

## **CHAPTER-4**

### **OVERVIEW OF POWER DISTRIBUTION IN INDIA**

#### **4.1 INTRODUCTION**

With advent of liberalization in 1991-1992, several amendments were made in the policy framework of electricity sector. Almost all stakeholders of the power sector were of the view that distributing sector is deteriorating the overall performance of the power distribution business. Therefore, for sustainability of power distribution business, amendments should be made in the current reforms and policies of the power sector. Despite the strong awareness of this need, hardly any significant reforms and policies have been implemented. Ranganathan (2004) has stated that “The Electricity Act 2003 opens the door to immense possibilities in unleashing competition and trading, but at the same time opens a new area of policy risk, which it is supposed to mitigate. The act has an enabling framework to introduce competition in generation and privatization in distribution, but the homework in terms of addressing transition issue has been left undone”. As a result power sector continue to decline and resulting financial losses keeps piling up. Financial losses have grown in the last four years and companies been financed by commercial banks are under huge debts now. The estimated loss in the year 2010-11 was approximately more than INR. 40,000 cores. This forthcoming financial distress is compelling all the stakeholders to come up with an optimal solution. Our study aims to foreseen potential amendments in the current strategy framework of power distribution business.

#### **4.2 OVERVIEW OF POWER SECTOR IN INDIA**

There was a 10-15% demand supply gap in 2012 in India, resulting in tight supply conditions that have been projected to persist. Problems with existing generation and lack of investment in new generating plants are a major

contributing factor for this scenario. There is a similar critical situation in the distribution side as well. According to Ranganathan and D. Narasimha Rao (2004) reveals that electricity reforms in India had started simultaneously with economic liberalization in 1991-92, though the driving force for private sector participation in the power sector predates this. Despite aggressive reform policies in the 90s, private sector participation was moderate at best, and the financial losses and cash flows of State Electricity Boards (SEBs) reached crisis proportions. [44] The author also explains the current market rules to put in perspective the benefits of competition. The nature of the current market is residual, unregulated bilateral, overlaid on a contractually bound, bulk regulated market. As such, the liquidity will remain low unless there is a migration of the existing contracts to the market. The reduction efficiencies are limited severely by the inflexible fuel markets through regional trade. Open access will facilitate capacity expansion, primarily for sale to private distribution companies and industries, but the current rules do not contain sufficient measures to discipline costs thereof. An important benefit of trading, though, is to generate megawatts – avoided supply needs – through better utilization of existing capacity. A few of the problems are – shortage in morning and evening peak demand, electricity pilferage, high AT&C losses, high power purchase cost, old electricity network, misuse of electricity for cooking and water heating, poor metering, billing and collection. The result is Heavy load shedding. [44]

As per the policies laid down in constitution, power sector is controlled by both State and Central Government. The Electricity Supply Act has predicted that Indian power sector is controlled by three entities. SEBs are solely responsible for generating, transmitting and distributing electricity in a particular state. Initially ESA permitted Government to set up their electricity generation plants but soon after 1991, this liberty was withdrawn and several Independent Power Producers were now allowed to set their private power plants in India. Sumir Lal (2005) has carried out a Case Study of the Power Sector in India. [45] The study finds that the weakness of the Indian power reform Program is that its primary focus is on sorting out disfigurements in the

relationship between the government and power utilities by means of unbundling and regulation model. This, however, has failed to carry any credible assurance that this is bound to improve the equation between the reformed utilities and their respective consumers. Private sectors after receiving approval from State Government in the form of license were now allowed to generate, distribute and transmit electricity. The power sector of India underwent significant changes in its ownership structure, from private sector to public sector and then again to private sector. After long period of time, entities like NTPC and NHPC were established to complement the financial requirements of the Central Government. Privatization sector was opened for electricity industry to recover the gap arising as a result of expected and actual performance demonstrated by SEBs. In addition to privatization, several legal, structural, administrative actions were taken to uphold power efficiencies. The first state in India was Orissa to privatize and restructure the existing power sector to escalate the efficiency of generation, transmission and distribution of electricity. Bikash Chandra Dash and Sangita (2011) studied the impact of government reforms on efficiency, equity and services so as to identify the factors attributable to the accomplishment/failure of reforms in the power sector in Orissa. It is found from their study that the success of reforms depends not on mere change of ownership from public to private. It depends on so many factors like to what extent the stakeholders involved in the process are benefited and how the institutions implement the policies in reality. Electricity business was sub-divided into three distinct units: Generation, Transmission and Distribution. Renewable alternative sources of energy that can be used to generate electricity were identified. Consequently, to ensure efficiency gains several other steps were taken. Studies of efficiency in electricity generation typically either determine how far individual plants (or electric generating units [EGUs]) are from the production frontier (Knittel 2002; Shanmugam and Kulshreshtha 2005; Singh 1991) or examine variation across plants in various performance measures, such as operating heat rate and plant availability (Joskow and Schmalensee 1987). For instance, Revenue Improvement Action Program (RIAP) was introduced to reduce non-technical power losses. The function of distribution

was transferred to private players. In the year 1991 Central Electricity Authority, computed fixed amount of tariffs for all generating companies and RBI legalized 100% FDI in power sector. After commencement of Electricity Regulatory Commission Act in the year 1998, CERC and SERC were formulated. And finally in the year 2003, Electricity Act brought about a revolutionary change in Indian power industry. Much of this literature, which is summarized by Jamasb et al. (2005) and by Khanna and Rao (2009), focuses on the impact of privatization on performance and uses cross-country panel data.

#### **4.3 EVOLUTION OF POWER DISTRIBUTION IN INDIA**

Electricity Act 2003 governs the Power utility business in India. Soon after breaking up of monopoly of State Electricity Boards, power sector reforms were introduced in India. Further emphasis was laid down on the reduction of the AT &C Loss. In order to build up the utility infrastructure there was a great need of capital and for those private and other forms of new investment was necessary. A reduction of cross subsidy was also emphasized.

In order to enhance the efficiency in the generation sector De-licensing of the generation was done. Open Access in Transmission and Distribution was introduced. Further trading and markets, de-licensing of rural distribution. Global experiences show that while reforms in the developed countries were undertaken to reduce costs and to improve the efficiency of existing utilities, in developing countries efforts to reform the electricity sector have been primarily because of financial losses of state run electricity utilities, availability of private financing and the available ideology of electricity restructuring (Dubash, 2005; Blumsacket al, 2005)

Establishment of norms for transparency and public participation, formation of CERC and SERC was done. The roles of the State Governments, Regulators and Licensees were redefined and mandated. For addressing the issues of the consumers the Consumer Grievance Redressal Forums, Appellate Tribunal was established.

Some of the key features of EA 2003 are as follows:

- Breaking monopoly of State Electricity Boards and promoting competition / trading
- Emphasis on AT &C Loss reduction
- Attracting new investment
- Reduction of cross-subsidy
- Competition for increasing efficiency (mostly in generation)
- De-license Generation
- Open Access in Transmission, Distribution
- Promote trading and markets
- De-license rural distribution
- Establishes norms for transparency and public participation
- Formation of CERC and SERC
- Re-defined role and mandate of State Governments, Regulators and Licensees
- Establishment of Consumer Grievance Redressal Forums, Appellate Tribunal

Some other policies which influence the Power Utility are as follows:

- National Electricity Policy - February 2005
- Tariff Policy- Jan 06 (Amendment – Mar 2008)
- National Rural Electrification Policy - Aug 2006
- National Electricity Plan - Aug 2007
  - Rural Electrification –RGGVY Apr 2005
  - Urban Distribution: R-APDRP July 2008
- Generation
  - Power-Demand to be fully met by 2012
  - A part of new generating capacity (say 15%) may be sold outside long term Power Purchase Agreements (PPAs)
- Transmission & Distribution
  - Development of National Grid
  - National and State level Open access to be facilitated

- Demand side management

Some of the Key highlights of Indian power sector reforms are

1. New Tariff Regulations
2. RPO-Renewable Power Obligation
3. Different distribution models
4. Development of Power Markets
5. NERC/SERC/AT-Regulator
6. Unbundling of Electricity Boards
7. Open access
8. APDRP and RAPDRP
9. AT&C Loss
10. NRLDC and SLDC
11. Automation for Power flow monitoring

Based on the study of Power sectors reforms the issues which would address the Power Utility business are

- Integration of Renewables: In order to reduce the power purchase cost, Renewable generation needs to integrate. Government had mandated RPO for all the distribution utility for using certain percentage of the total consumption through renewable.
- Open access: Carriage and content. Competitiveness creation by provision of Open access to consumers above 1MW load.
- Technology adoption for AT& C Loss reduction and for Reliability Improvement
- Effective Regulatory Mechanism by providing Cost reflective tariff.

#### **4.3.1 DISTRIBUTION UTILITY MODEL IN INDIA**

Post-independence, State Electricity Boards was the only governing institution responsible for growth and development of electricity sector in India. SEBs was solely responsible for laying down transmission lines and augmenting the overall generation capacity of the country. But, poor managerial infrastructure

and increased interference of government didn't enabled SEBs to augment the generation capacity to a significant amount. The situation was worsened to an extent that NTPC and NHPC were launched with a view to utilize thermal and hydro power for generating electricity. Deteriorating performance of SEBs, initiated several Independent powers to make investments into the electricity sector. An important part of Electricity Act was provision of open access, for direct sales to consumers. With this view, state electricity board was replaced with unbundled utilities for a shorter duration of time. APDRP was started to provide grants to state government. Unbundling and privatization has only been implemented in Orissa and Delhi. The planning Commission of India has forecasted the capacity addition of 88,537 MW for the 12th Five Year Plan on an all India basis. Though, escalation of generation capacity is likely to shorten the bridge between the demand and supply by the terminal year of the 12th Plan (2016-17). But this requires a huge investment of Rs. 15016660 mn, to exploit conventional sources to its full potential. This level of investment is not conceivable without the dynamic involvement of the private investors. There is a need to create an enabling environment for attracting the private investors. Generally privatization is used as a means by different economies for different reasons which include resource mobilisation, enhancing efficiency by promoting competition and for achieving commercial orientation. Ritu Anand (2009) et al stated that the electricity distribution franchisee (DF) arrangement is based on principles of 'Public Private Partnership' (PPP) wherein specific functions for a demarcated area within the total licensed area of distribution is franchised out by the distribution utility to a private sector entity, while the state retains the ownership of assets. In the initial years, such an arrangement was restricted to outsourcing of functions such as billing, collection and repair & maintenance (R&M) of transformers. There is empirical evidence of gains from privatization of the distribution segment of the Delhi Vidyut Board, the State Electricity Board of Government of the National Capital Territory of Delhi. A two percentage point Aggregate Technical and Commercial Loss (ATC) reduction above the target would increase ROE by approximately 7 percentage points. [46] Additional revenue would contribute towards reducing consumer tariffs and increasing revenue to

the State government of Delhi (Patel and Bhattacharya, 2009). The challenge lies in privatization in distribution of electricity to improve the quality of service in rural areas (Patel and Bhattacharya, 2009). Dr. Abhaya Kumar Panda et al (2011) mentioned that Distribution Franchisee is the only alternative for the Revenue Sustainability of the Electricity Distribution Utility and the role of the SHGs in the mixed model of Collection Based Revenue Franchisee, vigilance and enforcement activities backed with the awareness drive of use of electricity amongst the rural consumers economically shall be one of the driving force in cutting the AT & C Loss resulting the overall economic growth of rural India. The participative arrangement of utility-government-consumer in the Electricity Distribution can address the revenue sustainability and justify the Reform

#### 4.3.1.1 COMPARATIVE ANALYSIS OF VARIOUS DISTRIBUTION UTILITY MODELS

Table 4.1: Comparative Analysis of Distribution Utility Models

<b>Parameters</b>	<b>Distribution Franchisee</b>	<b>PPP Model</b>	<b>State Electricity Board</b>
<b>Term of agreement</b>	Fixed term for 10/15/20 years. Extension might be challenging since input rate is determined only for the term of the agreement.	Proposed for a term of 25 years. Provision for extension by 10 years. Being a SERC regulated entity, extension is expected to be smooth.	No such terms. Run by respective state Government
<b>Choice of area</b>	Easier and flexible to configure any potential area into a proposed area for franchisees	Easier and flexible to configure any potential area into a proposed area for franchisees	To be operated in respective state only.
<b>Responsibility</b>	Power Purchase optional, Capital expenditure, O&M ,All revenue cycle activities, Customer handling	All responsibilities as a distribution licensees	All responsibilities as a distribution licensees



<b>Regulatory recognition</b>	Franchisee is answerable only to the licensee	Concessionaire to assume the role of a licensee and shall be regulated by the respective SERC	Regulated by SERC and Respective state government
<b>Ability to terminate in events of default</b>	Licensee free to terminate DF contract at any pint	Government may terminate concession agreement in event of default	No such termination as it is run by respective Government
<b>Binding efficiency improvement targets on private player</b>	Licensee sets targets at the transaction stage. The model isolates the licensee from the actual efficiency levels once the input rates is determined through the competitive bidding process	Binding targets may be agreed at the transaction stage itself.	No targets defined.
<b>Employee handling</b>	Employees have the option to work for the Franchisee or remain with the licensee	Existing employees transferred to new licensee but benefits remains as per the previous role, Option for Voluntary retirement may also be given.	As per Government regulations
<b>Method of remuneration</b>	DF earns margin between input rate and retail tariff. Franchisee margin/return is unregulated	Regulated returns as may be approved by the regulator	Regulated returns as may be approved by the regulator
<b>Power Purchase/Energy input</b>	Energy input to be arranged by the licensee. Provision for additional purchase by the franchisee	PPAs to be assigned to the concessionaire/SPV for the specific area	PPA are arranged by State Government

<b>CAPEX</b>	Franchisee to meet the minimum specified capex during the initial years of operation (generally the first 5 years). Investment likely to diminish with the maturity of contract due to the reducing ROI	Concessionaire to make investments during the initial years in line with the terms of the concession agreement subject to the regulatory approval. Capital investments is expected to continue over the term of the agreement as the concessionaire would continue to earn returns on the same subjected to regulatory approvals.	CAPEX is allowed as per the regulatory approval and needs of the society.
<b>Political acceptance</b>	Medium	Low	High

#### 4.3.1.2 COMPARATIVE SUMMARY OF THE THREE MODELS

**SEB:** High Financial Losses., average AT&C losses to the tune of 25-30%, union problems and Political Interferences, shortage of power –demand supply gap- and power procurement issues

**PPP:** Declining profit, huge gap in ARR and tariff fixation- need of cost reflective tariff, huge regulatory overhang, steep rise in operational debt of private utilities, capex approval from regulator, financial support from state

**Franchisee:** Absence /Minimum Capex-Least network improvement, no authority of power purchase, lack of ownership, lack of Government support for enforcement and revenue collection, suffer to meet the target set for AT&C loss reduction, no fixed return and profit based only on the collection efficiency.

#### Key Findings of the three Models

1. Although all the State Power Utilities are unbundled, distribution Companies are making huge losses and compelling Government to meet the revenue gap.

2. After detailed study by Shunglu committee a new model of Power distribution franchisee came up in Maharashtra, MP, Orissa since 2008 but all franchisees except Bhiwandi are making losses and prove to be a unsuccessful model.
3. PPP model was implemented in Delhi and seems successful but there are issues of Transfer of Assets and Employee.

#### **4.3.2 SHUNGLU COMMITTEE REPORT:**

##### **4.3.2.1 SHUNGLU COMMITTEE REPROT ON FRANCHISEE MODEL**

- The accrued losses for the preceding 5 years is INR.1,79,000crore before subsidy and Rs. 82,000 crore after subsidy. For the year 2009-10 alone, the financial loss of all distribution companies is INR.57,000 crore before subsidy and about INR.27,000 crore after subsidy. [47]
- According to Shunglu Committee Report, distribution companies were bearing huge financial losses because of their weak managerial and operational structure. However, this fragile managerial structure of distribution companies coupled with illogical tariffs, imposed by regulators is yet another problem.
- The Panel has suggested that the SERC should be made a self-governing body. The Chairman and Members of Electricity Regulatory Commissions are required to be competent enough. An expert group is required to inspect their overall functioning to confirm that Commissions have fulfilled their duties like timely and regular revision of tariffs.
- The Panel has advised that areas experiencing huge transmission losses Commissions should impose an additional charge, over and above the basic tariff.
- Financial losses of Discom's have been substantially funded by several commercial banks. Large parts of such loans have been approved by State Governments. The Report has recommended that loans are subject to be rescheduled on account of measures listed in

concessionaire agreement. In case State government fails to fulfil the rescheduled commitments, such assets should be taken away from the banks and placed with the Special Purpose Vehicle (SPV) to be set up for the purpose. The SPV should be owned by the Reserve Bank of India and shall be empowered to suitably deal with the defaulting utilities/State Governments including debiting of State Government accounts. [47]

- Introduction of Franchise model in more than 255 towns is recommended in the report. Electricity Act 2003 proposes a judicious use of electricity in section 108. The subsequent section encloses policies pertaining to cautious use of electricity accounting of all consumers.

#### **4.3.2.2 SHUNGLU COMMITTEE REPORT ON PPP MODEL**

- The success and legality of privatization model are demonstrated in Bombay High court Order and Bhiwandi case.
- Franchisees are answerable to licensees who further are answerable to SERC's.
- Torrent Power has completed 1 billion of CAPEX in Bhiwandi every year and DF was capable of completing capex.

#### **4.3.2.3 VIEWS OF SHUNGLU REPORT OVER PPP MODEL**

- PPP model would lead to tariff anomalies in the states. It will lessen the count of participating companies. This will further deter the competitive environment of electricity market and the coerce extra burden on Government in the form of capital support
- With rising tariff anomalies sharing of assets between private players and government is a confusing state-of-art.

#### **4.3.3 B K CHATURVEDI COMMITTEE REPORT**

##### **4.3.3.1 CHATURVEDI COMMITTEE REPORT ON PPP MODEL**

- The Report recommends that PPP distribution model is aligned with reforms of Electricity Act 2003. The report also suggests that

concessionaire chosen from available supplier choices is accountable for operating, preserving and improving distribution network.

- The Panel recommends that PPP models should incorporate enough flexibility to the concessionaire to solicit the amount of power required from market.
- The panel was of the view that PPP model solicits inadequate resource funding from commercial banks and sustainability gap funding from governing authority.

#### **4.3.3.2 VIEWS OF CHATRUVEDI REPROT OVER DISTRIBUTION FRANCHISEE (DF)**

- Privatization model is not adequate enough to induce or gather sufficient capital investment for future power grid projects.
- It was unable to deliver quality and quantity demanded. The distribution model failed to sustain competition and take advantage of Open access.
- The model failed to confirm the financial stability of the sector.
- Legal framework imposes restrictions on power purchases.
- DF is outside the purview of SERC as they are not required to get distribution licensee.

#### **4.3.3.3 SUBGROUP REPORT**

- As per the subgroup neither the DF Model nor the Privatization (Delhi model) would proclaim the desired result.
- Subgroup proposes a systematically developed PPP model which should be aligned with Electricity Act-2003. Under PPP model, distribution is a licensed business and needs to seek approval from SERC for safeguarding and protecting the interests of consumers.
- The concessionaire is given the authority to make prohibited use of Distribution assets but still the possessions of proprietary rights remain restricted with the government.

- The concessionaire has the liberty to obtain over and above power by embarking into new PPA along with existing Power Purchase agreements which were transferred.
- The supplier and consumer bilaterally determine the supply tariff in correspondence to section 49 of Electricity Act 2003, in case of Open access.

#### **4.3.4 INTEGRATED POWER DEVELOPMENT SCHEME**

- Intensifying Distribution network and Sub-Transmission mode in metropolitan cities.
- Assessing or calibrating distribution transformers /Consumers/Feeders in urban areas.
- Intensifying distribution function by incorporating IT enabled services in the distribution sector as approved by CCEA.
- Provisioning of Solar Panels.
- Integrated Power development scheme aims to provide financial assistance to both State Power Departments and private sector Discoms.
- Scope for appointment for Project Management Consultancy for Monitoring and ensuring timely implementation of the Project.

#### **4.3.5 AMENDMENT IN ELECTRICITY ACT**

1. With commencement of Electricity Act 2003, consumer is liable to choose the supplier from available options at his own will. The concept of Multiple Distribution license was launched to liberalize consumers to choose the best efficient supplier as per their needs and requirements.
2. Modification of Electricity Act provides suggestions on segregation of content and carriage business. The wire business is possessed by some companies and other electricity distributors and suppliers are only liable to pay a specified fee to them.
3. Proposed amendment made it mandatory for power generating and distributing companies to favourably revise the electricity tariff to

overcome financial losses from end consumers. If the supplier does not make necessary changes in electricity tariffs as laid down by the Commission, the governing body is allowed to do so at its own direction without seeking permission from distributing companies.

4. Inter State open Access- According to this scheme, a state is allowed to sell the excess of power generated by a particular state, to entities outside it.
5. The amendment recommends that the supervisory commissions can start Suo-Moto procedures to control the rate in case a utility/generating company doesn't file its petition on time. This will permit supervisory commissions to plan action to be taken for determining revised tariff amount.
6. It proposes the fact that Central Government has an authority to charge an overblown penalty of INR. 1 Crore from entities that tend to violate the rules and policies stated by Electricity Act.

#### **4.3.6 CONTENT AND CARRIAGE**

Carriage - As the word suggests – Carrier of Electricity i.e. Wires Business (includes maintenance of distribution network up to the consumer meter)

Content – Providing end services to consumers i.e. Retail Business (includes procurement of power, metering and billing of consumers)

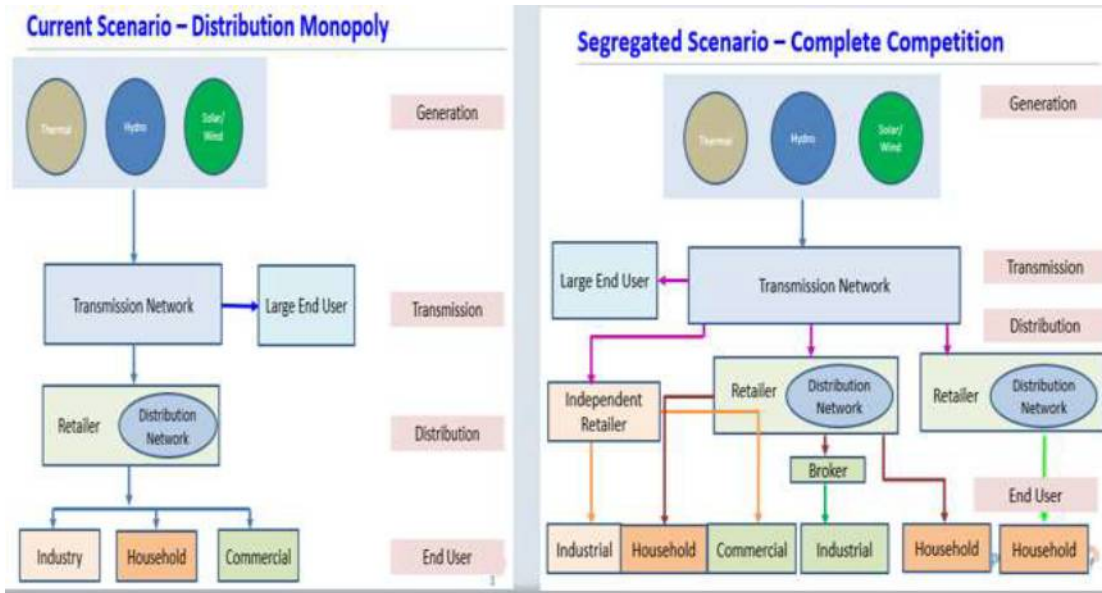


Figure 4.1: Content and carriage scenario

#### 4.4 POST REFORMS CHALLENGES OF POWER DISTRIBUTION UTILITY IN SUSTAINABILITY POINT OF VIEW

##### 4.4.1 POWER PURCHASE COST

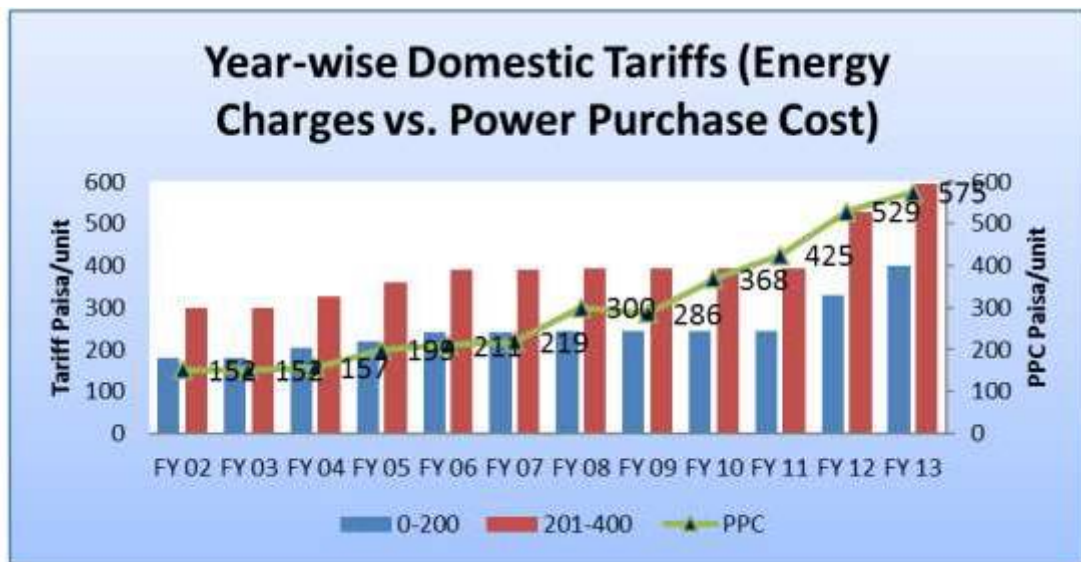


Figure 4.2: Tariff vs. Power Purchase Cost (Source: TPDDL report)



#### 4.4.2 AT&C LOSSES IN VARIOUS UTILITIES AND ITS IMPACT

Even though Utilities were trying to reduce the loss level still there is a scope in reducing the AT&C Loss.

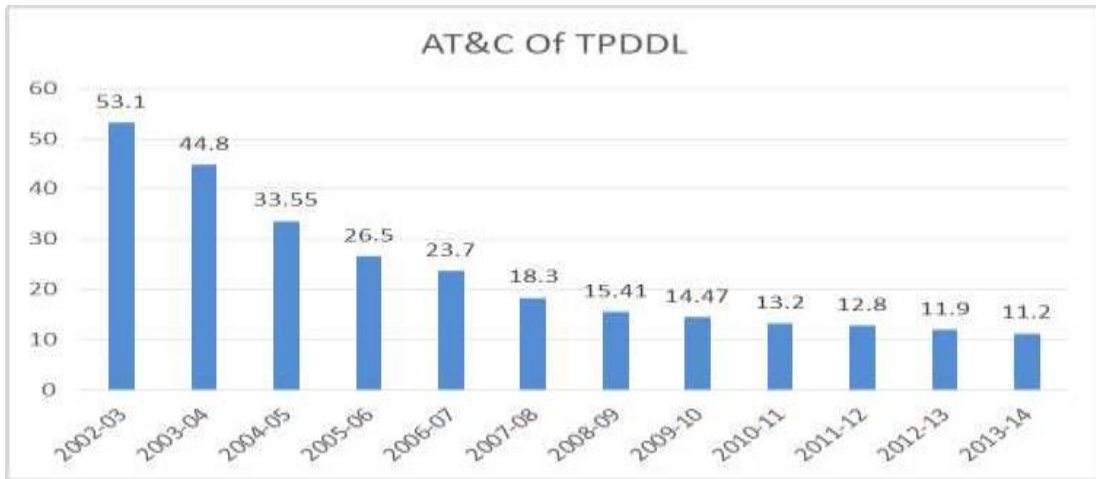


Figure 4.3: Aggregate Technical and Commercial loss of TPDDL

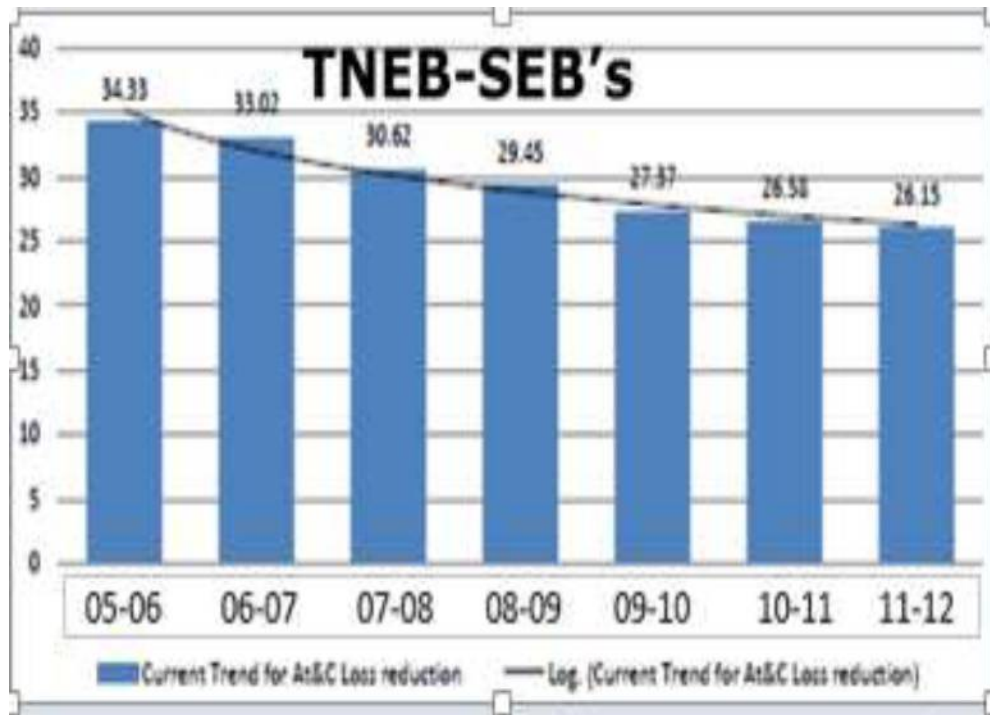


Figure 4.4: Tamil Nadu Electricity Board –State Electricity Boards

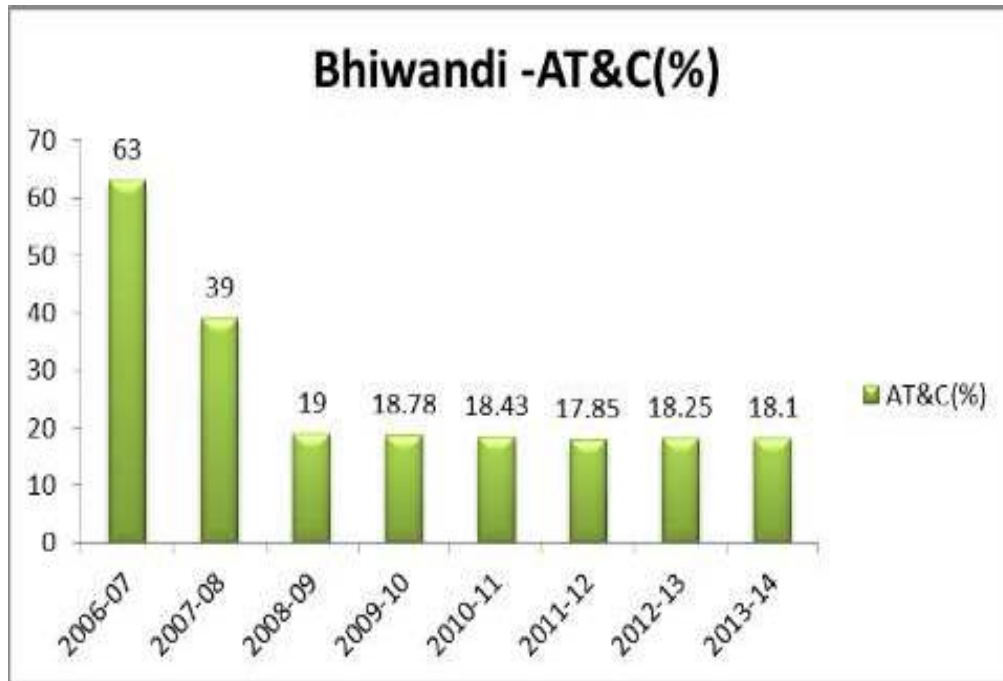


Figure 4.5: Bhiwandi – Aggregate Technical and Commercial loss (%)

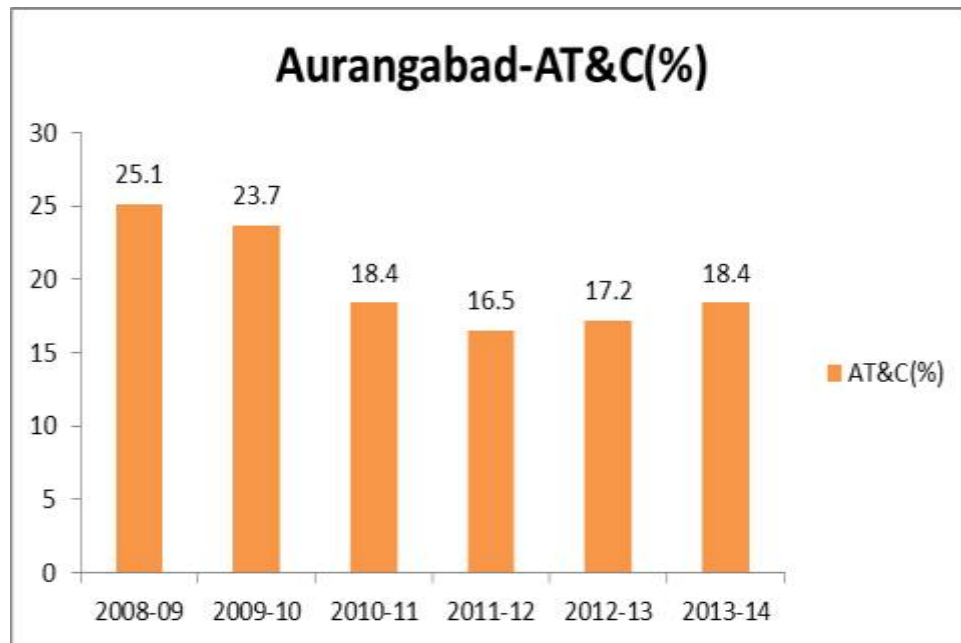


Figure 4.6: Aggregate Technical and Commercial Loss of Power Utility (Source: CEA Report)

#### 4.4.3 TARIFF DETERMINATION AND REGULATORY OVERHANG

##### *Regulatory Overhang*

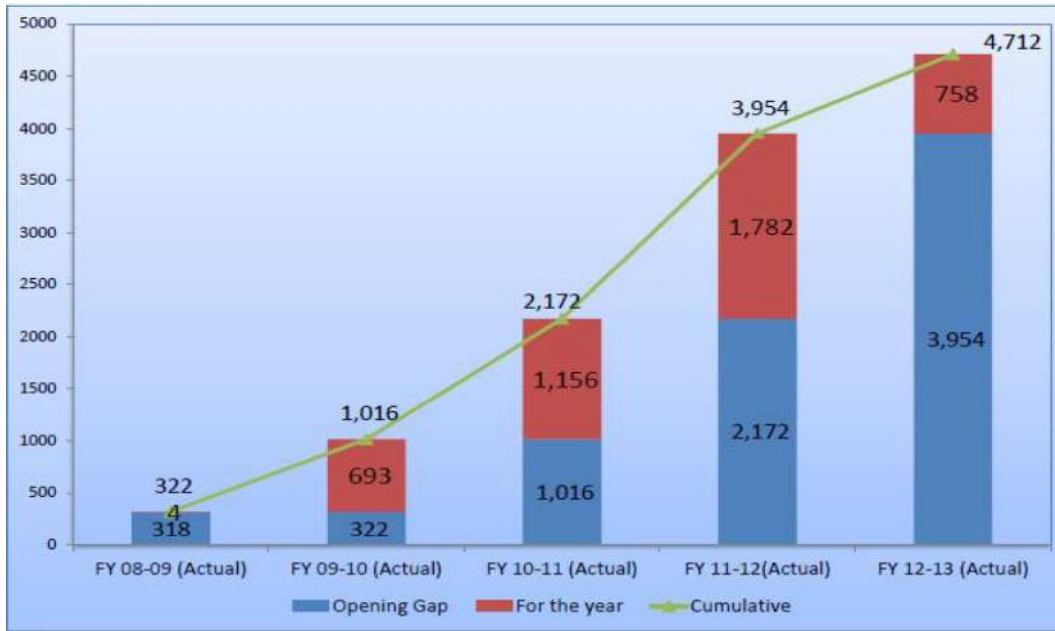


Figure 4.7: Regulatory Overhang

- The shortfall in the Company's revenues billed at current tariffs & those chargeable by it to its consumers based on costs incurred during the year is termed as **Revenue Gap** in Regulatory Parlance.
- Recognized as **Income of the Current Year** on basis of accrual system of accounting which requires revenues to be recognized in the year to which they pertain, even though realisable in future, so long as the same are quantifiable and there is certainty of ultimate recovery.
- The outstanding Revenue Gap recoverable from future tariffs is termed as **Regulatory Overhang**.

## 4.5 PROGRESS IN POWER SECTOR

### 4.5.1 TECHNOLOGY INTERVENTION FOR PERFORMANCE IMPROVEMENT

Restructuring of electricity power industry has an influential impact on energy market. In order to fulfil the ever increasing demand and gain competitive edge over rivalries, electricity providers need to focus on quality of electricity that it delivers in addition to the quantity. Previously, electricity was directly supplied from supplier to the consumers but after deregulation, electricity is

swapped at several places right from generation to distribution, before it actually reaches the consumer to ensure power quality is delivered. Ministry of Power (MOP) and other various agencies like CEA, NTPC, State Electricity Boards, CBIP etc. have taken several steps to improve the operating efficiency and PLF of power stations like exploring large sized units to add to the overall generation capacity, installing tower type boiler for adding approximately 201 MW, setting up demonstrations projects for exploiting the benefits that can be derived from IGCC technology etc. Integrated grid operation which required the normalization of frequency across all five Regions in the country has been achieved through proactive load management by beneficiaries and dispatch discipline by generators. To deal with several non-technical losses, India adopted a six level intervention strategy, to make power distribution sector financially viable, convert unmetered connections to metered connections, consumer satisfaction, revenue collection, energy conservation etc.

#### **4.5.2 DEMAND SIDE MANAGEMENT**

As per the CEA estimates, anticipated power demand is going to increase from ~775 BU to ~1400 BU by 2017. The major motivation behind this increasing demand is rural electrification, economic development, developing electricity infrastructure (grid reliability, distribution access etc.) and fulfilling demand-supply gaps. India is making sincere efforts to improve efficiency and add value to the existing capacity of power sector. 80-85 GW is likely to be installed to further increase the generation capacity. The average PLF of generation capacity is likely to exceed from ~56% to ~61-63% by 2014-15. Several other advancements aims to enhance the capacity of transmission lines and voltage lines, to reduce AT&D losses.

#### **4.5.3 ROLE OF SOCIAL INITIATIVES LIKE CSR FOR PERFORMANCE IMPROVEMENT**

According to the *Shunglu* Committee, India ranks among those countries having the highest levels of AT&C losses, and according to recent findings these losses are to the tune of INR 72,000 Crores. Approximately 5% of the AT&C losses (estimated to be about 30%), which equates to more than over

INR. 10,000 Crores, is attributed to the rampant electricity theft through hooking from bare network in the slum clusters. Along with the losses, this is a safety issue for the residents as well, and a social concern to the power utility. Be it be housewives, students, offices, small businesses like flour mill, fabricating workshops, all sections prevailing in the existing society are infected so adversely that situations are going to worsen if corrective remedial actions are not taken immediately. Rising number of electricity cuts is the reason behind rising frustration. Provision of electricity in slum and rural areas is further deteriorated.

#### **4.5.3.1 VARIOUS SOCIAL PARTICIPATION REFORMS BY TPDDL**

Prolonged continuous efforts of TPDDL has not only reduced transmission losses from 52% to 15% in 2009 but also has brought significant changes in the number of reported cases of electricity theft. Still more than 80% of population base is deprived of electricity and other necessity resources. Politicians need to pay attention on these under-privileged sections of society to fulfil their basic needs.

Brijesh Bhatt (2012) et al stated that the distribution sector, the major objectives of the reform were to restrain the huge distribution losses, improve the technical performance of distribution networks and increase private participation. An analytical framework based on Institutions of Sustainability and socio-technical system is presented to analyse the technological change in the distribution sector with the institutional change. The electricity distribution companies are key factor in the analysis and factors affecting their decisions regarding the choice of energy efficient technology adoption in the distribution networks.

A survey was conducted by TPDDL to bring about a revolutionary change in current situation of people belonging to slum area and as a result following needs were recognized:

1. Education Services.
2. Health Services.
3. Provision of Livelihood opportunities.

An innovative business model was formed by TPDDL to deal transmission and distribution losses of electricity in slum areas. Aligning business strategy with corporate social initiative is the motivation behind formation of this business model. A Special Consumer Group was formed to provide these customers with affordable range of electricity. Thereby dropping the number of reported cases of electricity theft and strengthening their Capacity to pay by expanding their income source. A radical change was brought in the overall mind-set of the consumers, cultivating the need for consumers to a considerable pay for the service they receive rather than engaging in fraudulent cases. The corporate sustainable activities aims to boost the financial viability of the under privileged section of the society and in return raise their standard of living. Some of the activities include free medical facilities, vocational courses, education of children through scholarships and remedial education across School College and professional institutions, drug de-addiction camps, enhancing household income by training women in and supporting. As a result the model helped in developing close empathy with the miserable situation of slum dwellers.

Various initiatives taken by Special consumer group of utility specially operating in Slum area were:

#### ***Affordable Metered Connection***

Safe electrical networks were developed and maintained thus reducing options for hooking. TPDDL reduced the charges for new electric connection to bare minimum and that too with the facility of easy interest free instalments. Special consumer group has been charged INR.350 (plus 24 instalments of INR.50 each) as against INR.4200 charged from other consumers.

#### ***Political relevance***

Special camps have been arranged in the localities to ease the process of new connections. Bare minimum documentation has been done including a written recommendation letter from local MLA or Member of Parliament.

Connections were provided on the same day but keeping safety at first priority.

This empowerment and involvement of Politicians have garnered their wholehearted support for initiative with increased sense of responsibility towards government and society.

Some other initiatives that were taken to escalate the process of affordable electric connection includes

1. waiver of outstanding dues
2. Providing free Accidental Insurance Cover of Rs.1 lac with new connection.
3. Indexing of consumers in GIS.
4. Simplifying document requirements.
5. Customizing meter reading and billing.
6. Spot billing for instant bill delivery and resolving clarification if any.
7. Fixing bill payment dates with pay days of residents

These initiatives also helped much to promote the residents to use authorized electric connection.

Activities of Franchisees include the following to ensure proper operation:

- a. Encouraging consumers to get legal connections.
- b. Improving collection in area of operation.
- c. Motivating slum dwellers for taking advantage of TPDDLs CS initiatives like drug de-addiction camps and Mobile health check-ups.
- d. Act as bridge between TPDDL and consumers for improved services and complaint Redressal.
- e. Vocational training programs for slum dwellers in Trades like Electrician and Plumbing, beauty culture, tailoring and stitching for ladies and computer training.
- f. Scholarships to students of Govt. schools to eliminate drop outs.
- g. ALCs to impart functional literacy to resident women of JJ Clusters & resettlement colonies through Computer Functional Literacy Program of TCS.

- h. Tutorial classes for Class VI & VII for the needy students.
- i. Provide access to quality medical services and support through Mobile Dispensaries.
- j. Organizing Camps through mobile vans for drug de-addiction.



Figure 4.8: Social Upliftment Model

***Benefits of the reforms***

The reforms and policies of Tata Power Delhi Distribution Ltd. were able to bring about a radical change in socio-economic condition of under-privileged section of the society. Thus reconstructing their financial position and helping them pay for their livelihood. This regular payment of electricity charges will help power sector in overcoming their financial losses. On the whole customer satisfaction index for Special Consumer Group is illustrated in the figure below:



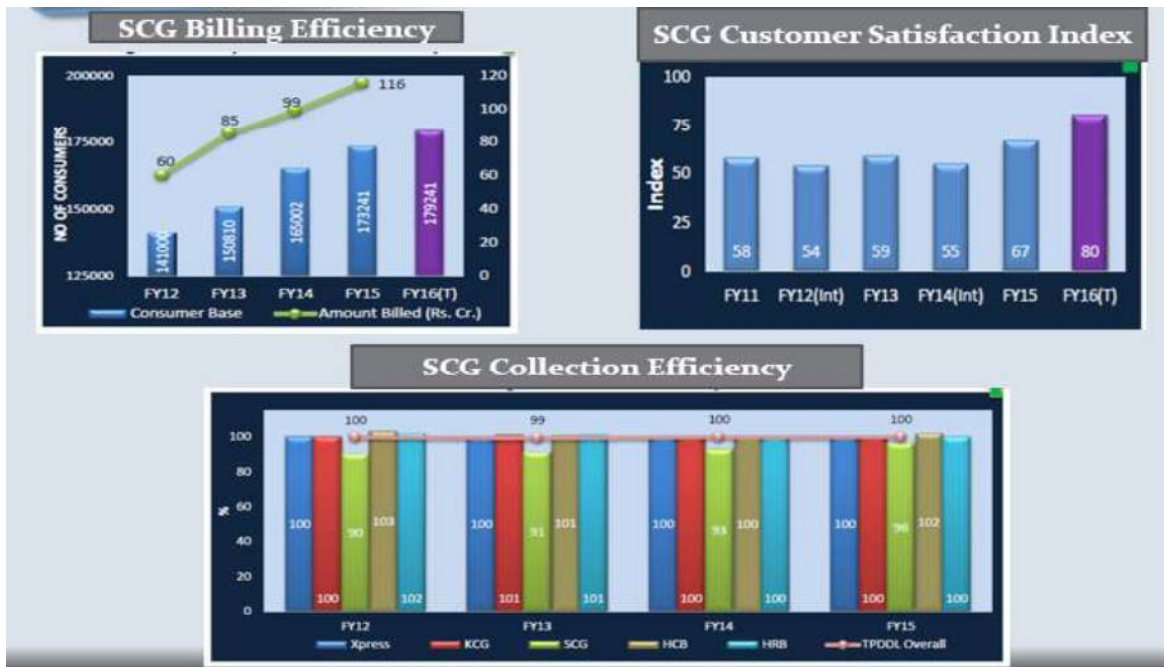


Figure 4.9: Efficiencies of SCG

Seeing the advantages of authorized legal connection on state utilities, several Power Finance Corporations are radically switching to adopt the same from TPDDL to overcome issues of transmission losses.

### ***Increase in employment***

The vocational trainings imparted to under-privileged section of the society have enabled slum dwellers to earn decent jobs for themselves. Mehndi centres, Handicrafts, beauty-parlours have opened wide scale opportunities for slum dwellers who were formerly unemployed.

### ***Reduction in crime rate***

The majority of population living in major portion of JJ colony was unsafe because of less job opportunities available there. In order to learn for their livelihood youth were dependent on money obtained from several illegitimate activities ranging from thefts to property vandalism etc.

With increasing employment opportunities crime rate has dropped to a substantial rate. Therefore, companies are striving hard to boost the performance of power generating companies by reducing AT&D losses and Load shedding by intelligent application of Socio-political alternatives. Power

utility companies aims to come with sustainable solution to fulfil basic needs of its consumers and develop a sense of belongingness in the minds of consumers

Empowerment models and social participation, both were initiatives taken by power distribution companies to deal with issues like instable political situation, complex social environment, financial instability and shortage of power. This will not only transform the financial position of power utility business but will also improve the social environment wherein people will willingly participate to come up with harmonious solutions rather than struggling with political environment.

#### **4.5.4 CUSTOMER SATISFACTION**

Evaluating components of customer's satisfaction is important for electricity sector. Demands have grown over the succeeding years, but still supply is not efficient enough. The load shedding is done in many areas and the DISCOMs exert a lot of pressure on the regulatory body to increase the price. Privatization of power reforms has strengthened. Energy efficient sources of electricity are identified. Quality of service needs to be addressed. In order to support efficient power usage by customers, tariffs needs to be revised on account of smart meters. Smart Grid vision for India is an initiative to revolutionize electricity supply to Indian consumers and developing robust and secure electronic infrastructure.

#### **4.6 SUMMARY**

The power sector is a vital component in the industrialization and urbanization of India, the major concern being the high input costs. It is the stepping stone in minimizing the disparities between the urban and rural sectors by enhancing availability of inexpensive commercial energy. The power sector will continue to play a pivotal role to facilitate high growth in the economic sector. Appreciable progress has been made by the Indian power sector in the last decade and it has grown from a nascent market to a developing market led by policy reforms and an increased participation from the private sector. The

Indian power market is substantially dissimilar from power markets elsewhere in the world; its very nature poses unique challenges in the development of the market and the product as well. Challenges do exist in the sector, which need to be overcome for the transition from a developing market to a matured market. In consideration of the issues highlighted above, significant and substantial work still needs to be done on the part of regulators and other stakeholders to ensure smooth functioning of the power sector value chain. Energy storage is of critical importance, and it is essential to invest in such technologies for the Management & Marketing order to fully utilize the potential of RE generation. Further, smart grid should be explored for better reliability and efficiency, with the possible integration of RE and alternate energy sources. The usage of renewable energy sources including the likes of pump storage, geothermal, biomass and hydro is on the rise. Additional generation capacity from renewable variable sources, such as wind and solar energy can be added to improve the efficiency of power value chain in India. India's requirement of electricity in the long run would be to the tune of 3870TWh by 2030 which implies CAGR of 7% from 2005-30. According to McKinsey report (2008), an investment of US\$600 billion would be required across the value chain to meet India's growing power demand. This would lead to avenues of significant and rewarding opportunities across the value chain including but not limited to the setting up of group captive plants, investment in over-sized captive plants by players in process industries, resource holders could consider integrating forward to realize higher prices for their resources, capacity expansion would lead to power trading on a more regular basis since volumes are increasing tremendously irrespective of prices and it can provide the opportunity of creating a permanent revenue stream. The private sector has emerged as a strategic participant in both conventional and renewable power, and more so in other parts of the business. Positive future outlook of power sector also provides an opportunity in terms of expanding current capacity or fully fledged entry into power sector given that they have considerable expertise in power sector. In addition, there will also be demand for turnaround specialist; futures trading is also expected to take off hence that will open up another window of opportunity. Notwithstanding

the many openings which would arise, there would also be several inherent risks in the power sector like uncertainty of key regulations and potential failures in the market. It is vital to recognize and proactively manage these risks. Hurdles across the value chain, along with committed fixed tariffs will lead to risks in the project execution. There would be a need to develop business models which can leverage opportunities across the value chain and overcome key risks associated with the Indian power sector in order to create a sustainable effect. If successful, India's power sector would be able to fulfil its ambitious target of "electric power for all".

#### **4.7 CONCLUDING REMARKS**

The current chapter briefs about the need for conducting the study, the history of power distribution business in India. Overview of power sector reforms in India is discussed in detail. Key issues are highlighted in the preceding section, that power sector should focus on for sustainability. The chapter discusses several advancements made to fulfil the demand-supply gap in power sector in India. The implementation of standardized reform model engendered pressure for revenue capability. After commencement of Electricity Act 2003 and recapitalization of State Electricity Boards, power sector of the country has radically changed and India has made considerable progress in enhancing power generation capacity of the country, thereby making electrifying major portion of the country. Since power sector of the country relies upon coal availability, the company is facing challenge in managing depleting sources of energy. Gathering required quantity and quality of coal and natural gas for production of electricity is a major challenge for the company. Securing fuel supplies, financing sources is yet another challenge. The reforms had negative impacts on distributive function of power sector because high prices restricted poor consumers or slum dwellers to take benefit of enhanced service being provided. Privatization is a move towards a competitive landscape which possesses difficulty in discovering competitive tariffs.