2) to reduce the bureaucratic control over the system.

(i). Central Electricity Regulatory Commission (CERC)

Central Electricity Regulatory Commission was formed on 26 April 1999. It is an independent statutory body with quasi-judicial powers, functioning under section-76 of the Electricity Act, 2003. But CERC was initially constituted under the Central Electricity Regulatory Commission Act, 1998 on 24th July 1998. The Commission consists of a Chairperson and four other members including the Chairperson, CEA as the ex-officio member. The main functions of the CERC are to regulate the tariff of generating companies other than those owned or controlled by the Central Government, Main responsibilities of the SERC are to determine the tariff for generation, supply transmission and wheeling of electricity, whole sale, bulk or retail sale within the state, to issue licenses for intra-state transmission, distribution and trading to promote cogeneration and generation of electricity from renewable source of energy etc.

(ii). State Electricity Regulatory Commissions (SERC)

Most of the states that had gone in for the reform and established Electricity Regulatory Commission, in order to bring in moderation in the practices of the privatized power sector and regulate their activities. Orissa was the first to enact, in 1996, comprehensive power sector reform Act involving on independent regulatory commission, unbundling of the State Electricity Board into separate generation, transmission and distribution entities, and eventual privatization, particularly of
distribution the urging of the World Bank assistance. Tariff Orders have been issued by twenty (20) SERCs and thirteen (13) states have unbundled/corporatised and nine (9) are expected to follow suit shortly.

The World Bank has not been the only donor agency active in the sector in India. The United Kingdom departments, CIDA (Canada), USAID and PHRD (Japan) have also provided funding for elements of the reform of these; DFID has provided considerable funds for technical assistance with the reform programme. The World Bank was observer, DFID’s grant support for basic technical work was critical to implementation of reforms.

III. Reforms in Distribution

The power sector was facing some serious problems such as old worn-out and poor distribution network leading the frequently outages, skewed tariff structure, high T&D losses. Largely due to outright theft un metered supply, high LT/HT rates, overloaded distribution lines, lack of accountability at feeder level and distribution set up of SEBs. Hence the need for distribution reforms was recognized. It was towards this effort that in the Meeting of the Chief Ministers on Power Sector Reforms was held in March 2001 where some level of political convergence concerning the reforms emerged. The most important step to improve the bottom line of the sector is effective and creative management to reduce technical and commercial losses and increase revenues. The resulting revenues along with performance-tied grants from government and multilateral and bilateral agencies can be used to improve technical performance involving reduction of T&D losses and improvement of power quality (frequency, voltage, continuity).

(i) Accelerated Power Development Reform Programme

Accelerated Power Development Programme (APDRP) was introduced in Feb, 2001. This Programme’s main aim is to achieve the AT&C losses to around 15% as
against existing over 50% and ensure reliability and quality of power supply with adequate customer satisfaction. To begin with, the activities will concentrate in high-density networks where investments could lead to substantial, quick and demonstrable results. The implementation of projects aimed at upgradation of Sub-Transmission & Distribution network in the high density areas,

The State utilities will be urged to:

❖ Meter all the consumers.
❖ Rationalize tariff by removing cross subsidies and
❖ Develop local bodies & local institutions to take up electricity distribution to develop a large number of bulk & retail consumers.

This program has two components namely the Investment Component which covers strengthening and upgradation of sub-transmission and distribution and the Incentive Component which is a grant for states/Utilities towards reduction of cash losses with 2000-01 as the base year.

(A). Investment component

The investment component was divided into two parts

a. Non-Special Category States: Union Government finances 50% of the project cost and the ratio of grants and loan is 1:1 (grant 25%, loan 25%) SEBs and Utilities have to arrange 50% of the fund from Power Finance Corporation and Rural Electrification Corporation or other financial institutions.

b. Special Category States: Union Government's assistance 90% in the from of grant and the balance 10% fund they have to arrange (soft loan)
(B). Incentive Component

An incentive equivalent to 50% of the actual cash loss reduction by SEBs / Utilities is provided as grant. The year 200-01 is the base year for the calculation of loss reduction, in subsequent years. The cash losses are calculated net of subsidy and receivables.

This strategy for Distribution reforms would envisage interventions at the following levels:

(a). National Level Interventions

The basic issues at national level are related to policy issues, legislation, uniform standards, and energy conservation, accounting standards.

(b). State Level Interventions

The basic issues confronting the state level interventions are formation of SERs, issuance to regular tariff orders, providing legislative support for involving local bodies in management of distribution business, removal of tariff anomalies, subsidies and budgetary support.

(c). SEB Level Interventions

The basic issues confronting the SEB level interventions are restructuring, accountability, commercial accounting, integrated management information system, grid discipline and TOD metering.

(d). Distribution Circle Level

Increase in income; increasing the billing, reduction of pilferage, more remunerative pricing of the commodity (energy) and optimum utilization of physical assets and brand value of the supplier.
(e). Feeder Level Intervention

11 kV Feeders are the basic source of income to an electricity utility. The issues confronting it are metering and billing, bill collection, abnormal voltage, segregation of losses and over all ensuring quality of power supply.

(f). Consumer Level Intervention

The basic issues at Consumer level are related to mandatory metering, compliance of billing, consumer satisfaction, and energy conservation.

Schemes undertaken under APDRP are for renovation and modernisation of sub-transmission lines & distribution transformers, augmentation of feeder & transformers, feeder and consumer meters, high voltage distribution system, consumer indexing, SCADA, computerizing billings etc. APDRP was also formulating to specific projects of renovation and modernisation, life extension up rating of old thermal and hydel power generation plants.

(ii). Re-Structured Accelerated Power Development Programme

The Cabinet Committee on Economic Affairs (CCEA) approved the programme of R-APDRP in the meeting held on 31.07.2008. It is a Central scheme. The focus of the programme shall be on actual, demonstrable performance in terms of sustained loss reduction. Establishment of reliable and automated systems for sustained collection of accurate base line data, and the adoption of information technology in the areas of energy accounting will be essential before taking up the regular distribution strengthening projects.

It is proposed to cover urban areas - towns and cities with population of more than 30,000 (10,000 in case of special category states). In addition, in certain high-load density rural areas with significant loads, works of separation of agricultural feeders from
domestic and industrial ones, and of high voltage distribution system (11kV) will also be taken up.

The projects are taken up in two parts

Part-A: shall include the projects for establishment of baseline data and IT applications for energy accounting/auditing & IT based consumer service centers. Entire the distribution net work at and bellow the 11 kV transformers and include the distribution transformers and feeders, low tension lines, poles and the other distribution network equipment, it will also include adoption of IT application energy accounting & auditing. The base link data shall be verified by an independent agency appointed by the Ministry of Power.

Part-B: shall include regular distribution strengthening projects. The activities to be covered under each part are renovation, modernization and strengthening of 11 kV levels sub-stations, transformers/ transformers centers, re-conducting of lines at 11 kV level and bellow, load bifurcation, load balancing, HVDS, installation of capacitor banks and mobile service centers etc. In exceptional cases, where sub-transmission system is week, strengthening of 33 kV or 66 kV levels may also be considered.

(iii). High Voltage Distribution System (HVDS)

HVDS Scheme implementation under APDRP is to improve the quality of supply. One of the recommendations is the implementation of Single phase HT distribution system with small capacity single transformers. It is to reconfigure the existing Low voltage (LV) network as High Voltage Distribution System, wherein the 11kV line is taken as near to the loads as possible and the LV power supply is fed by providing an appropriate capacity transformer and minimum length of LV line with an objective to provide better quality power supply. Under this system HT line is extended up to or near
the load as possible and to erect small capacity distribution transformers i.e. 10 KVA, 16 KVA and to extend supply to the consumers through a short length of lines preferably insulated cable (Arial bunched cable) system. These projects involve installation of large number of smaller capacity of 11 kV/400V transformers viz., with large number of smaller capacity of 3-Phase distribution transformers, 25/16/10 KVA supply to agricultural consumers.

**Objective of HVDS**

The main objectives of HVDS are reduction of losses through replacement of the low voltage network with high voltage. To improve the quality of power supply and better consumer service in rural areas.

**The benefits of the scheme**

- Reduction in technical losses at LV lines.
- Distribution losses are reduced by 75% or more, depending on the load factor.
- Improved voltage profile.
- Arrest of commercial losses by avoiding unauthorized IP set Connections and prevention of un-authorized agricultural services.
- Energy savings due to improved efficiency of pump sets Consequent to better voltage profile.
- Reduction in Distribution Transformer failure.
- In single phase system only a few consumers are connected to transformers and as a result changes of unauthorized connections and theft of energy are reduced.
- The power utilities can keep the investment low and cut down the expenses during the initial period of low demand and electrifying remote rural areas.
IV. Reforms in Transmission

The Act of 1998 has allowed independent transmission service providers to setup transmission lines for inter-state and intra-state transactions under the directions, control and supervision of the Central Transmission Utility/State Transmission Utility for development of efficient and economical and better management for day to day operation of transmission network across the country.

(i). Central Transmission Utility

CTU as a statutory body was conceived in Section 27A of the erstwhile Indian Electricity Act, 1910 and has been retained in the Electricity Act, 2003. The functions of the CTU are to undertake transmission system and discharge all functions of planning and coordination relating to inter-state transmission system with State Transmission Utilities, Central Government, State Governments, generating companies etc. (Power Grid Corporation of India will be CTU).

(ii). State Transmission Utility

STU as a statutory body was conceived in Section 27B of the erstwhile Indian Electricity Act, 1910 and has been retained in the Electricity Act, 2003. The functions of the STU are to undertake transmission of energy through intra-state transmission system and discharge all functions of planning and coordination relating to intra-state transmission system with Central Transmission Utilities, State Governments, generating companies etc.
(iii) National Load Dispatch Centers

The Electricity Act, 2003 has provided for constitution of the NLDC for optimum scheduling and dispatch of electricity among the RLDC. The Constitution and functions of NLDC are yet to prescribed by the Central Government.

(iv) Regional Load Dispatch Centers

Section 25 of the Electricity Act, 2003 requires the Central Government to make regional demarcation of the country for the efficient, economical and integrated transmission and supply of electricity and particulars to facilitate voluntarily inter-connection and co-ordination of facilities for the inter state, regional and inter-regional generation and transmission of electricity. To ensure integrated power system in each such region the RLDC has been envisaged as an apex body. The RLDC is responsible inter-alia for dispatch of electricity with in the region, monitoring grid operations etc. The directions given by the RLDC for ensuring grid stability etc are required to be complied with by the licensees, generating company, generating stations, sub- stations and any other persons connected with the operation of the power system.

(v) State Load Dispatch Centers

Corresponding the RLDC which operates at the regional level, the SLDCs have been envisaged at state level with the responsibility of ensuring integrated operations of the power system.

The Appellate Tribunal for Electricity

The APTEL has been setup under the provisions of the Electricity Act, 2003, Section (110) with all India jurisdiction and it started functioning on 21st July, 2005. The Tribunal is presently located at New Delhi. APTEL is headed by a chairperson who has a
status of a sitting Judge of the Hon'ble Supreme court and also having the post of one Judicial member and two Technical members.

APTEL hears and disposes of appeals filed against the orders of the Central Electricity Regulatory Commission, State Electricity Regulatory Commission and Adjudicating officers. Subsequent to the setting up of APTEL, the appeals pending in the Jammu& Kashmir proceedings are conducted in two courts, each court consisting of Judicial Member and a Technical Member. As on 31st December, 2009 of 2183/petitions/matters etc that have been filed to date, 1740 have already been disposed.

V. Energy conservation

Electrical energy conservation is an important element of energy policy. Energy conservation reduces the energy consumption and energy demand per capita and thus offsets some of the growth in energy supply needed to keep up with population growth. This reduces the rise in energy costs, and can reduce the need for new power plants, and energy imports. The reduced energy demand can provide more flexibility in choosing the most preferred methods of energy production. Energy conservation can be achieved through increased efficient energy use, in conjunction with decreased energy consumption and/or reduced consumption from conventional energy sources.

Energy conservation can result in increased financial capital, environmental quality, national security, personal security, and human comfort. Individuals and organizations that are direct consumers of energy choose to conserve energy to reduce energy costs and promote economic security. Industrial and commercial users can increase energy use efficiency to maximize profit.

The Government of India has passed the Energy Conservation Act in 2001, and established the Bureau of Energy Efficiency (BEE), under Ministry of Power,
Government of India, on 1st March 2002 to promote the efficient use of energy and its conservation. Ministry of Power, through BEE, has initiated a number of energy efficiency initiatives through a range of measures including the launch of Energy Conservation Building Code for large, new commercial buildings; the launch of energy labeling scheme for appliances; the initiation of process for the development of energy consumption norms for industrial sub sectors and an annual examination to certify energy auditors and energy managers. However, the effectiveness of this and other measures ultimately depend on their adoption by all energy users and consequently on their awareness of the energy savings opportunities around them. Keeping this in view, Ministry of Power has initiated National Campaign on Energy Conservation and National Painting Competition on Energy Conservation for school children.

(i) Schemes for Promoting Energy Efficiency in India during XIth Plan

The Bachat Lamp Yojana is designed as a public-private partnership between the Government of India, private sector CFL suppliers and State level Electricity Distribution Companies (DISCOMs). This scheme aims at the large scale replacement of incandescent bulbs in households by CFLs. It seeks to provide CFLs to households at the price similar to that of incandescent bulbs and plans to utilize the Clean Development Mechanism (CDM) of the Kyoto Protocol to recover the cost differential between the market price of the CFLs and the price at which they are sold to households.

(ii). Standards and Labeling

The Bureau of Energy Efficiency, Ministry of Power has developed a scheme for energy efficiency labeling of equipment, under clause (a-d) of section 14 of the Energy Conservation Act, 2001 by the Central Government. This scheme was launched by the
Hon'ble Minister of Power in May, 2006 and Energy labels have been put on the following equipments and appliances under program implementation on voluntary basis.

The scheme was invoked on voluntary basis for four equipments and appliances viz. ACs, Distribution Transformers, Refrigerators and Tube Lights. The standards and labelling programme for end use appliances and equipments provides for self certification by the manufacturers based on the standards issued by BEE, STAR rating, ranging from 1 to 5 in the increasing order of energy efficiency. The scheme has been developed in collaboration with all the stakeholders, and aims at providing information on energy performance so that consumers can make informed decisions while purchasing appliances.

**The major aims and objectives of the scheme.**

Education and awareness about labels, ensuring credibility of the scheme by check and challenge testing; monitoring and evaluation of the impact of the scheme.

(iii). The Energy Conservation Building Code (ECBC)

This scheme was launched by the Government of India on 27 May, 2007. This code is intended for new commercial buildings having a connected load of more than 500 kW and has initially been launched on voluntary basis.

The major components of the building which are being addressed through the code are:

- Envelope (walls, roofs, windows)
- Lighting systems
- HVAC System
- Water heating and pumping system
Electrical distribution system.

(iv) Agricultural (Ag DSM) Scheme

Government of India approved a scheme on Ag DSM to be implemented by Bureau of Energy Efficiency (BEE), Ministry of Power. The objective of the scheme is to create appropriate framework for market based interventions in agricultural pumping sector by facilitating conducive policy environment to promote Public Private Partnership (PPP) to implement projects.

Under this scheme, based on an approved framework, the 5 states namely, Maharashtra, Gujarat, Rajasthan, Haryana and Punjab were selected for implementation of Agriculture DSM in the first phase. In the Ag DSM project, BEE is providing resources to create a shelf of bankable DPRs in the agricultural sector to mainstream the scheme.

**Phase 1:** Identification and selection of most preferred states, sub-divisions and feeders based on a framework for initial engagement of the study, engagement of consultants for carrying out the study at the areas (feeders) predetermined as mentioned above and preparation of detailed project reports (DPRs).

**Phase 2:** Implementation of the pilot project by distributing the BEE Star Rated pump sets free of cost to the farmers through PPP mode based on the business models emanating from the study conducted in phase-1.

(v) Energy Efficiency in Small and Medium Enterprises (SMEs) Sector

Bureau of Energy Efficiency (BEE) is implementing a program to improve the energy performance in the identified 25 SME clusters across the country. The objective of the program is to accelerate the adoption of energy efficient technologies and practices in
the chosen SME clusters through knowledge sharing, capacity building and development of innovative financing mechanisms.

(vi). **Contribution to State Energy Conservation Fund (SECF) Scheme**

SECF is a statutory requirement under Section 16 of the Energy Conservation Act 2001 and is one of the key elements of the ECAP. State Governments are required to constitute SECF for the purpose of promotion of efficient use of energy and its conservation within the State. About 9 States have already created SECF and this scheme would help all others to do so, while strengthening the existing SECFs. The scheme will provide contribution to SECF after it is notified by states and will be pari-passu with the contribution made by the states.

(vii). **National Energy Conservation Awards, 2009**

Ministry of Power had instituted National Energy Conservation Awards to motivate industrial units to conserve and use energy efficiency. This award scheme has been extended to aviation sector and manufacturers of BEE Star labeled appliances.

(viii). **Painting Competition on Energy Conservation, 2009**

Ministry of Power has undertaken a National Campaign on Energy Conservation, 2009. Under this campaign, a Painting Competition on Energy Conservation at School, State and National level are conducted in which children of 4 and 5 standards participate. This year, the students of 6 Standard are also eligible to participate in the Painting Competition on Energy Conservation, 2009.
Power Sector Reforms in Andhra Pradesh

Until its unbundling in February 1999, the Andhra Pradesh State Electricity Board (APSEB) was responsible for electricity generation, transmission, distribution and supply in the state. The APSEB was formed on 01-4-1959 and similar to other SEBs in the country, it had a monopoly in the power sector. It functioned under the overall guidance of the state government, interacting with the central power agencies for planning and coordination. At the time of unbundling, APSEB controlled 100 per cent power distribution and around 70 per cent of the generation capacity in the state.

On many technical aspects, APSEB enjoyed a good reputation amongst the other utilities in India – some of the features continue even now. For example, the Plant Load Factor (PLF) of State owned generation stations in AP has been much higher than the national average. Other aspects of good performance include fast erection of power stations, and low employee/consumer ratio. Though APSEB’s performance on generation side was far better compared to other State Electricity Boards, performance on distribution and financial aspects proved to be very poor.

The APSEB began incurring heavy losses in the mid 90s. Reasons for losses of such magnitude are still debated. One third of the Board’s income was going to meet interest payments. The APSEB had been increasingly dependent on the government budgetary support, which the state government found difficult to provide. High Transmission and Distribution (T&D) losses, inefficiency in metering & collection, very low tariff to agricultural consumers, changes in the hydro-thermal energy mix, and increased reliance on thermal power, change in load mix and high average cost of power supplied from private generators were some of the factors that have contributed to the
deterioration of the financial health of the APSEB. Consequently, APSEB was unable to raise finances for the required investments in generation and T&D.

In the background of the deteriorating situation on the power front and the new initiatives by the Government of India to attract private investment, the then State Government of Andhra Pradesh contemplated to restructure the power sector. As a first step, it constituted a high level Committee under the chairmanship of Sri Hiten Bhayya, a former chairman of Central Electricity Authority, to suggest reforms to be introduced in the power sector. The Committee had to review the existing policy of private participation in generation and also examine the issues relating to greater private involvement in T&D. The Committee was asked to provide guidelines and recommendations on the restructuring of the power sector, in addition to the formulation of an appropriate tariff policy. This Committee which was constituted in January 1995, submitted its report in June 1995.

The Committee considered carefully various demand projections and came to the conclusion that during the Tenth Plan period, generation capacity would need to be augmented at least by about 1000 MW every year. The Committee recommended that APSEB should be restructured on a functional basis to promote efficiency and functional specialization by unbundling the APSEB and constituting separate companies for each function. These would be wholly owned subsidiaries of the residual statutory body of APSEB.

The Committee recommended the constitution of a Regulatory Commission to fix retail tariffs and to protect the interest of the distributing licensees as well as the consumers. It also recommended that tariff should reflect costs. The Committee did not recommend outright privatization of public utilities and cautioned that substitution of private monopoly in the place of public monopoly would only make the situation worse.
The Committee felt that privatization should start initially with management contracts in the distribution business. Further steps were dependent on the working of the management contracts. The Committee suggested unbundling but important functions like licensing and regulation were to be kept with state government.

After Chandrababu Naidu became the Chief Minister in September 1995, the Government of Andhra Pradesh (GoAP) approached the World Bank for a structural adjustment loan to tide over the unprecedented fiscal crisis that engulfed the state Government. As a response to this, the World Bank brought out a comprehensive report ‘A.P-Agenda for Economic Reforms’, in January 1997, outlining its approach to reforms including power sector.

The World Bank report states, “if tariffs reflect costs and efficiency and are determined by an independent regulatory body, and distribution is privatized to reduce revenue leakage and improve collection - capital markets and private developers will react positively. To establish credibility, the initial policy measures have to be bold, making a sharp break with the past, and explicitly endorsed by the government”. The thrust of the report is towards privatization and globalization of the sector with minimal role of the state.

According to the World Bank, the root cause of this crisis “is the pervasive politicization of most decisions affecting APSEB’s operations and expansion, and the resulting lack of a commercial orientation in its functioning. This has led to evolution of an organizational culture that does not promote accountability or provide incentives to the managers and staff for performance”. Further it states that “while theoretically possible, it is very difficult to introduce, in the public sector at the state level in India, the required management and operational autonomy and performance incentives, that are essential to successfully address the fundamental issues in power distribution in India”
Hence, the Bank suggested comprehensive reforms in the power sector going beyond the recommendations of the Hiten Bhayya Committee. Some important components of the reforms proposed by the World Bank are:

- Defining a structure for the sector consistent with privatization of distribution and Private sector development in generation.
- Corporating the power utilities and ensuring that they operate without Governments’ interference.
- Creating an independent and transparent regulatory system for the sector with broad range of responsibilities including granting of licenses and enforcing them.
- Enacting comprehensive reform legislation to establish the new regulatory framework and implement the restructuring measures.
- Increasing the tariff rate to agriculture to at least 50 paise/kWh in the near term and
- Continuing to adjust tariffs to cover costs and reduce cross subsidies.

There is a basic difference between the Hiten Bhayya Committee and the World Bank in their approach to reform. Hiten Bhayya Committee’s suggestions were towards improving the performance of a sector under public ownership and management. The Bank’s approach was driven by the idea of changing the ownership from public to private in a span of 8-10 years.

Within six months of the World Bank recommendations, on 14th June 1997, the GoAP released a power sector policy statement indicating proposed policy and structural changes in the power sector. The policy statement went along the lines of the World Bank report and made similar recommendations. This marked a paradigm shift in power policy
- state ownership to private ownership, budgetary support to private capital, self-reliance
to globalization and cross subsidy to cost based tariff.

In order to give a concrete shape to this policy, the GoAP enacted Electricity
Reforms Act of 1998. The Reform Bill was introduced in the legislative assembly on
April 27, 1998 and was passed on April 28th. It was notified on 29th October 1998 and
made effective from February 1999. The Reform Act was nearly a carbon copy of the
Orissa Reform Act. With its enactment, the GoAP fulfilled one of conditionalities of the
World Bank loan.

Soon after the Reform Act, the World Bank released its project appraisal
document (PAD) for loan under the Andhra Pradesh Power Sector Re-structuring
Program (APSRP) in January 1999. The Project Appraisal Document (PAD) reflects
several conditionalities laid down by the World Bank.

The reform programme is to be implemented over a 10-years period, starting from
February 1999. The Adaptable Program Loan (APL) scheme was planned in 5 stages,
APL-1 to APL-5. The total loan amount is US $ 4660 million with World Bank
contributing 22 per cent of the amount. Interestingly, World Bank’s contribution is 36 per
cent in APL-1 and goes down to 13 per cent in APL-5. The other international lending
agencies include DFID and OECF. The Indian agencies include Government of Andhra
Pradesh, Power Finance Corporation and Rural Electrification Corporation. At each stage,
some conditionalities have to be satisfied so that the utility becomes eligible for the next
stage loan. These include privatization of distribution & generation, average annual tariff
hikes of 15-20 per cent, implementing cost based tariff and reducing government subsidy
to zero.
As per the reform time table, thirty per cent of the distribution system is expected to have private sector participation by 2002 and hundred per cent by 2007. At least one distribution company has to be privatized by the end of the financial year 2003. An investment of US$ 103 million is planned as part of the first phase of reform project in the distribution area to strengthen the distribution system, providing single-phase transformers and installing VHF based communication system.

Both the World Bank and the GoAP considered the reform in the power sector as the single most important aspect of structural and fiscal reform in the state. "The underlying broader development objective of the APPSRP is to bring about a permanent shift in public expenditure in the power sector, from a major drain on the budget to a contributor of funds for social sectors and other priority areas for public investment. This fiscal dimension links the program to the broader APERP. Taken together, APERP and the proposed APPSRP would make a major contribution to modernizing the state's infrastructure and social sectors, and they would be fundamental to the restructuring of the state's finances and for the acceleration of economic growth and longer term human development". "The power sector specific development objective of APPSRP is to ensure that by the financial year 2007, the energy requirements of the state are met, and consumers are provided with reliable, high-quality and cost-effective electrical supply by creditworthy and commercially operated power utilities, functioning in the competitive and appropriately regulated power market, with significant private ownership and participation".

The two important reasons given for restructuring APSEB were the dwindling finances of APSEB and the need to find additional resources for capacity addition. Both these two grounds are questionable. The losses suddenly appeared in the books of APSEB in 1995-1996 and from then onwards they increased each year by thousands of crore.
Nowhere justifiable reasons were given for these losses. The losses were mainly explained in terms of a substantial increase in agricultural consumption (after the introduction of slab rate in 1982) rather than major factors like theft, pilferage, underbilling, non collection of revenue, corruption and mismanagement. Both the GoAP and World Bank argued that state required an additional capacity of 8,500 MW by the end of 2002. It was estimated that a whooping investment of Rs 50,000 crore was required. As neither the APSEB nor the GoAP was in a position to mobilize resources, private capital had to be promoted in the power sector. The additional requirements of capacity are also questionable. Reform legislation was pushed through on the basis of these arguments and restructuring was undertaken as the corrupt politicians found a gold mine in it.

The APSEB was unbundled into APGENCO and APTRANSCO in February 1999. In April 2000, the APTRANSCO was further unbundled into a transmission company and four distribution companies (DISCOMs) managing distribution in four zones of the State, Central, Eastern, Northern and Southern. In March 2001, State Government signed a MOU with the Ministry of Power, Government of India on reform and restructuring which has the road map for reform, plans for tariff rationalization, metering and maintaining grid discipline. As part of the distribution sector reforms, the four DISCOMs have been issued independent licenses for distributions in April 2001.

The Electricity Reform Act provided for the constitution of Andhra Pradesh Electricity Regulatory Commission (APERC). The independent regulation is intended and designed to serve the interests of the service providers and the consumers. Prior to the establishment of independent regulation, tariff setting was subject to political whims and compulsions. Tariffs seldom covered the costs of the utility. Setting appropriate tariffs that cover cost of supply is a key regulatory function. This takes care of the interests of the service providers. In the pre-reform period, the utility was a distant entity inaccessible
to consumers. The regulator has to protect the interests of the consumers by providing a credible and authoritative interface between the consumers and service provider. The APERC started functioning since April 1999. The first tariff order was issued by the APERC on May 27, 2000. So far 7 tariff orders have been issued by the Regulatory Commission.