ECONOMIST REPORT

National Competition Policy and Economic Growth in India – Electricity Sector Study

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SUBMITTED BY

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SUBMITTED TO

Consumer Unity & Trust Society

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I. Executive Summary

Competition is increasingly understood to enhance production, efficiency, and consumer welfare in almost all sectors of economies across the world. Policymakers also seem to embrace competition as a process by which the most productive firms win. Over the past few years in India, industries such as telecommunications, pharmaceuticals, and automobiles, have had to adapt to competitive market discipline—and consumers have benefited in terms of choice, price, and product satisfaction.

Historically, India's industrial sector has been controlled by the government. This resulted in monopolisation of some sectors by publically owned companies, and the propping up of public sector undertakings under the soft budget constraints of the government.[1] Realising that the costs of this protective regime – subsidies, lack of consumer choice, and inefficiencies — outweighed benefits, the government began in the early 1990s to open some sectors to competition. Until 1991, for example, the electricity sector was essentially a vertically integrated monopoly-owned largely by the state. Regulatory reform increased the supply of electricity to a larger segment of the population, but the Electricity Act of 2003 introduced competition in all segments—generation, transmission, and distribution. Political pressure, however, still influences the sector. For example, political parties and industrial units vigorously opposed the recent attempt of distribution companies in Andhra Pradesh to raise power tariffs by an average of 20 percent from April 01, 2013.[2] Raising tariffs and making them competitive is fraught with political risk in India. Punjab, Maharashtra, and Uttar Pradesh also faced stiff resistance in raising tariffs.

Nathan Economic Consulting India Private Ltd., (Nathan India) has been asked by the Consumer Unity & Trust Society (CUTS) to: assess how well policies, regulations, laws, and practices in the electricity sector support objectives for generating and sustaining competition; and analyse political economy constraints on the implementation of competition principles. `

Nathan India has analysed the structure of the power sector in India, sector regulations, demand-supply gaps, the role of private players, and tariff rates. Our findings suggest that India has yet to reap benefits from liberalising the electricity sector and the principles of the Electricity Act of 2003 and the National Electricity Policy (NEP) need to be implemented in letter and spirit.

Although the government's intent to stimulate competition is evident in the provisions of various policies, implementation is far from satisfactory. The examples below suggest that competition in the sector may take a much longer time and more political will to realise than previously believed.

- The political structure of the sector is well organised, with statutory bodies at the Central and the state levels managing generation, transmission, and distribution, but their autonomous functions are influenced by pressure from state governments.

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[1] Janos Kornal, Eric Maskin and Gerard Roland. Understanding the Soft Budget Constraint www.sss.ias.edu/files/papers/econpaper19.pdf

[2] Livemint (January 07, 2013). Andhra Pradesh latest state to propose hike in power tariffs: www.livemint.com/Industry/dJYB5tEtgEblhoQVdZSpOP/Andhra-Pradesh-latest-state-to-propose-hike-in-power-tariffs.html

- The primary fuel for electricity generation is coal and the government holds a near monopoly in its production, price, and distribution. The government's control over the fuel for electricity generation leads to preferences given to public sector companies over private sector companies for the supply of fuel. This inhibits the entry of private players in the market and thus hampers competition.
- Nevertheless, generation is the only segment that has witnessed some sort of competition. The other two segments, namely, transmission and distribution, are largely controlled by the state with very few private players operating in these segments.
- The Electricity Act of 2003 mandated open access to transmission networks to increase the supply of electricity and give consumers a choice of generating units. This has not been implemented in many states.
- The Electricity Act of 2003 mandates tariff rationalisation but state governments continue to set and revise tariffs.[3] Electricity provided to the agriculture and domestic consumer segments is heavily subsidised, leading to commercial losses for the distribution companies.
- A close study of four states--Tamil Nadu, Bihar, Gujarat, and Maharashtra—shows that Maharashtra and Gujarat have reduced their distribution losses, have healthier balance sheets, and better serve consumers since corporatising their state-owned distribution companies (discoms), and applying corporate and business management techniques in 2005.

We conclude that the government needs to overhaul India's electricity sector to increase competition. Changes are needed in the political economy and the regulatory framework governing the autonomy of the statutory bodies. In addition, policies that facilitate open access by private players and that augment the electricity supply are needed.

[3] As per Ministry of Power, Additional Secretary, Ashok Lavasa, at CUTS seminar on 'The Political Economy of Regulation in India: Impact on Investments and Economic Growth' on December 26, 2012

II. Introduction

A. Background and Context of the Study

In India, the power sector is viewed as a public utility and basic infrastructure. While undergoing a transition, from a controlled environment to a competitive, market driven regime, it has to provide affordable, reliable and quality power at reasonable prices to various segments of consumers in the economy.[4] With a population of over 1.2 billion people and increasing, the development of such a system of power supply is crucial for the development of the economy.

Energy is a building block in human development and a key factor in economic development.[5] Electricity is used by all sectors of an economy including:

- The industrial sector (facilities and equipment used for manufacturing, agriculture, mining, and construction);
- The transportation sector (including vehicles that transport people or goods, such as cars, trucks, buses, motorcycles, trains, subways, aircraft, boats, and barges);
- The residential sector (housing of various types); and
- The commercial sector (buildings such as offices, malls, stores, schools, hospitals, hotels, warehouses, and restaurants).

As the population of an economy grows, so does the demand for electricity to satisfy the needs of the growing population.[6] In India, a vast and growing population and limited natural resources leads to an ever increasing demand for energy. Economic growth and the resultant demand for technologies and electric appliances further escalate the demand for power.[7] Therefore, India needs to undertake measures to augment the current resource base and energy supply to meet the population's demands for electricity. Therefore, it is imperative to implement a consistent energy policy and, simultaneously, relentlessly pursue increases in energy efficiency and conservation.[8]

Recent years have seen a decline in the scope of regulation all over the world. Major industries, such as telecommunications and automobile manufacturing, have been exposed to market discipline and have delivered significant benefits to consumers in terms of choice, competitive rates, and user satisfaction. However, the deregulation of the electric power industry has been slow and limited in scope.

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[4] Report of The Working Group on Power for Twelfth Five Year Plan (2012-17), Planning Commission http://planningcommission.nic.in/aboutus/committee/wrkgrp12/wg_power1904.pdf

[5] Energy Statistics, 2012. The Ministry of Statistics and Programme Implementation, Government of India http://mospi.nic.in/mospi_new/upload/Energy_Statistics_2012_28mar.pdf

[6] Renewable Energy and Developing Countries: The Cases of India and Nigeria http://humanities.uchicago.edu/orgs/institute/bigproblems/Team2-1209.pdf

[7] www.emcentre.com/rudicon2012/Presentation/Mr.%20Subrat%20Ratho.pdf

[8] Gargh, P. (2012). Energy Scenario and Vision 2020 in India www.jseejournal.com/JSEE%202012/PDF%20file%20JSEE%203(1)%202012/7.Energy%20scenarios%20pp.%207-17.pdf

This is primarily due to the nature of economies of scale[9] and the high fixed costs in markets such as electricity that lead to their characterisation as natural monopolies. A natural monopoly is "[a]n industry in which multi firm production is more costly than production by a monopoly",[10] which means that a monopoly can produce at a lower cost than multiple firms. In order to prevent natural monopolists from maximising profits and earning a monopoly profit (or excess economic profits), governments often regulate the sector to protect consumer welfare. By regulating the market, the government may set tariffs or the rate of return that can be earned by the natural monopoly. Different countries have gone through various stages of regulation and deregulation of public utilities, including the electricity sector.

However, the natural monopoly arguments cannot be used to explain the all-inclusive scope of state-guaranteed franchises. Regulation has been applied far too broadly to the electric power industry. As a result, policies intended to restrain monopoly power have instead propagated that power. Most researchers and practitioners in the field now recognise that substantial deregulation of electric utilities is both possible and advisable, and promises significant improvements.

Countries have different models of regulating the electricity sector depending on the each country's national political economy. For example, while there is a centralised system governing electricity in countries such as Great Britain or France, a federal structure exists in countries such as the US, Australia and Argentina. Some countries in Europe have also given powers to municipal governments as far as the electricity is concerned.[11]

The evolution of India's electricity sector has been no exception. The sector was largely under government control until as late as 1990's and despite some opening up, it continues to be under government control. However, to satisfy the ever increasing demand for electricity, it is important to streamline the existing regulations governing the sector, to stimulate competition, and thereby encourage entry of new players in electricity generation, supply and distribution.

To meet people's needs and improve its financial health, the electricity sector in India has undergone restructuring. This restructuring was twofold: the establishment of an independent regulatory body called the Central Electricity Regulatory Commission (CERC) at the Central government level and State Electricity Regulatory Commissions (SERCs) at state levels. In addition, the state electricity boards (SEBs) were unbundled into different companies to perform the functions of generation, transmission and distribution.

The experience of introducing competition into the generation and distribution sectors has been unsuccessful. The poor financial health of discoms often deters private entry, as the payments made to generating companies are linked to the discoms' health. Additionally, although the Electricity Act, 2003 requires the regulatory authorities to facilitate open access, the implementation have been poor.

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[9] Economies of scale refer to the factors that cause the average cost of producing a commodity to fall as the volume of its output increases

[10] Baumol, William J., (1977). On the Proper Cost Tests for Natural Monopoly in a Multiproduct Industry, American Economic Review 67, 809-22

[11] Harris. Chris (2005), Electricity Markets: Pricing, Structures and Economics

B. Study Objective

The study's objective is twofold. First, the study's aim is to identify distortions and other issues that limit competition in India's electricity sector and to provide specific recommendations—including legislative amendments and amendments to regulations — to make India's electricity sector more competitive. Second, the study focuses on the role of political economy constraints and analyses regulatory issues and their effects on the sector's competitiveness. Case studies have been incorporated to highlight the quantitative impact of various regulatory issues on competition.

C. Methodology

The study is a mix of qualitative and quantitative analysis. We have studied the laws and regulations related to the electricity sector, along with their implementation or non-implementation and absence of laws/regulations have been studied. These include granting independent status to load dispatch centres, separation of wire business with that of electricity supply and transparency in coal supply, besides others. The qualitative analysis incorporates secondary data available in the public domain and information gathered through interviews with senior officials in the central power ministry, CERC, state-level officials in different discoms, officials in the Competition Commission of India (CCI), and executives in private sector and industry associations. A competition impact assessment has been undertaken using the CUTS toolkit. The quantitative and narrative analysis of market structures and the advantages of having a National Competition Policy (NCP) also have been addressed. Sector studies have been conducted through a literature review and by analysing secondary data.

To evaluate the benefits arising from competition, we developed a matrix for four states: Tamil Nadu, Bihar, Gujarat, and Maharashtra. Performance of the power sector in these states is compared to analyse the effectiveness of unbundling of the power sector and benefits resulting from the same. Analysis of different segments of the electricity supply chain – generation, transmission and distribution has been done to assess the level of competition in these segments respectively. In the generation sector, the impact of higher private sector participation on increased power availability has been highlighted. Private sector participation in the generation sector increased after the removal of the license requirement under the Electricity Act, 2003. This trend has also been analysed. A comparative analysis along various parameters such as open access, transmission and distribution (T&D) losses, aggregate technical and commercial losses (AT&C) and subsidies has also been done for the distribution sector in each of these four states.

D. Report Structure

The remainder of this report is organised as follows:

- Section III provides an overview of the market structure and market participants in the electricity sector in India, highlighting the current level of competition and competition issues facing all the segments of electricity supply chain;
- Section IV introduces the historical and the current regulations in the electricity sector. It further gives a descriptive analysis of how the principles of the proposed National Competition Policy of India would introduce competition in the sector,

followed by an examination of the distortionary effects of regulations on competition in the sector using the tootlkit approach;

- Section V provides the economic analysis of competition and the regulatory issues in the electricity sector using case studies on private and public players' performance in the sector;
- Section VI provides a concluding summary of the findings with recommendations to solve the competition issues in the electricity sector of India.

III. Market Structure and Competition in the Electricity Sector

In this section, we discuss the electricity supply chain in India, the responsible regulatory bodies, the market structure of each segment of the sector, and issues related to competition in the electricity sector.

A. Market Structure

The electricity supply chain is composed of the three primary segments defined below and illustrated in Figure 1. A fourth segment, trading, is an offshoot of the primary segments and is important to overcome the persistent electricity shortages in the country.

- **Generation** (also known as production): Electricity is generated or produced using hydro, thermal, wind, nuclear, and other renewable sources;

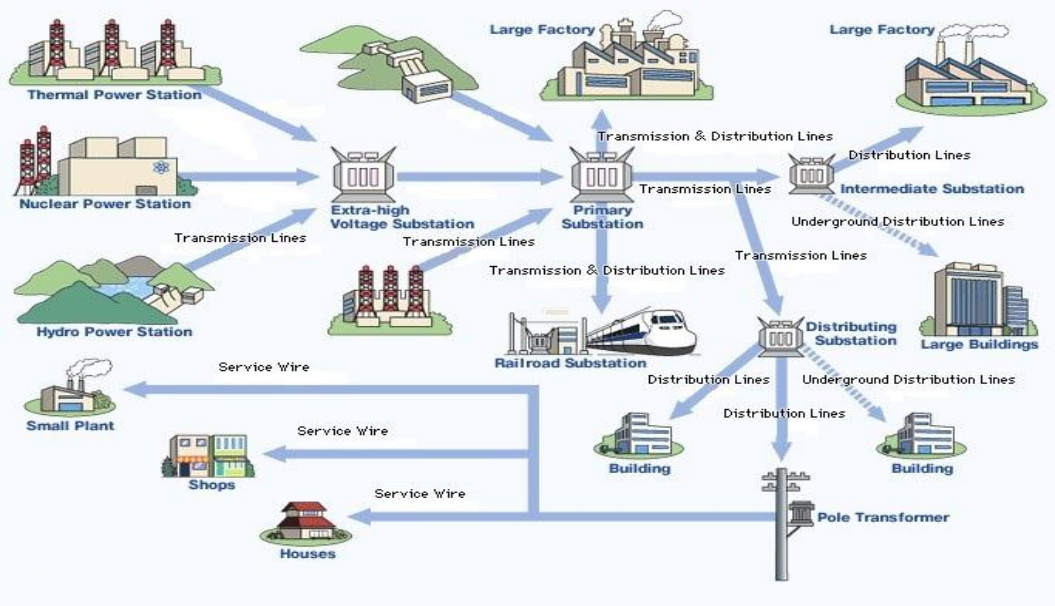
- **Transmission:** After it is generated, electricity is transmitted through high-power copper or aluminum transmission lines spread across geographic areas. Huge amounts of power are transferred to high-voltage substations which then send smaller amounts to distribution substations.

- **Distribution:** Electric power is distributed by power or service lines from substations to customers including industries, businesses, agricultural settings, and residences.

- **Trading:** "[the] purchase of electricity for resale."[12] Electricity trading is a mechanism used to meet short-term shortages in electricity demand and ensure overall resource optimisation through the purchase and the resale of electricity by a licensed trader.

[12] The Electricity Act 2003

Figure 1: Electricity Supply Chain



Source: Tokyo Electric Power Company. [13] *This is an ideal supply chain model mostly prevalent in developed economies. Some of the components might not be applicable to India*

B. Entities Involved in India's Electricity Sector

The main body responsible for the development of electrical energy in India is the Ministry of Power (MoP). The Ministry began functioning independently on July 02, 1992.[14] Other statutory bodies involved in the electricity supply chain include the following regulatory and other organisations:[15]

Regulatory Bodies: Entities which are regulatory in nature include the following:

- **Central Electricity Authority (CEA)**: The CEA is the statutory body responsible for all the technical coordination and supervision of power-related programmes. It is entrusted with a number of statutory functions such as preparing a National Electricity Plan in accordance with the National Electricity Policy once every five years. The MoP is assisted by the CEA in all technical and economic matters.
- **Central Electricity Regulatory Commission (CERC):** The main functions of the CERC are to regulate generating company tariffs and the interstate transmission of energy (including transmission utility tariffs). CERC's other primary responsibilities are to grant licenses for interstate transmission and trading and to advise the central government (including CEA) in formulating the National Electricity Policy and Tariff Policy.

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13 TEPCO www.tepco.co.jp/en/challenge/energy/pow-net-e.html

14 Ministry of Power http://powermin.nic.in/JSP_SERVLETS/internal.jsp

15 *Ibid*

- **State Electricity Regulatory Commission (SERC)**: Three main responsibilities of the SERC are to determine the tariff for generation, supply, transmission and wheeling[16] of electricity for wholesale, bulk, or retail sale within the state; to issue licenses for intrastate transmission, distribution and trading; and to promote the use of renewable energy sources to generate electricity.

Non regulatory bodies: Entities that manage various functions but are not regulatory in nature include the following:

- **Central Transmission Utility (CTU):** The CTU manages energy transmission through the interstate transmission system. The Power Grid Corporation of India Limited (PGCIL) is the country's CTU.
- **State Transmission Utility (STU):** The STUs manage transmission of energy through the intrastate transmission system.
- **National Load Despatch Centre (NLDC):** The responsibilities of the NLDC are to ensure optimum dispatch of electricity among the Regional Load Despatch Centres.
- **Regional Load Despatch Centres (RLDCs):** Each RLDC is responsible for dispatching electricity within a region, monitoring grid operations, and related duties. There are five RLDCs covering North, East, South, West and North-east parts of India.
- **State Load Despatch Centres (SLDCs):** These centers are responsible for integrating power system operations at the state level.

Figure 2 represents the various statutory bodies involved in the three segments of electricity supply chain.

GOVERNMENT MONOPOLY OVER COAL

More than half the electricity generated in India comes from coal, which continues to be nearly a government monopoly as far as production, price, and distribution are concerned. The state-owned Coal India, Ltd. (CIL) produces about 80 percent of the country's coal supply and currently is the single largest coal company in India and the world. The major issue with the state monopoly of the fuel supply is that it extends to the electricity generation process, since in the generation segment, public companies are given preference over private companies. The government's initiative in the last 5 or 6 years to allocate coal blocks for captive use to private players backfired as competition neutrality was ignored. The result was an INR1.86 lakh crore scam dubbed 'Coalgate.' To bring back transparency and objectivity in coal block allocations, an expert panel convened by the federal Comptroller and Auditor General (CAG) has recommended implementing a competitive bidding process. CAG alleged that favoritism and arbitrariness rather a competitive bidding process was followed while allocating captive blocks. In response to the CAG report and its aftereffects, the government de allocated 15 coal blocks.

Auctions are an effective method for maximising government revenues in a competitive bidding process. This is because mining companies bid according to how much they value a license. Countries like Australia also have implemented successful non auction methods for competitive bidding.

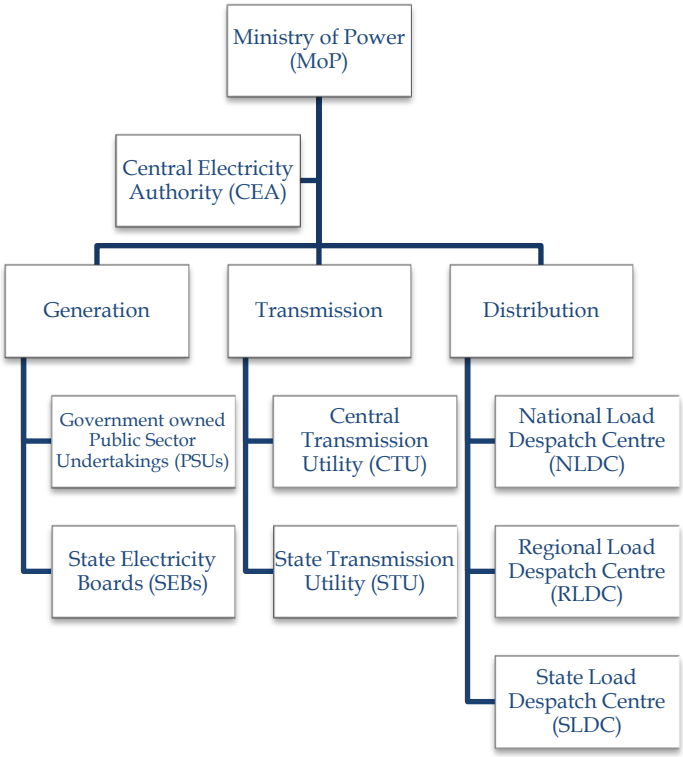
Of paramount importance is how a regime of granting coal mining licenses addresses information asymmetries faced by prospective entrants in the market. These asymmetries—which may be caused by geologic anomalies, infrastructural constraints, and demand based-issues—make it difficult to value the coal on a prospective tract with reasonable certainty.

Sources:
www.coalindia.in/Company.aspx?tab=0
www.thehindubusinessline.com/opinion/article3866521.ece

[16] Wheeling charge refers to the amount charged by one electrical system to transmit the energy of, and for, another system or systems.

Generating companies owned by the government are called Public Sector Undertakings (PSUs).

Figure 2: Power Sector of India: Statutory Bodies



Source: Ministry of Power

We next discuss the market conditions in each of these segments in India, including power trading.

C. Supply Chain in India

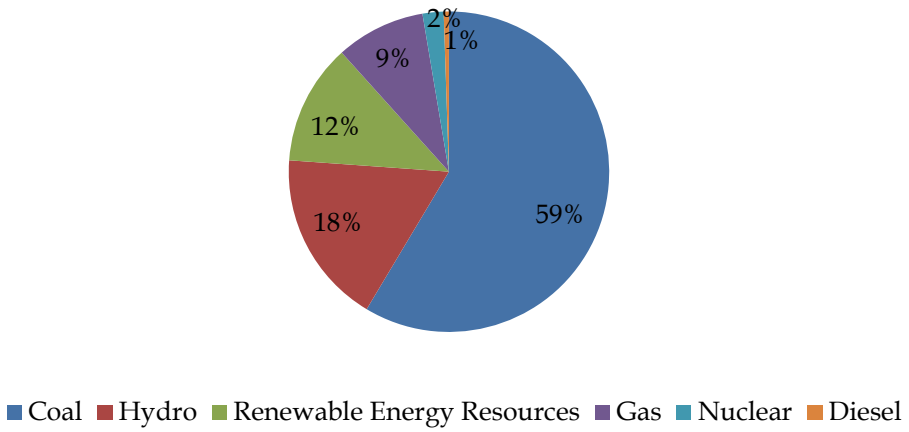
i. GENERATION

Power generation sources range from the usual—such as coal, lignite, natural gas, oil, hydro and nuclear power—to viable nonconventional sources including wind and solar power and agricultural and domestic waste. Figure 3 shows the installed generation capacity[17] supplied in India by source.[18] As can be seen in Figure 3, coal is the most important source of electricity generation in India, contributing about 55 percent of the total capacity generated.

[17] Installed generation capacity refers to the maximum capacity at which an installed plant could be operated for a sustained period without causing damage to it

[18] Annual Report (2012), State Power Utilities and Electricity Department, Planning Commission http://planningcommission.nic.in/reports/genrep/arep_seb11_12.pdf

Figure 3: Sources of Electricity Generation in India



Source: Report of the Working Group on Power for Twelfth Five Year Plan (2012-17), Planning Commission [Note: Capacities as 30 June, 2013.

The total installed capacity of India increased from 132,327 megawatts (MW) in 2006-07 to 2,25,793MW as on June 30, 2013. The demand shortage correspondingly decreased from 9.6 percent in 2006-07 to about 8.5 percent in 2010-11. In terms of per capita consumption, only 178kwh (kilowatt- hour)/year were used per person in 1985-86; this increased to 355 kwh/year in 1999-2000, an average annual growth rate of 7.1 percent. In 2008-09, the per capita consumption increased to 734kwh/year; this is significantly lower than the per capita consumption in China, which is 2,456kwh/year per person.[19]

ii. KEY PLAYERS IN THE GENERATION SEGMENT

The players in the generation segment can be divided into the following three types based on ownership and operations.

- **Central or public sector undertakings (PSUs):** These large public organisations include the National Thermal Power Corporation (NTPC), National Hydroelectric Power Corporation (NHPC), and similar organisations.
- **State-level corporations:** These include State Electricity Boards (SEBs) such as the Gujarat State Electricity Corporation Limited (GSEC).
- **Private sector enterprises:** This segment includes Reliance Power Ltd, Tata Power Company Ltd, Torrent Power Ltd, AdaniPower Ltd., Lanco Infratech Ltd and similar entities.

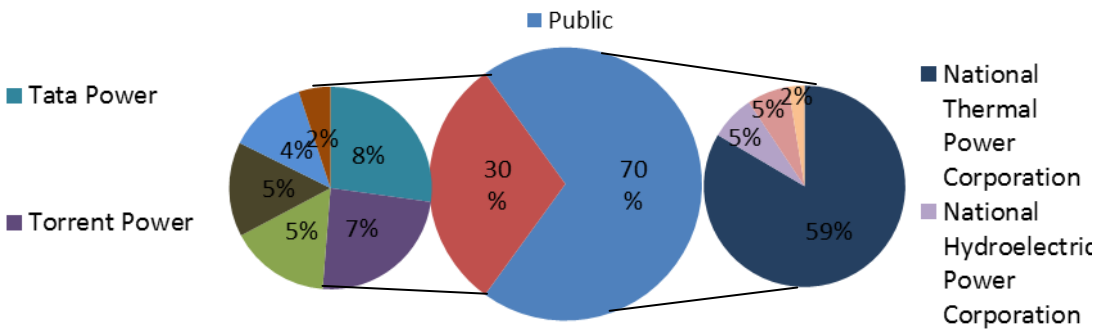
Legislative steps taken by India have increased the entry of private players into the field of electricity generation; however, the sector is still dominated by public sector players. Figure 4 shows the market shares of the top 10 electricity generation entities based on sales revenue.[20]As can be seen, the public sector has a 70 percent market share in terms of sale revenue from electricity generation in India, whereas the private sector

[19] Annual Report (2012), State Power Utilities and Electricity Department, Planning Commission http://planningcommission.nic.in/reports/genrep/arep_seb11_12.pdf

[20] Sales as of March 2012, Centre for Monitoring Indian Economy

has only a 30 percent share. Moreover, state-owned NTPC accounts for 59 percent of the total revenue from electricity generation.

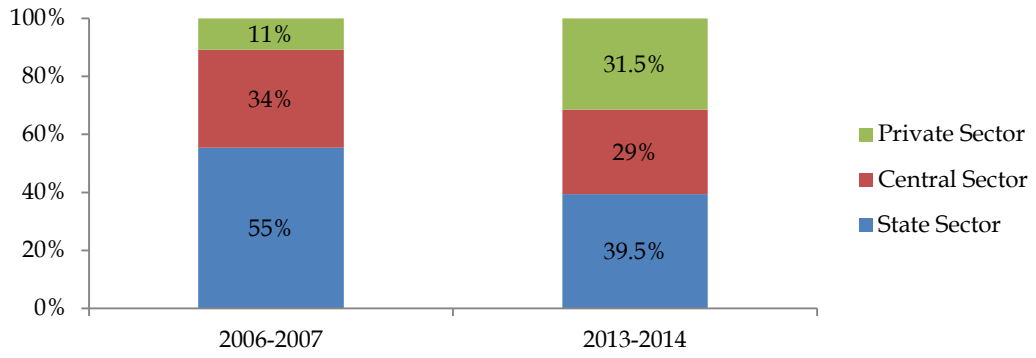
Figure 4: Market Share (Sales Revenue) of Top 10 Firms in Electricity Generation (March 2012)



Source: Centre for Monitoring Indian Economy

The share of private sector in the generation segment has increased between 2006-07 and now as reflected in Table 1. As on 30 June 2013, the share of state sector was 39.5 percent followed by the private sector at 31.5 percent and the central sector at 29 percent in the total installed capacity of 2,25,793 MW. Against this, the share of private sector in the total installed capacity of 1,28,182 MW, was 11 percent as on 31 January 2007, while the shares of state and central sectors were 55 percent and 34 percent respectively.

Figure 5: Sector-wise share in Installed Capacity in 2006-07 and 2013-14



Source: Ministry of Power, India

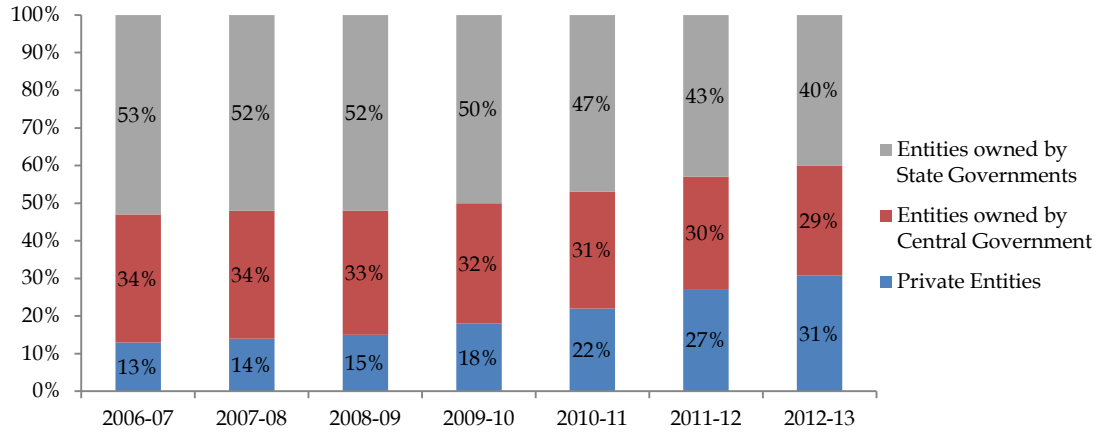
However, the public sector continues to be the largest owner, holding a 69 percent share in 2013-14.

The Electricity Act of 2003 liberalised the generation sector through a license-free regime. However, procedural delays and the risks associated with projects that need large, unpredictably timed investments have kept several aspiring companies from entering the segment.

As illustrated in Figure 6, the government has made it easier for private firms to enter and exit the market, increasing competition in the electricity sector. The eleventh 5-year plan (2007-12) has spurred the entry of private players into the generation segment,

which significantly increased their share of the total capacity by 2011. However, these steps have had only a partial impact and have not led to the development of the number of players and efficiencies required in the sector. Electricity shortages are still acute and the dominance of public sector generation companies such as NTPC and NHCP continues.

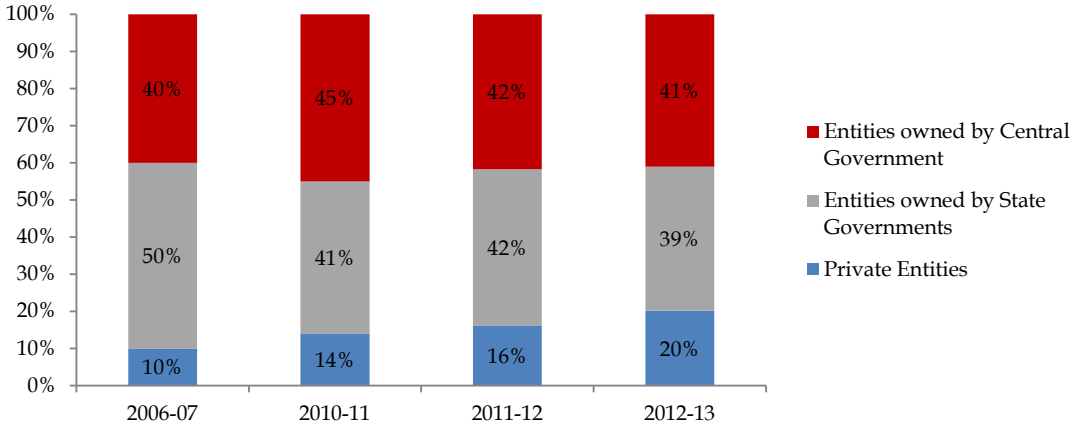
Figure 6: Segment-wise ownership pattern of installed generation capacity from 2006- 2013



Source: Annual Report (2012), State Power Utilities and Electricity Department, Planning Commission, CEA

Between 2006-07 and 2012-13, the share of private sector players in gross electricity generation doubled from 10 percent to 20 percent. However, the relative percentages of ownership shares suggest that the dominance of the state and the central governments persists. Figure 7 illustrates the relative shares of ownership between 2006-07 and 2012-13.

Figure 7: Share of Ownership of Gross Generation in 2006-07 and 2012-13



Source: Annual Report (2012), State Power Utilities and Electricity Department, Planning Commission, Ministry of Power, India

iii. TRANSMISSION SEGMENT

The transmission sector was opened for private investments in 1998. The CTU is the nodal agency for providing the medium-term (3 months to 3 years) and long-term (12

years to 25 years) access typically required by a generating station or a trader acting on the station's behalf. As mentioned earlier, the PGCIL is responsible for interstate transmission and development of the national grid, and it acts as the CTU. The RLDCs are the nodal agencies for grants of short-term open access (up to 3months). The nodal agency providing transmission access to the power exchanges is the NLDC.[21] Open Access refers to the right to generators of electricity [Captive Power Plants[22] (CPP)/Independent Power Plants (IPP)] and bulk consumers[23] to sell the generated electricity at a certain transmission surcharge and to access the transmission and distribution networks of any generator without any discrimination by the distribution/transmission line owners.

The principle of open access is based on the premise that while it is uneconomical to lay down multiple transmission lines in the same region because of the large sunk costs involved, it is still best to give consumers a choice to decide which firm's electricity they want to consume.[24] Table 1 shows the current status of transmission lines in India. The eleventh 5-year plan set the transmission line target at almost 69,000 circuit kilometers, and an estimated 61,000 circuit kilometers were in place by March 2012. The performance in terms of increasing transmission has been satisfactory the bulk transmission has increased from 3708 ckm in 1950 to more than 265,000 ckm as in September 2013. Nevertheless, there is room for a substantial increase.

Table 1: Transmission Lines- Eleventh Five Year Plan Programme & Achievement

Voltage level	Circuit Kilometers Targeted (2007)	Circuit Kilometers Achieved up to March 2012
765 kV	2,773	5,250
± 500 kV HVDC	1,600	9,432
400 kV	40,000	1,06,819
220 kV	24,300	1,35,980
Total	**68,673**	**2,57,481**

Source: Report of the Working Group on Power for Twelfth Five Year Plan (2012-17), Planning Commission, Ministry of Power, India

The sector is a natural monopoly as there are high sunk costs in investing in the infrastructure needed to transmit electricity, such as power lines. Because of these characteristics, nonpublic entities also face entry barriers, and private investments are allowed in projects only after approval from CERC.

Although the transmission market is largely dominated by the public sector, Adani Power Ltd. is a key private sector player in transmission. Adani entered the transmission market in the Mundra-Dehgam area and is setting up another 1,000km system, which will be the first high-voltage direct current (HVDC) line owned by a private player.

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[21] Report of The Working Group on Power for Twelfth Five Year Plan (2012-17), Planning Commission http://planningcommission.nic.in/aboutus/committee/wrkgrp12/wg_power1904.pdf

[22] Captive Power refers to generation from a unit set up by industry for its exclusive consumption.

[23] Bulk consumers are consumers with power requirement of 1MW or above.

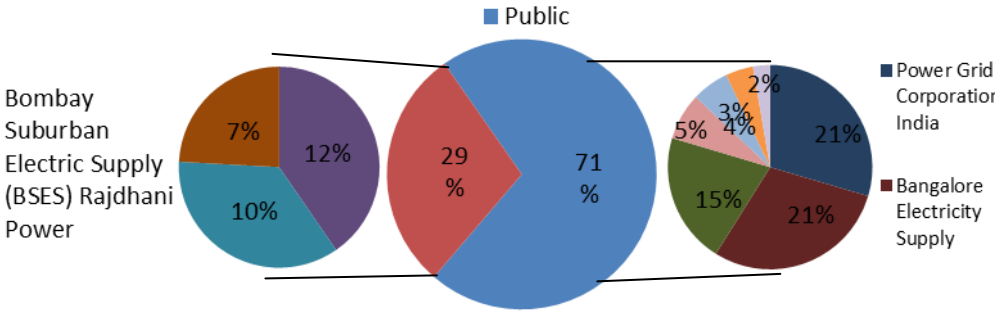
[24] The Electricity Consumer Grid.Assam Electricity Regulatory Commission. http://aerc.gov.in/consumer-grid-vol6-no1-2007.pdf

iv. DISTRIBUTION SEGMENT

Distribution remains a public monopoly despite the existence of laws shaping a multiple buyer model. SEBs own the majority of the distribution segment in the electricity supply chain. In order to boost competition and make the sector more efficient, the government is emphasising the importance of a well-performing distribution sector and is focusing on the improvement of the financial health of utilities. This is necessary to meet the goal of providing people with a reliable and good-quality power supply and universal access to electricity. To meet this goal, important related objectives must be met. These include increasing rural electrification (making electricity available in remote rural areas), reducing aggregate technical and commercial (AT&C) losses[25] incurred while distributing electricity, ensuring the financial viability of discoms, and encouraging private sector participation.

Figure 8, a market share analysis based on the 2010-11 sales revenue for the top 10 organisations in the sector, clearly illustrates the lack of competition in the segment. As can be seen from the figure, the public sector dominates electricity distribution. Further, all three private sector companies operating in the distribution sector are engaged in distributing electricity only in Delhi.[26]

Figure 8: Market Share (Sales Revenue) of Top 10 Firms in Electricity Distribution



Source: Centre for Monitoring Indian Economy

State-promoted discoms have been facing huge losses because they sell electricity below cost or provide power free for the agriculture and rural sectors. Collectively, state utilities have outstanding loans of about Rs 80,000 crore.[27] State governments have promised to share the burden of loss experienced by discoms that have offered rate subsidies. The discoms' cumulative losses increase when the governments fail to keep these promises.

Table 2 shows the region wise AT&C losses borne by state utilities between the period from 2009-10 to 2010-11.This has been adopted as a critical utility assessment parameter.[28] As can be seen from the table, the eastern and northeastern regions have

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[25] AT&C losses capture the technical as well as commercial losses in the power network arising due to lagging improvement works of transmission and distribution lines, theft of power and low metering efficiencies. Ministry of Power

[26] Sales as of March 2011, Centre for Monitoring Indian Economy

[27] Shunglu Committee Report

[28] Power Finance Corporation, The Performance of State Power Utilities for the years 2008-09 to 2010-11

the most significant losses. In addition, for eastern, northeastern and southern region, the losses have increased while for other regions, a reduction in losses can be seen.

Table 2: AT&C Losses for 2009-10 and 2010-11

Region	2009-10 (%)	2010-11 (%)
Eastern	33.94	38.24
Northeastern	36.23	37.33
Northern	29.66	28.91
Southern	19.05	19.26
Western	28.02	24.44
National	26.58	26.15

Source: Power Finance Corporation

Table 3 shows the profit/loss situation of 14 state utilities from 2005-06 to 2009-10. 11 of the 14 state utilities incurred losses in 2009-10.

Table 3: Profit/Loss before Prior Period Adjustment from 2005-06 to 2012-13

Year	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13
Andhra Pradesh Distribution Utilities	183	-90	57	152	35	-1072	-1115	-1163
Tamil Nadu State Electricity Board	-968	-1826	-3693	-7785	-9578	-10462	-11200	-12037
Gujarat Distribution Utilities	58	90	38	32	65	1619	1937	2295
Karnataka Distribution Utilities	198	-23	122	-1717	-258	67	160	264
Madhya Pradesh Distribution Utilities	-741	-979	-1786	-2455	-3008	-3738	-3641	-3491
Punjab State Electricity Board	89	-1645	-1501	-933	-1151	-1263	-1199	-1112
Uttar Pradesh Distribution Utilities	-2772	-3765	-4207	-4424	-4308	-6584	-6926	-7231
Rajasthan Distribution Utilities	-30	-5	-1273	-2383	-4034	-2665	-2529	-2529
Haryana Distribution Utilities	-266	-403	-815	-1372	-1663	-941	-955	-852
Bihar State Electricity Board	-169	-856	-851	-1102	-1496	-2008	-2088	-2209
Kerala State Electricity Board	183	233	157	-311	192	210	278	354
Jharkhand State Electricity Board	-249	-545	-1214	-1000	-559	232	333	451
Himachal Pradesh State Electricity Board	56	79	-48	52	-209	-385	-370	-351
Uttrakhand Power Corporation Limited	-215	-209	-220	-355	-391	-412	-403	-391

Source: High Level Report on Financial Position of Distribution Utilities. The report was submitted in December 2011. Figures for periods beyond 2010-11 are based on projections made by the committee

Figure 9 shows the aggregate losses accumulated by all utilities from 2006-07 to 2010-11. The losses (on accrual basis) of all the utilities increased from Rs 24,796 crore in the year 2008-09 to Rs 30,466 crore in 2009-10. In the year 2010-11, the aggregate losses of all utilities decreased to Rs 29,701 crore.

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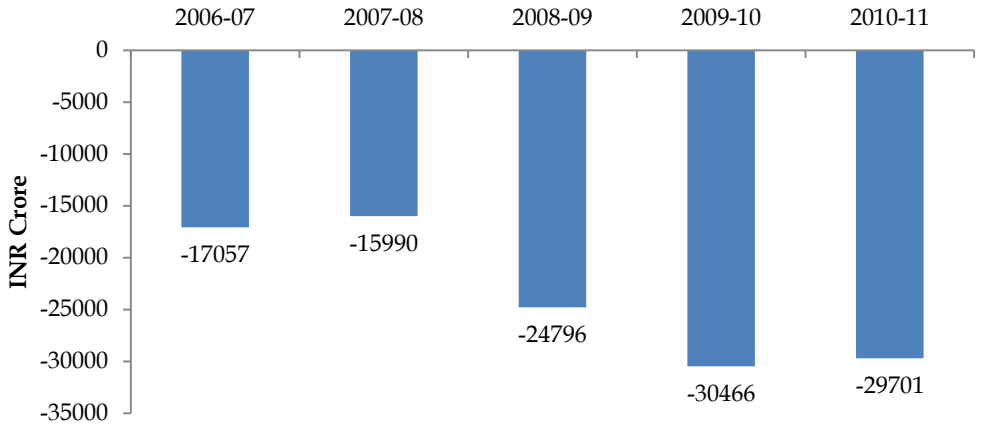
www.pfcindia.com/writereaddata/userfiles/file/ResearchReport/Performance_Report_State_Power_Utilities_forfy_2008-09to2010-11_03102012.pdf

Figure 9: Aggregate Book Losses –All Utilities from 2006-07to 2010-11



Source: Power Finance Corporation

To increase the number of private players participating in the distribution market, the government must allow them to fix their own tariff regime or, at least, adhere to a more liberalised regime that allows them to cover their costs. Additionally, states will have to commit to compensating companies for the losses that they face due to factors such as supplying electricity at subsidised rates to certain sections of the economy and for the theft of electricity, a phenomenon rampant in India. Of the three electricity segments, distribution appears to have the most challenges, and this has kept private players from entering the field.

V. TRADING

Power trading was recognised as a distinct licensed operation by the Indian Electricity Act of 2003. Power trading is a bilateral agreement between a generator and a trader on one hand and a trader and a distributor on the other. It balances out the forces of demand and supply of electricity by enabling the electricity procurer to meet seasonal fluctuations in demand, and the generating organisation to economically eliminate surpluses.[29]

Bilateral trading is carried out through:

- Interstate trading licensees and directly by the discoms (also referred as distribution licensees);
- Power exchanges namely, the Indian Energy Exchange Ltd (IEX) and the Power Exchange India Ltd (PXIL) ; and
- The unscheduled interchange charge (UI), a mechanism developed to improve grid efficiency and discipline and increase accountability and responsibility of users across the supply chain by imposing charges on those who defer from their scheduled generation. Introduction of UI has supported the development of India's

[29] Report on Short-term Power Market in India: 2011-12, Central Electricity Regulatory Commission www.cercind.gov.in/2012/market_monitoring/Annual%20Report%202011-12.pdf

power trading market by bringing all the consumers and sellers together on a single platform with standardised contracts, trading procedures, and bid formats.[30]

Of the total electricity produced in India in 2011-12, about 11 percent was routed through short-term power trading between states. The rest was routed using long-term purchase agreements between companies and short-term intrastate contracts. The volume of power traded was 94.51 Billion Units (BUs). This was a 16 percent rise in trading from 2010-11 when the volume of electricity transactions was 81.56 BU and a 43.41 percent increase from 2009-2010 when the transaction volume was 65.90 BU. About 62.8 percent of the growth was due to transactions by private traders, 39.5 percent by discoms and only 0.2 percent by power exchanges. In monetary terms, the amount of power traded was valued at INR 20,532 crores in 2011-2012 which was a 10 percent increase over the previous year.

D. Competition Issues

The amendment to the Electricity Supply Act, 1948 was introduced in 1991 specifically to encourage competition in the electricity supply market in India. There were around 314 registered private companies operating in electricity generation[31] and around 31 companies in electricity transmission and distribution as of December 2012.[32] The small number of private players operating in the generation, transmission, and distribution markets indicates the low level of competition in the sector.

One of the reasons why there are so few players in the market has to do with barriers to entry. As per economic literature, conditions that constitute entry barriers might be structural or strategic. Structural barriers are a result of basic industry conditions such as cost and demand not tactical actions taken by incumbent firms. Structural barriers exist due to conditions such as economies of scale and network effects. On the other hand, strategic barriers are created by incumbents themselves in order to deter entry. These barriers may arise from behaviour such as exclusive dealing arrangements.[33]

Entry of new firms in the electricity sector is considered to be marred by the barriers to entry posed by economies of scale needed for generation, transmission and distribution, and also due to regulation in the electricity tariff rates. Economies of scale occur when output can be doubled for less than doubling of the cost.[34] In the case of electricity supply, the technologies used often have high up-front sunk costs[35] and very long asset lives. This is most true in the transmission and distribution sectors which have high sunk costs such as the cost of building infrastructure such as power lines and less true in the generation sector.[36] These features are responsible for natural monopoly characteristics of the transmission segment of electricity supply chain. The existence of

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[30] Rangwala, H. K. 2010, Issues in Unscheduled Interchange in India http://greatlakes.edu.in/gurgaon/pdf/Issues_in_Unscheduled_interchange_in_India.pdf

[31] Total number of companies includes companies that generate electricity using biomass power, wind energy, thermal energy, hyro power, coal, gas, solar energy

[32] A company is said to be registered if it is formed and registered under the Companies Act, 1956

[33] Organisation for Economic Cooperation and Development (2007), Competition and Barriers to Entry www.oecd.org/competition/mergers/37921908.pdf

[34] Microeconomics, Rubinfeld and Pindyck

[35] A sunk cost is a cost that has already been incurred and thus cannot be recovered
Read more: www.investopedia.com/terms/s/sunkcost.asp#ixzz2FwjHqGSt

[36] Waldman, Don E. and Elizabeth J. Jensen (2006). Industrial Organization: Theory and Practice, Third Edition. Pearson Education. P629.

high sunk costs makes entry risky because the time required to breakeven in terms of profits is long, which prevents exit in the short run. Moreover, large economies of scale relative to the market being served means that current prices might not be reflective of the market prices post entry. The entry of a new competitor might reduce the economies of scale and therefore increase the costs incurred by all market participants, thereby having a significant impact on the market capacity and, hence, market prices. Although this may not be true for underserved markets where players are yet to achieve economies of scale. Therefore, investors need to have a good understanding of market dynamics, including the ability to forecast post entry dynamics and revenues.[37]

The electricity sector also faces competition issues in terms of the vertical integration of the generation, transmission and distribution sectors. Vertical integration means that the upstream and downstream players are integrated and run by one firm instead of multiple independent firms.

As mentioned earlier, the electricity market has often historically been seen as a natural monopoly due to the nature of economies of scale and the high fixed costs associated with transmitting and distributing electricity. In order to prevent natural monopolists from earning a monopoly profit or excess economic profits, governments often regulate the sector to protect consumer welfare, including setting tariffs or rates of return. This is such the case in India; the electricity sector was a state monopoly prior to liberalisation in 1991. Directed by socio-political compulsions, tariff regulation remains to be a prerogative of the central and the state governments. The regulated nature of this sector produces further sources of uncertainty in competition and hampers the large scale entry of firms because of restrictions on setting tariffs independently in ways needed to maintain profitability. States need to realise that allowing entry of private firms would mean moving away from natural monopoly and possibility of monopoly profit. Thus, allowing effective competition has potential of regulating prices.

To look into the state of the financial health of the SEBs and suggest corrective measures, in July 2010, the Planning Commission appointed a high-level panel headed by V K Shunglu, former comptroller and auditor general, to review the financial health of the SEBs and suggest corrective measures.[38] The panel's tasks included reviewing the finances of SEBs and state distribution companies as of March 2010 and projecting losses through 2017; reviewing the electricity tariffs; examining the roles of state governments, electricity regulatory commissions, and distribution companies; and assessing system improvement measures accomplished in the distribution of power. After completing the analysis, the Shunglu Committee was to recommend a plan of action to achieve financial viability in power distribution by 2017.[39]

The Shunglu Committee presented its report to the Deputy Chairman, Planning Commission on 15 December, 2011. The salient features of the report are as follows:[40]

- The accumulated losses for the preceding 5 years were Rs 1,79,000 crore before subsidies were included and Rs 82,000 crore after they were incorporated. For the

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[37] Hird, T. et al. (2012), Barriers to entry in electricity generation, Competition Economists Group www.aemc.gov.au/Media/docs/CEG-Report-ece57d9c-399c-4724-b5f0-a6ba319dca83-0.PDF

[38] Press Note on Shunglu Committee Report, Planning Commission http://planningcommission.nic.in/reports/genrep/hlpf/pr_note.pdf 28-07-2010

[39] Press Note, Planning Commission

[40] Press Note, Planning Commission

year 2009-10 alone, the financial loss of all distribution companies was Rs 57,000crore before subsidy and about Rs 27,000 crore after subsidy.

- These losses are primarily due to the poor managerial and operational practices of distribution companies and compounded by unpredictability in tariffs set by regulators.
- The panel recommended that SERCs be made financially, as well as functionally, independent. The selection of chairpersons and members should be fine-tuned and their functioning should be scrutinised by an expert group to determine to what extent the commissions have discharged their statutory duties such as the timely and regular revision of tariffs.
- The panel suggested that, in areas where losses are high, a loss surcharge should be imposed over and above the basic tariff.
- Discoms' losses have been substantially financed by commercial banks, with a large part of the loans guaranteed by state governments. The panel suggested that, subject to the state government and its utilities agreeing to and implementing a set of measures listed in the action plan, these loans could be suitably rescheduled. In case of failure to meet the rescheduled obligations, such assets should be taken away from the banks and placed with a special purpose vehicle (SPV) to be established. The SPV should be owned by the Reserve Bank of India and be empowered to deal appropriately with the defaulting utilities/state governments including debiting state government accounts.
- Some other important recommendations included introducing input based franchise models in about 255 more towns (listed in the report) and cautiously using Section 108 of the 2003 Electricity Act relating to issues of policy directions and proper energy accounting for all consumers.

E. Introducing Competition in the Electricity Sector

As per the Organisation for Economic Cooperation and Development (OECD), competition refers to a situation in which firms or sellers independently strive to get buyers in order to achieve a particular business objective. It is viewed as a process by which firms are forced to become efficient and offer greater choice of products and services at lower prices.[41]

Economic theory establishes that competition is beneficial for the economy as it restricts the market power of single firms. For consumers, increased competition implies more choice, lower prices (higher consumer welfare), improved quality, and increased access to products. Producers benefit through their profit maximising behavior as markets adjust to supply and demand according to scarcity relations leading to allocative efficiency. Newer firms and increased competition provides incentives for decreasing costs and enhancing innovation (dynamic efficiency).

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[41] OECD Glossary of Statistical Terms ,(2008), OECD Book
http://books.google.co.in/books?id=VW1do0xshS8C&pg=PA87&lpg=PA87&dq=The+situation+in+which+firms+or+sellers+independently+strive+for+buyers%E2%80%99+patronage+in+order+to+achieve+a+particular+business+objective&source=bl&ots=4wOapzhg3I&sig=VmRp6N83_OZZJlVl205Ira8ph3k&hl=en&sa=X&ei=R6TaUO-eK8SdiAfpooDYDw&ved=0CDEQ6AEwAA#v=onepage&q=The%20situation%20in%20which%20firms%20or%20sellers%20independently%20strive%20for%20buyers%E2%80%99%20patronage%20in%20order%20to%20achieve%20a%20particular%20business%20objective&f=false

Theoretically, these benefits are measured using consumer surplus, producer surplus, and the resulting total welfare.

Economic theory recognises various parameters that can be used to assess the level of competition in a market. Some of the most commonly used parameters are:

- **Profit mark-ups:** According to economic literature profit mark-ups[42] tend to decline as the competition in the market increases. This is because reduction in the market power[43] of any single firm motivates producers to charge prices close to the marginal costs.[44]
- **Entry of new firms:** Presence of barriers to entry in a market is indicative of the existence of market power by firm (s) in the market.[45]If however the entry were easy, new firms can easily enter the market and compete with the existing firms to gain market share.
- **Improved efficiency:** As aforementioned, prices in a competitive market are generally pegged closer to the marginal costs of production firms generally try to improve their efficiency performance to gain market shares and achieve higher profitability.[46] This efficiency can be realised either by innovative techniques to reduce the costs of production or to increase the production.[47]

There are many benefits that would accrue to different sectors of the economy by introducing more competition into the electricity sector. The following are some of the benefits and the user groups that would enjoy these benefits.

i. POWER SUPPLIERS

- **Innovation:** Competitive markets encourage innovative solutions to meet energy requirements through advances in energy efficiency, storage, and generation. This has a direct bearing on lowering the costs of production for power suppliers, and increasing the variety of products and services available to consumers.

- **Investment:** Competition encourages private investment in new clean energy generation which creates technology to satisfy rising electricity demands. For instance, in the United Kingdom, investment in new technology, like the Combined Cycle Gas Turbine (CCGT)[48] power stations have added to the portfolios of power stations, reduced their non-fuel costs and have led to improvements in their manpower productivity. This has enabled companies to

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[42] Defined as (Price of the Product – Marginal Cost of the Product)/Price of the Product

[43] Market power is said to exist when the actions of a single dominant firm about its own output and prices can have an influence market outcomes. OECD Policy Brief, Substantial Market Power and Competition

[44] Borg.Mario. Measuring Market Competition in the EU: The Mark-Up Approach *www.bov.com/filebank/documents/20-31_Mario%20Borg.pdf*

[45] Western Parcel Express v. United Parcel Service, 190 F.3d 974 (9th Cir. 1999) http://bulk.resource.org/courts.gov/c/F3/190/190.F3d.974.98-16338.html>

[46] P. Mukhopadhyay. Jyoti.*Competition in Markets Promotes Economic Efficiency* *www.cci.gov.in/May2011/Advocacy/essay2012/jyoti.pdf*

[47] *Ibid*

[48] In electric power generation, a combined cycle is an assembly of heat engines that work in tandem off the same source of heat, converting it into mechanical energy, which in turn usually drives electrical generators. The principle is that the exhaust of one heat engine is used as the heat source for another, thus extracting more useful energy from the heat, increasing the system's overall efficiency.

compete efficiently at home and abroad, and also improve their environmental performance.[49]

ii. CONSUMERS

- **Lower Prices:** The most important benefit of privatisation of electricity is the consumer welfare accrued by the reduction in electricity tariff rates for industrial and commercial units which are currently cross subsidising categories such as agricultural and rural units. For instance, the average price paid by the manufacturing industry in Great Britain fell by about 10 percent in real terms since privatisation (1990).[50]

- **Variety:** By providing the freedom to choose from amongst a variety of power suppliers, a competitive market place ensures a reliable and quality supply of electricity to consumers.

iii. OTHERS

- **Government:** Competition in the electricity sector would open up avenues for employment generation in the country, thus contributing to the overall economic development. Subsidies will also reduce if competition brings in efficiencies in production and enhances total production with a larger number of players generating more electricity.

- **Environment Protection:** An organised competitive electricity markets enables a movement towards clean energy generation.

Thus it would not be wrong to infer that from the above examples that a competitive electricity market leads to benefits at a micro as well as at macro levels.

Although India has initiated the necessary legislations to welcome private players into the electricity sector, the country has been unable to reap the above mentioned benefits. It is essential that India ensures implementation of these regulations proactively both in letter and spirit.

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[49] Competition Policy in the Electricity Sector (1996), OECD Book *www.oecd.org/regreform/liberalisationandcompetitioninterventioninregulatedsectors/1919993.pdf*

[50] *Ibid*

IV. Regulations in the Electricity Sector

A. Historical and Current Regulations

Until 1991, the Indian electricity sector largely remained a government monopoly.[51] Regulation and policies governing the sector were tailored in order to cater to the social objectives of serving the agricultural sector that provided livelihood to a majority of the Indian population up until 1990s. This was done primarily by granting subsidies to the agricultural and domestic consumer segments. However, to provide adequate electricity to all, while ensuring reliability and quality, the government of India has introduced various legislative initiatives in India's electricity sector. In the subsequent paragraphs, we discuss the electricity laws passed in India since 1900 and their objectives, with a detailed analysis of the Electricity Act, 2003 that laid the foundation of competition in India's electricity sector. The following are the objectives of the electricity laws passed in India, starting with the Indian Electricity Act, 1910.

Indian Electricity Act, 1910:[52] This Act was introduced to provide a basic framework for electricity supply industry in India. Its main objectives were:

- To assign nominal powers to local governments so as to remove the problem of dual control of electricity supply;
- To allow local governments to issue licenses for bulk supply[53] of electricity;
- To provide a legal framework for laying down of wires and other works; and,
- To provide for laying down relationships between licensee and consumer.

Electricity Supply Act, 1948: The main objective of this Act was to make provisions for the establishment of the CEA to monitor the electricity sector at the central level. SEBs were established at the state level to expand the supply of electricity to remote areas of the country. The electricity sector was covered under the concurrent list of the Constitution under Article 246. Accordingly, the Central Government was responsible for framing policies and defining the role of statutory bodies. The States on their part were made responsible for generation and supply of power to consumers.[54]

The SEBs were created as independent bodies responsible for the following:

- Ensuring generation, transmission and distribution of electricity in the most economic and efficient way across the states;

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[51] T. Thakur et al., (2004), Impact assessment of the Electricity Act 2003 on the Indian power sector, *Energy Policy, Elsevier Ltd.* http://eprint.iitd.ac.in:8080/bitstream/2074/1345/1/thakurimp2004.pdf

[52] Historical Background of Legislative Initiative , Ministry of Power, GOI www.powermin.nic.in/indian_electricity_scenario/pdf/Historical%20Back%20Ground.pdf

[53] Bulk supply meant that a company could generate and sell to other distributors in large quantities who would, in turn, retail it under a different license to small consumers

[54] Annual Report (2012), State Power Utilities and Electricity Department, Planning Commission < http://planningcommission.nic.in/reports/genrep/arep_seb11_12.pdf>

- Supply of electricity as soon as possible to a licensee or other person requiring such supply; and,
- Collection of data on the demand for and use of electricity and to formulate the balance in coordination with the generating company.

Despite the autonomy granted to the SEBs, their performance was characterised by low labour productivity and non-availability of service to large portions of the population. Further, the tariffs charged were too low to cover costs and support investments in the sector, amounting to huge financial losses for the SEBs. Keeping in mind the above and to further improve the generation of electricity, amendments to the Indian Electricity Supply Act were brought about in 1975, 1991 and 1998.

Amendments to Electricity Supply Act, 1948:[55] The following are the amendments introduced in the Act:

Electricity Supply Act, Amendment 1975:

- To enable the generation of electricity at the Central government level; and,
- To bring commercial viability to the functioning of SEBs by ensuring a minimum return of three percent on net capital at the beginning of each year as a mandatory requirement for SEBs.

By the late 1980s, the Indian power sector had deteriorated considerably due to the massive financial losses borne by the SEBs and shortages in power supply in various regions. It was then that amendments were made to the existing Act to provide for entry of private players in India's electricity sector.

Electricity Supply Act, Amendment 1991:

- To open generation to the private sector; and
- To establish the setting up of RLDCs to monitor the appropriate dispatch of electricity within their respective regions.

Electricity Supply Act, Amendment 1998: To provide for private sector participation in transmission.

The Electricity Regulatory Commission Act, 1998: The Act provided for the setting up of the Central/SERCs with powers to determine electricity tariffs. While the CERC had responsibility over all centrally owned power stations and other interstate stations, the SERCs were responsible for stations within their own jurisdiction or state.[56] The constitution of SERC was left optional for States.

As can be seen, the amendments to the Indian Electricity Supply Act, 1948, and also the Electricity Regulatory Commissions Act of 1998, made provisions to increase the role of the States, and later, the private sector, to make the electricity sector more competitive. The landmark Act in this direction was, however, the Electricity Act of 2003.

Electricity Act, 2003 (Act): This Act repealed the above three Acts namely (i) The Indian Electricity Act, 1910 (ii) The Electricity Supply Act, 1948 (including its amendments) and (iii) The Electricity Regulatory Commission Act, 1998. With a large

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[55] Historical Background of Legislative Initiative , Ministry of Power , GOI <http://www.powermin.nic.in/indian_electricity_scenario/pdf/Historical%20Back%20Ground.pdf>

[56] Annual Report (2012), State Power Utilities and Electricity Department, Planning Commission *http://planningcommission.nic.in/reports/genrep/arep_seb11_12.pdf*

number of reforms and provisions for the private sector, this was a landmark Act in the history of the electricity sector. The primary objectives of this Act were to:[57]

- consolidate the laws relating to generation, transmission, distribution, trading and use of electricity, and for taking measures conducive to development of electricity industry;
- promote competition therein;
- protect the interest of consumers by enabling them to have the best possible price and quality of supply;
- ensure supply of electricity to all areas;
- ensure rationalisation of electricity tariff;
- ensure transparent policies regarding subsidies;
- promote efficient and environmentally benign policies; and,
- ensure constitution of Central Electricity Authority, Regulatory Commissions and establishment of Appellate Tribunal for matters connected therein.

The Electricity Act, 2003 endeavoured to provide an enabling framework for an accelerated and more efficient development of the power sector. It encouraged competition with appropriate regulatory intervention.

Further, Section 3 (1) of the Electricity Act 2003 required the Central Government to formulate, *inter alia*, the National Electricity Policy (NEP) in consultation with the CEA, CERC and state governments. Thus in 2005, the NEP was formulated with the main objectives to achieve the following:

- Make available access to electricity for all households in next five years;
- Ensure that demand for power is fully met by 2012, by overcoming energy and peaking shortages;
- Supply of reliable and quality power of specified standards in an efficient manner and at reasonable rates;
- Increase per capita availability of electricity to over 1000 units by 2012;
- Maintain a minimum lifeline consumption of 1 unit/household/day as a merit good by year 2012;
- Ensure financial turnaround and commercial viability of electricity sector; and,
- Protect interests of consumers.

Section 3 of the Electricity Act, 2003 also required the Central Government to formulate the National Tariff Policy (NTP). Thus in continuation of the NEP, the NTP was notified in 2006 to deal with various parameters with respect to fixation of tariffs, like providing adequate return on investment to the power generator and supplier and ensuring reasonable tariffs for consumers. [58] The main objectives of the policy were to:[59]

- ensure availability of electricity to consumers at reasonable and competitive rates;
- ensure financial viability of the sector and attract investments;
- promote transparency, consistency and predictability in regulatory approaches across jurisdictions and minimise perceptions of regulatory risks;

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[57] T. Thakur et al., (2004), Impact assessment of the Electricity Act 2003 on the Indian power sector, *Energy Policy, Elsevier Ltd.* http://eprint.iitd.ac.in:8080/bitstream/2074/1345/1/thakurimp2004.pdf

[58] Crisil, (2006, Jan 06), Impact analysis: National Tariff Policy http://crisil.com/Ratings/Brochureware/News/tariff-policy0106.pdf

[5959] Tariff Policy, Ministry of Power, GOI www.powermin.nic.in/whats_new/pdf/Tariff_Policy.pdf

- promote competition, efficiency in operations and improvement in quality of supply; and,
- making available access to electricity for all households in next five years.

Thus from the above section, the government's efforts in creating a regulatory environment to promote competition in the electricity sector are clearly evident. Noteworthy is, however, the lack of impact that these regulations have had in increasing the competitiveness in the sector. We discuss this in the subsequent section.

B. National Competition Policy and its Benefits in the Electricity Sector

i. BACKGROUND

In 2011, the Ministry of Corporate Affairs (MCA) set up a committee to draft a National Competition Policy to look into competition issues in certain sectors under the aegis of the Indian Institute of Corporate Affairs, which was assisted by CUTS.

According to the MCA, policies initiated and pursued in various sectors like manufacturing, electricity, telecom, roads, transport, civil aviation, tourism etc. have yielded rich dividends so far. However, the progress across sectors has been somewhat uneven, and so the trickledown effects on the common man. A universal thread explaining these successes is the dismantling of restraints and introduction of competition. This has also resulted in enhanced competitiveness with all the allied benefits, including the static, dynamic and allocative efficiencies, all helping to push the growth trajectory.[60]

Based on the recommendations made by the Planning Commission under the Eleventh Five-Year Plan, the government intends to introduce an overarching NCP through this Policy Statement. This Policy, when implemented, will enable a coordinated effort to attain the full growth potential of the economy in a faster, inclusive, and sustainable manner.[61]

The draft NCP is based on the premise that competition is the key to economic efficiency which includes allocative, productive and dynamic efficiencies, which are important for maximising the overall welfare of the society. It postulates that a single national market with minimum barriers will be beneficial for competition. Good governance through greater transparency and accountability, especially in matters dealing with public procurement along with use of information and communication technologies, will also enhance competition, according to NCP. The policy also mentions that flexibilities in the move towards market economy should be allowed in matters dealing with sensitive issues such as environment protection and for the welfare of the weaker section.

The principles of NCP include an effective prevention of anti-competitive conduct, institutional separation between policy making, operations and regulation, a fair market process, competitive neutrality, fair pricing and inclusionary behavior, third party access to essential facilities. The government envisions implementing these principles by setting up of the National Competition Policy Council (NCPC) and

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60 *www.mca.gov.in/Ministry/pdf/Revised_Draft_National_Competition_Policy_2011_17nov2011.pdf*

61 *Ibid*

regularly reviewing policies, regulations and statues that may restrict competition in these sectors.

The MCA has recognised the importance of infrastructure owners granting third parties access to their essential facilities at reasonable, agreed terms and conditions to increase the overall level of competition in the economy. These sectors include electricity, communications, gas pipelines, railways, ports and IT equipment. The NCP calls for national, regional and international cooperation in the field of competition policy enforcement and advocacy in these sectors.

ii. HOW CAN THE ELECTRICITY SECTOR BENEFIT FROM NCP?

a. Transparency in the coal sector

The NCP will benefit the electricity sector by introducing competition in all associated segments starting from fuel supply. Under a regime with an effective competition policy, generation of electricity can become competitive if prices of coal are more transparent; the national and international prices of coal are pronounced and volatility in the market is factored in coal prices. At the same time, regulation of coal needs to be strengthened. NCP's principle of preventing anticompetitive conduct will ensure transparency, accountability, and a transparent bidding process that will take care of information asymmetry which currently persists in the coal sector. Once transparency in the supply of fuel for electricity generation is ensured, more companies will apply for licenses in generation. This will not only increase the power supply, but will also ensure that power is produced efficiently.

b. Functional autonomy between Generation, Transmission and Distribution

The principles of NCP encourage the unbundling of SEBs. Unbundling refers to separation of generation, transmission, and distribution services from a single bundle of electricity services to individual service packages that are discreet and have separately-priced components. The resulting functional autonomy of different segments of electricity supply chain is important especially from the point of view of encouraging private entry in the sector. Currently, the lack of effective enforcement of unbundling and continued monopolisation by the respective states is responsible for limited autonomy to utilities.

iii. DISTORTIONARY EFFECT OF REGULATIONS ON COMPETITION: THE TOOLKIT APPROACH

a. Fair Pricing of Tariffs will Encourage Private Players

Currently, the setting of tariffs is largely controlled by the state governments. Many of these state governments have resisted revisions in tariff rates due to apprehensions of losing vote banks, particularly from agricultural farmers. Tariffs to sectors like agriculture have therefore been heavily subsidised for a long time. Though the Electricity Act, 2003, envisaged rationalisation of tariffs, State governments continue to exercise control over the tariff setting in their respective states.[62]

The heavily subsidised tariffs offer low returns to private players from investment in electricity distribution to private players and therefore discourages them from entering the segment. However, NCP's principle of fair pricing of tariffs will attempt to rectify

[62] Supra Note 3

this scenario by allowing tariff setting to be based on economic principles and thereby influencing private entry in the electricity sector.

Effective competition is considered to be an important instrument promoting overall efficiency in any economy thus affecting welfare positively. In his book, Power and Productivity[63], author William Lewis argues that if countries eliminated the policies that distort competition, they could grow rapidly. Competition is distorted by factors such as anti-competitive practices of enterprises as well as policies and regulations adopted and implemented by the government that have anti-competitive outcomes.

One example of a major distortive policy frequently seen in India is the use of subsidies. For instance, in electricity, the distortion is clearly seen through State governments' grant of free or highly subsidised power to rural areas and agriculture. The result is that industrial users have to cross subsidise these sectors by paying higher tariffs.

In the following paragraphs, we assess the distortions induced by regulations governing the electricity sector.

b. Distorts level playing field between competitors

The primary fuel in India for electricity generation is coal, which is a near monopoly of the government. Producing around 80 percent of India's overall coal excavation, the monopoly in coal is led by the state owned CIL, which is today the single largest coal company in India and also in the world. Thus, even though the Electricity Act of 2003 mandates competition in the generation of electricity, the government monopoly in the fuel supply does not ensure a level playing field to the private generating companies that might be less preferred over public generation companies for supplying coal from CIL. Competitive neutrality between state-owned enterprises and private players is thus often distorted by lack of government policies in ensuring transparency in the coal sector. This is also reflected in the recent multibillion scandals arising from the government's attempt to open up of coal mining for captive power plants.

Another issue that 173 coal-based power generating companies faced relate to the fuel supply agreement (FSA) between Coal India Ltd (CIL) and them. The contention of power companies was the new FSA issued in April 2012 was skewed in favour of CIL, as far as terms and conditions relating to the penalty imposed on CIL, force majeure conditions and importing coal, were concerned.

However, of late, these conditions were partially relaxed and Coal India had entered into FSA agreements with 142 power plants as on September 23, 2013.[64] According to the revised norms Coal India will supply 65 percent of the contracted amount from within the country and another 15 percent through imports with pass-on pricing model, which essentially means CIL will charge buyers imported coal at landed cost plus a service charge and no subsidy will be given.

c. Creates entry barriers

Some policies such as licensing and authorisation conditions create entry barriers. A classic case of this in India is the opening up of the nuclear energy sector to foreign players. Foreign Direct Investment (FDI) is not allowed in the nuclear sector in India,

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63 William W. Lewis, Power of Productivity: Wealth, Poverty and the Threat to Global Stability," University of Chicago Press 2005

64 *www.moneycontrol.com/news/business/coal-linkage-panel-allows-lanco-babandh-to-ink-fsacil_955125.html*

despite several international nuclear power based companies having shown interest in setting up nuclear power plants. Although there are security issues in this sector, the way out could be if the foreign partner becomes an investor, rather than a supplier of equipment and after undertaking substantial responsibility of plant safety and security.

Further, entry of private players in transmission and distribution is also restricted because of the lack of implementation of regulations that ensure enforcement of Open Access. The provision of Open Access to transmission and distribution networks was granted by the Electricity Act, 2003 in order to encourage entry of private players in generation of electricity. The CERC has passed required regulations in the realm and has also taken steps to promote competition in the market. However, state level reforms have not addressed the issue of fair access to the common carrier adequately.[65]

Though instrumental in the development of the electricity sector, Open Access has not yet been implemented effectively.

Table 4 shows the current status of Open Access implementation in electricity transmission in India.

Table 4: Status of Open Access Applications in India

State	Applications Received	Capacity (MW)	Approved	Capacity (MW)	Cases Implemented	Capacity Implemented
Andhra Pradesh	9	130	2	44	2	44
Chhattisgarh	14	333	6	66	5	53
Gujarat	15	871	15	871	15	871
Haryana	2	573	0	0	0	0
Himachal Pradesh	3	32	0	0	0	0
Jharkhand	1	40	0	0	0	0
Kerala	1	30	1	30	0	0
Madhya Pradesh	29	56	29	56	29	56
Orissa	1	5	1	5	1	5
Punjab	2	21	2	21	2	21
Rajasthan	29	259	12	165	12	165
Tamil Nadu	12	1,764	0	0	0	0
Uttar Pradesh	5	46	5	46	5	46
West Bengal	4	86	3	36	0	0

Source: K.Vaishali, Report on Competition Issues in the Infrastructure Sector (2012); Forum of Indian Regulators, KPMG

As can be seen from Table 4, the number of approvals granted for Open Access across states in India has been very low. Apart from Madhya Pradesh, Gujarat, Orissa and

[65] Kumar. Rajesh (2010). Promoting Competition though Open Access in the Power Sector. *www.cuts-ccier.org/pdf/Promoting_Competition_though_Open_Access_in_the_Power_Sector.pdf*

Uttar Pradesh no other state has approved and implemented all the applications for practicing Open Access.[66]

In distribution Open Access is currently only for 1 MW and above customers. Gujarat and Maharashtra are states which have experimented with open access more vigorously. Delhi has also witnessed Open Access in a limited manner. The *Delhi Vidyut Board* has been privatised and licences have been granted to three distribution companies – North Delhi Power Limited (NDPL), BSES Yamuna Power Limited (BYPL) and Bombay Suburban Electric Supply (BSES). NDPL caters to the needs of north and north-west Delhi, BYPL to that of Central and East Delhi while BSPL to South and West Delhi.[67] Region-wise licences, however, do not go well with the spirit of competition. Real competition can exist when area wise monopoly is abolished and firms compete in the same market.[68]

At present, the status of the recognition of the Open Access to transmission and distribution as per the Electricity Act, 2003 and the National Electricity Policy, 2005 is as following:

- **Transmission:** As per Section 42, respective regulatory commissions must specify various norms and charges, including wheeling or cross subsidy surcharges[69] to make provisions of non discriminatory Open Access to any licensee or generating company
- **Distribution:** As per section 42(2), depending upon availability, a distribution licensee must allow non-discriminatory Open Access to any consumer who applies for such access by giving a notice. This can be applied by a consumer only.

There are many constraints to wide scale implementation of Open Access:

- The Cross Subsidy Surcharge has been the single biggest roadblock to an open access regime. Most states have been charging a high level of cross subsidy which makes it financially unviable for private operators to try to purchase power from a generator other than the distribution licensee because after adding the cross-subsidy surcharge and other charges, he ends up paying a very high amount.[70]
- Reluctance of State governments in allowing independent generators to supply electricity. Open Access implementation by an independent generator requires a no objection certificate from the respective SLDC. Further, because

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66 Vaishali, K. (2012). Competition Issues in the Infrastructure Sector, (Internship Report), Competition Commission of India *http://cci.gov.in/images/media/ResearchReports/Competition%20Issues%20in%20the%20Infrastructure%20Sector_With%20Special%20reference%20to%20the%20Indian%20Electricity%20Sector.pdf*

67 Ailawadi.V.S, GulatiBhawna, Ensuring Electricity to All. *www.circ.in/pdf/Electricity_Sector.pdf*

68 *Ibid*

69 When an industrial or commercial consumer decides to purchase power from an independent generator and not from the distribution licensee in that area, that distribution licensee loses the cross subsidy amount, which is the difference in the tariff charged to industrial or commercial consumers vis a vis agricultural consumers. The Cross Subsidy Surcharge is imposed on the consumer to ensure that the distribution licensee does not pass on this additional amount to the domestic and agricultural consumers, which can result in a steep rise in the cost of power.

70 PVX Law Partners. http://pxvlaw.wordpress.com/2011/06/14/cross-subsidy-and-open-access/

of close associations of SLDCs with distribution licensees, the process of granting approvals to the independent generators might be biased against such independent generators.[71] Before unbundling officials of SLDC and discom were all part of the SEBs.

Moreover, in almost every state, CPPs and IPPs are offered very low tariffs by domestic distribution companies. At the same time, if such units are interested in selling energy out of the state, the incumbent transmission utilities do not provide the needed access to the transmission system. Consequently, a huge chunk of capacity remains unutilised in many states. such as Tamil Nadu, Karnataka and Rajasthan. Given this acute shortage, various state governments including Karnataka, Tamil Nadu and Chhattisgarh are not allowing private players, especially CPPs, to export energy to other states.[72]

d. Promotes monopolies and their abuse

We have already observed how the coal monopoly abuse has a dominant position in generating fuel in India. The CCI has started issuing notices to CIL subsidiaries in two separate cases for discriminating in fuel supply agreements and abuse of dominance.[73]

The first case relates to a complaint by Maharashtra State Power Generation Company (Mahagenco) against CIL and its subsidiaries, Mahanadi Coalfields (MCL) and Western Coalfields (WCL), for alleged abuse of their dominant market positions. Mahagenco has alleged that the miner has been supplying low quality coal at higher prices and putting in place non-transparent contract conditions regarding quality and other parameters for supply[74].

The second allegation is made by the power industry lobby alleging discrimination in favor of public sector companies in the reworked format of fuel supply agreements (FSAs). The allegations are focused around several issues including CIL's unilateral right to terminate supplies, security deposit and the mechanism for settlement of disputes between the supplier and the buyer.

e. Institutional independence:

The Electricity Act of 2003 mandated the unbundling of SEBs as a means for increasing competition in the sector. It, however, gave the States a provision of deferring this post consultation with the Union Government. This provision has been misused by many states as an instrument to postpone the disintegration of power supply process, and as seen in earlier sections this has resulted in unbundling not being achieved in many states of India.

Further, for competition to be effective, institutional independence in the structure of different authorities is also necessary. For example, in the electricity sector, a need has been felt since 2009 to separate the working of the Load Despatch Centres, Transmission and Distribution. However, little has been done in this regard despite the strong recommendations of the Central Advisory Committee of the CERC since 2009

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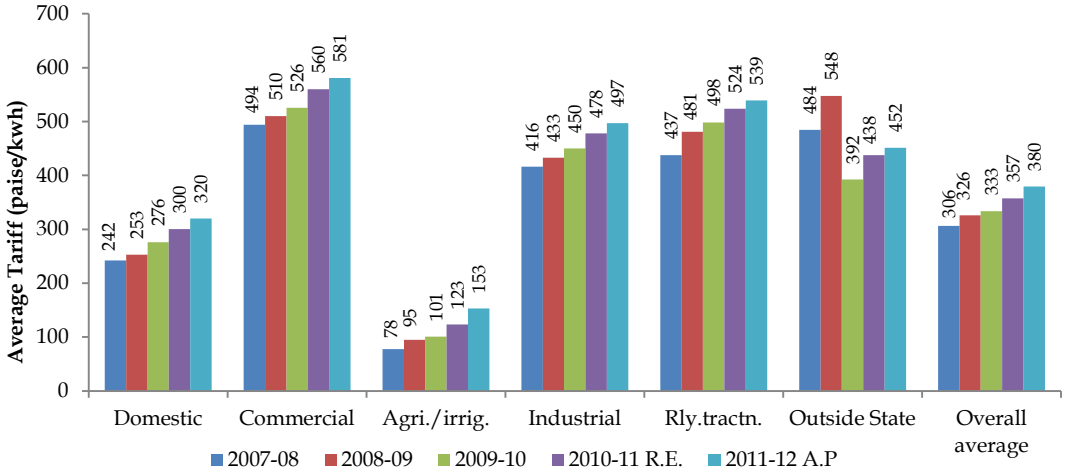
[71] PVX Law Partners.
http://pxvlaw.wordpress.com/2011/06/14/cross-subsidy-and-open-access/
[72] Supra Note 65
[73] *www.business-standard.com/india/news/cci-to-complete-probe-against-coal-india-in-two-months/202525/on*
[74] *Ibid*

which has said that it is not only important to grant independent status to these authorities but also to insulate the load despatch centres from political pressure.[75]

f. Subsidy or aid by the states leads to distortions in the market.

From 2007-08 to 2011-12, the overall average tariff rates in India increased by 24 percent. Figure 10 shows the consumer category-wise tariff for electricity from 2007-08 to 2011.[76] The maximum increase has been observed in case of agriculture/irrigation, where tariffs increased by 97 percent, followed by domestic consumer segment that observed a tariff increase of 32 percent from 2007-08 to 2011-12. The only category that experienced a decline in the tariff rate was the outside state sales, where tariff rates decreased by 7 percent in 2011-12 compared to 2007-08.

Figure 10: Consumer Category-wise Tariff for Electricity (paise/kWh) from 2007 to 2012



Source: Annual Report (2012), State Power Utilities and Electricity Department, Planning Commission
Note: For 2011-12 Data represents Annual Plan figures.

As can also be seen, the agriculture and domestic consumer segments pay the lowest tariffs of all of the sectors. The reason for this is the heavy subsidisation of these sectors by the state governments.

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[75] CUTS Competition Impact Assessment Toolkit

[76] For 2011-12, the data represent Annual Plan figures

Table 5 shows the commercial losses[77] accrued by the economy from 2007-08 to 2011-12. Here, the total revenue includes aid given by the state government in lieu of subsidised power supplies to domestic and agricultural sectors. On the other hand, the total expenditure includes payments towards depreciation and interest to the state government as well as financial institutions.[78]

[77] Commercial loss is the gap between total revenue receivables and total expenditure in a given year

[78] Annual Report (2012), State Power Utilities and Electricity Department, Planning Commission http://planningcommission.nic.in/reports/genrep/arep_seb11_12.pdf

Table 5: Commercial Loss (with subsidy) in INR crore from 2007-08 to 2011-12 (INR crore)

Year	Total Revenue	Revenue Expenditure	Gross Operating Surplus	Depreciation	Net Operating Surplus	Total Interest Payable	Commercial Profit /Loss
2007-08	158,569	158,128	-440	6,623	6182	10,147	-16,330
2008-09	185,278	194,289	-9,011	7,640	-16,651	12,817	-29,468
2009-10	202,680	214,270	-11,590	8,761	-20,351	15,529	-35,880
2010-11 R.E	223,434	235,433	-11999	9,802	-21,801	19,600	-41,401
2011-12 AP	262,288	265,213	-2,925	11,265	-14,190	23,646	-37,836

Source: Annual Report (2012), State Power Utilities and Electricity Department, Planning Commission

Further, cross subsidisation was considered an effective mechanism by state governments to counter the losses that they were accumulating because of subsidies granted to agriculture and domestic consumers. As a result, the commercial and the industrial sectors, along with railway traction, made up for a part of the revenue lost through sale of electricity to the agricultural and domestic sectors. This led to a steep rise in electricity price for the industrial sector. The *Table 6*shows the subsidies uncovered by cross subsidisation hence amounting leading to losses for the economy.

Table 6: Subsidy to Agriculture and Domestic Sector & Uncovered Subsidy (INR crore)

Year	Subsidy to Agricultural Consumers	Subsidy to Domestic Consumers	Subsidy on Inter-state Sales	Gross Subsidy	Subvention received from State	Net Subsidy	Surplus from Other Sectors	Uncovere d Subsidy
2007-08	33,363	15,767	-1124	48,005	17032	30,973	8,962	22,011
2008-09	39,391	21,919	-1,529	59,781	23,049	36,731	-3,694	40,426
2009-10	44,738	23,744	1,333	69,815	24,453	45,361	-2,780	48,141
2010-11 R.E	44,599	24,093	587	69,279	18,210	51,069	39	51,030
2011-12 AP	45,561	25,006	461	71,028	17,684	53,343	4,754	48,590

Source: Annual Report (2012), State Power Utilities and Electricity Department, Planning Commission

In the European Union, there are regulations which lead to checking state aids by conducting a cost benefit analysis between the distortions caused by state aids and the benefits of correcting market failures to which state aid it directed. Article 107 of the treaty on functioning of European Union addresses this issue and recommends adopting a refined economic approach and conducting a balancing test when dealing with approval of state aids.[79] State aids do not only distort markets but also promote operational inefficiencies.

g. Is driven by vested interests promoted by the government

In India, electricity is on the concurrent list where both the Centre and the states can make laws. However, the Centre dominates in cases of ambiguity. While the government is not gaining by way of high profits on electricity it becomes an issue of

[79] *Ibid*

political economy. As populist measures government's or political parties announce making electricity tariffs cheaper or free for certain sections of the society. A lot of times these become election gimmicks.

V. Economic Analysis of Competition and Regulatory Issues in the Electricity Sector

A. Benefits to the Economy, Consumers and Producers of Competition

While progress has been made in recent years, the electricity sector in India still has ways to go until it can be considered fully open and effective competition is introduced. For instance, in the distribution segment, 90 percent of the business is still controlled by state-run utilities. Only when the sector is truly open will the benefits of competition be fully quantifiable. An attempt, however, has been made in this study to determine the apparent benefits of opening up the sector to competition through a case study of distribution companies in four states.

In this section, we assess the economic gains that would arise due to changes in government regulations resulting in increased competition in the market.

i. Unbundling of SEBs

The unbundling of SEBs into separate entities for generation, transmission and distribution has still not been achieved by many states. States such as Bihar only unbundled its state utility in 2012 and Tamil Nadu reorganised in 2010. Other states continue to work as vertically integrated utilities, such as in Jammu and Kashmir, Puducherry, Goa, Sikkim, Arunachal Pradesh, Manipur, Mizoram, Nagaland and Tripura, where the power sectors are administered through government departments. Even in states where unbundling has progressed, all the three segments remain largely dominated by publicly owned enterprises. Delhi, Maharashtra, Gujarat and Orissa are some instances where the distribution sector has seen privatisation. Also, there are few private players in the distribution sector operating in cities of major states like RInfra and TataPower Company (TPC) in Mumbai, CESC in Kolkata, Torrent Power in Ahmedabad and Noida Power in Noida.

Solar bid case study

This case study provides a good example of how competition can benefit consumers by lowering power tariff rates through measures like competitive bidding. This was reflected in the bid for solar energy conducted by the Ministry of Renewable Energy. The government launched the Jawaharlal Nehru National Solar Mission in 2010.

Competitive bidding in solar energy under the National Solar Mission in 2011 brought down the price at which solar energy can be consumed. While the lowest bid was valued at Rs7.49 per unit by Solairedirect India, the highest was valued at Rs9.44 per unit by Green Infra Solar. The lowest bid at 7.49 per unit was 50 percent lower than the benchmark tariff of Rs 15.39/unit as set up by the CERC

Source:http://www.downtoearth.org.in/print/34592http

Effective unbundling can lead to the dilution of government ownership of power utilities and granting functional autonomy to these utilities. Transparent and non-

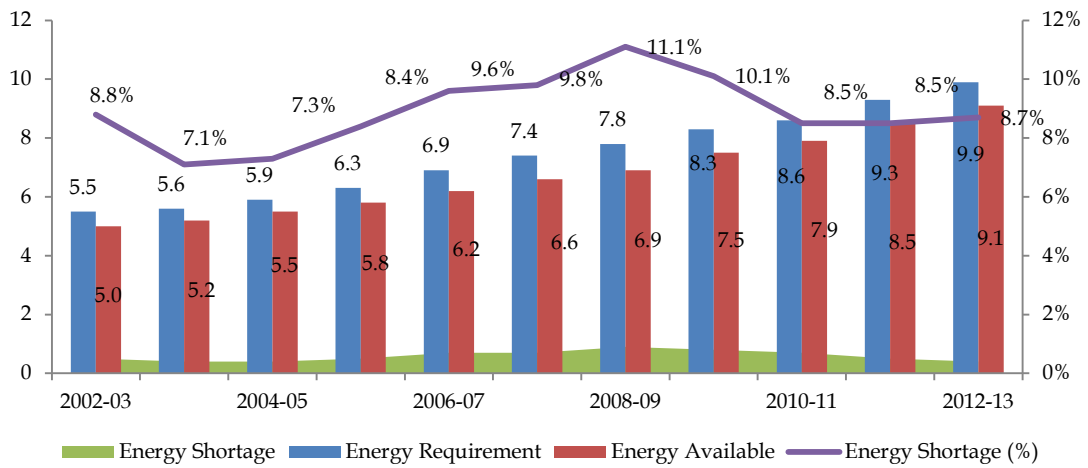
discriminatory allocation of network access as promised by the open access provision, if overseen by a regulator, will encourage private players to enter the electricity generation market. Thus, competition neutrality would ensure a level playing field in the electricity supply in India.

ii. REDUCING POWER SHORTAGE BY INCREASING GENERATION CAPACITIES

The amount of electricity used in households is affected by many social and structural factors such as: income, age of householders, size of home, population, age of home and equipment. In addition, weather, appliance energy standards, and energy-saving programmes influence the use of electricity.[80] Being the second most populous country of the world, the demand for electricity in India is bound to be increasing.

The total electricity generation in the country increased from 531.6 billion units during 2002-03 to 580.5 billion units in November 2011.[81] However, corresponding to this, the demand for electricity also increased from 546.0 billion units in 2002-03 to 613.9 billion units in November 2011. Figure 11 shows the trend in electricity demand and supply over the years, also consequently the shortage of demand for electricity.

Figure 11: Power Supply Position from 2002-03 to 2012-13*



Source: Ministry of Power
*Note: * Up to November, #Provisional*

The above figure shows the growing demand for energy over the years and also the growing supply of energy from 2002-03 to 2011-12. Though the growth rate in electricity supply (10 percent) surpassed the growth rate in electricity demand (8 percent) in 2011-12 (till November), as can be seen from the figure, shortage of electricity still persists.

Tables 7, 8, 9 and 10 give an account of the region-wise supply position of electricity in the country from 2007-08. As can be seen from the data, there is a deficit in the supply of electricity across all regions, which has nonetheless started falling in recent years. This indicates that the supply of electricity has increased, but the demand still exceeds the current supply.

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[80] Hojjati, B. & Battles, S. J., The Growth in Electricity Demand in U.S. Households, 1981-2001, Energy Information Administration www.eia.gov/emeu/efficiency/2005_usaee.pdf

[81] Annual Report 2011-12, Ministry of Power, GoI. www.powermin.nic.in/reports/pdf/Annual_Report_2011-12_English.pdf

Table 7: Power Supply Position of States in the Northern Region from 2007-08 to 2011-12

Northern Region	Surplus/ Deficit (-) (%)				
	2007-08	2008-09	2009-10	2010-11	2011-12
Chandigarh	0.0	0.0	-3.0	0.0	-0.3
Delhi	-0.6	-0.6	-0.8	-0.3	-0.3
Haryana	-12.6	-8.5	-4.2	-5.6	-3.6
Himachal Pradesh	-3.0	-0.3	-3.9	-3.4	-0.7
Jammu & Kashmir	-29.0	-24.1	-24.8	-25.0	-23.6
Punjab	-8.4	-10.6	-13.8	-6.0	-3.1
Rajasthan	-3.1	-1.1	-2.4	-0.9	-3.9
Uttar Pradesh	-18.0	-21.5	-21.6	-15.0	-11.3
Uttarakhand	-2.9	-1.0	-6.5	-6.0	-2.9

Source: Load Generation Balance Report, Central Electricity Authority, Government of India

Table 8: Power Supply Position of States in the Southern Region from 2007-08 to 2011-12

Southern Region	Surplus/ Deficit (-) (%)				
	2007-08	2008-09	2009-10	2010-11	2011-12
Andhra Pradesh	-4.1	-6.8	-6.6	-3.2	-7.2
Karnataka	-2.7	-6.0	-7.7	-7.6	-11.2
Kerala	-2.4	-11.8	-2.4	-1.4	-2.1
Tamil Nadu	-2.8	-7.8	-6.2	-6.5	-10.5
Puducherry	0.0	-12.2	-6.8	-4.0	-1.4

Source: Load Generation Balance Report, Central Electricity Authority, Government of India

Table 9: Power Supply Position of States in the Western Region from 2007-08 to 2011-12

Western Region	Surplus/ Deficit (-) (%)				
	2007-08	2008-09	2009-10	2010-11	2011-12
Chhattisgarh	-4.8	-2.6	-2.5	-1.7	-2.7
Gujarat	-16.2	-9.8	-4.5	-5.7	-0.4
Madhya Pradesh	-14.1	-17.2	-19	-20.2	-16.9
Maharashtra	-18.3	-21.4	-18.7	-16.6	-16.7
Goa	-1.2	-12.3	-6.8	-8.4	-10.6
Daman & Diu	-10.9	-3.3	-3.8	-0.1	-0.7
Dadra & Nagar Haveli	-0.5	-1.7	-2.1	-2.1	-1.4

Source: Load Generation Balance Report, Central Electricity Authority, Government of India

Table 10: Power Supply Position of States in the Eastern Region from 2007-08 to 2011-12

Eastern Region	Surplus/ Deficit (-) (%)				
	2007-08	2008-09	2009-10	2010-11	2011-12
Bihar	-13.3	-16.4	-14.4	-13.0	-21.3
Jharkhand	-13.3	-4.7	-7.8	-3.4	-4.0
Orissa	-1.8	-1.5	-0.9	-0.3	-1.5
West Bengal	-6.5	-5.4	-6.9	-10.9	-4.8
Sikkim	-6.0	-22.0	-11.1	0.0	-1.5

Source: Load Generation Balance Report, Central Electricity Authority, Government of India

The above data indicate that there is a need for greater intervention and increased competition in the sector, to allow for the entry of more participants in order to cater to the increasing demand for electricity in the country.

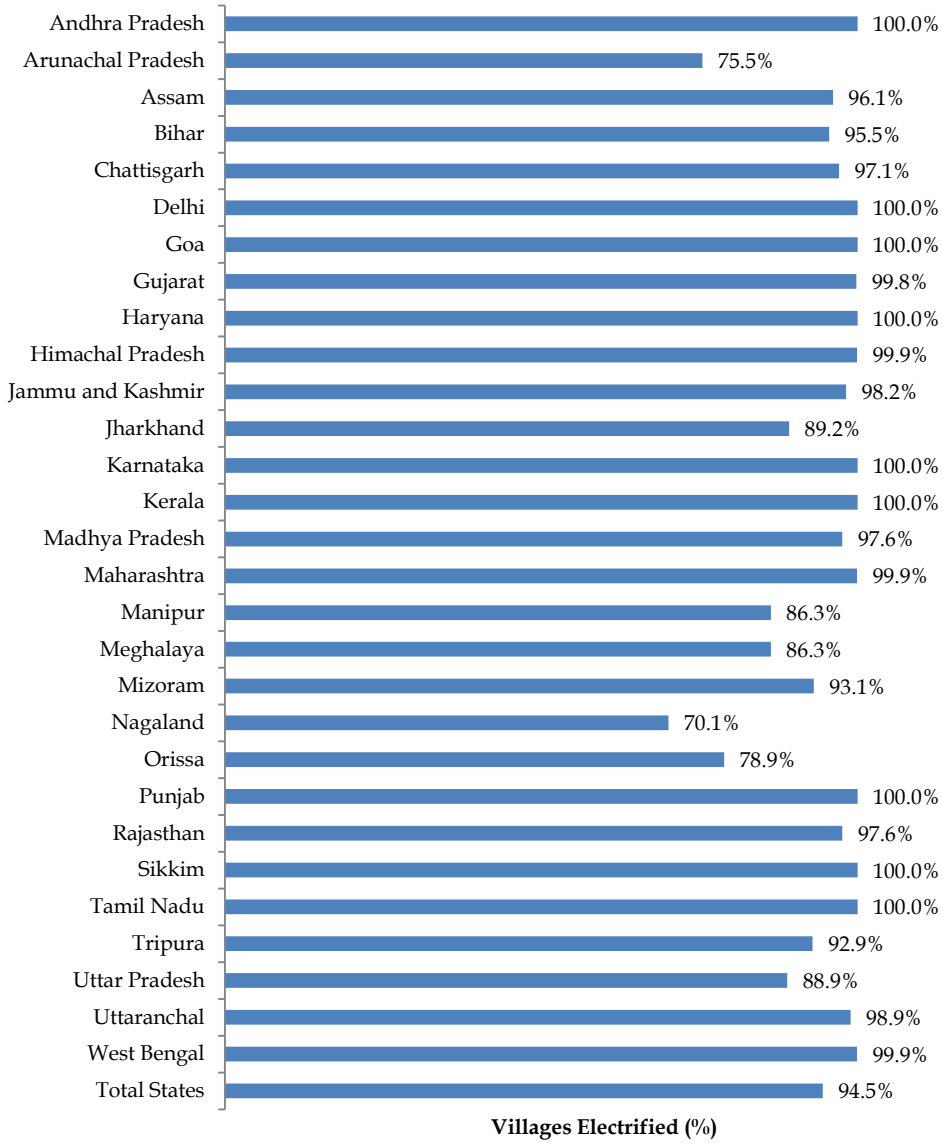
iii. INCREASING AVAILABILITY OF ELECTRICITY BY IMPLEMENTING OPEN ACCESS AND RURAL ELECTRIFICATION

Open Access is the paradigm shift brought about by the Electricity Act of 2003 to increase competition in the electricity sector and open avenues for cheaper and more reliable sources of electricity.

Instituting Open Access of transmission and distribution related infrastructure would reduce barriers to entry and increase the number of players, resulting in greater competition among market participants.

In India, rural electrification, which is the process of bringing electricity to remote and rural areas, has been regarded as a vital part of all schemes aimed at the development of the rural areas. Earlier a village was considered to be electrified if it could use electricity for irrigational purposes. However, this definition was modified in 1997 to hold a more comprehensive and practical meaning. As per this new definition, a village will be considered electrified if electricity is used in the locality for any purpose. shows the state-wise status of rural electrification in India as per March 2011 data.[82] As can be seen from the figure, around 92 percent of the total villages in India were electrified as of March 2011. Further, around 7 states were 100 percent electrified. The government has played an exceptional role in this regard, as indicated from the various government schemes on rural electrification such as *Pradhan Mantri GramodyayaYojna* (PMGY), Accelerated Rural Electrification Programme (AREP) and *Rajiv Gandhi Grameen Vidyutikaran Yojna* (RGGVY).

[82] Source: India Stat www.indiastat.com/default.aspx



Source: India Stat

Increased competition in the electricity sector would solve the issues of electricity shortages and last mile availability in remote areas by increasing private player participation in generation as well as transmission through open access and rural electrification.

B. Open Access Case Study – Navi Mumbai

As noted above, Open Access is an important tool of introducing competition in the electricity industry and ensuring choice to buyers and suppliers of electricity. The Electricity Act (2003) envisions Open Access in the transmission and distribution networks; Open Access in transmission has been rather smooth compared to that in distribution which has been subject to several interpretations.

According to the Ministry of Power, Section 42 of the Electricity Act, 2003 (relating to the grant of Open Access) makes it mandatory for all consumers with load exceeding 1 MW to be Open Access consumers and that the tariffs for such consumers not to be regulated by SERCs.[84] The main role of SERCs in such cases is to regulate wheeling charges and surcharge only.

The below case study on the distribution of power in Maharashtra suggests how competition has been introduced in the electricity market through Open Access mechanisms. However, the same faces certain restrictions imposed by regulatory interventions that are not determined by market forces.

There are two main private players, Reliance Infrastructure (RInfra) and TPC competing in suburban Mumbai to supply power to consumers with loads exceeding 1 MW under the Open Access regime, where each can set its own tariff to attract the maximum number of customers to maximise their profits. This competitive tariff rate lets the consumer enjoy a choice of suppliers to buy electricity from, and forces the suppliers compete and innovate in order to gain/retain customers.

Tariffs charged by TPC are Rs 5.2 per unit compared to RInfra's Rs 7.06 per unit price. In 2011-12, about 120,000 customers switched from RInfra to TPC. Of these, the residential segment accounted for 88 percent, followed by the commercial segment (11 percent) and the industrial segment (1 percent). TPC, with a customer base of 300,000, receives 300-350 consumer applications for a switch daily. In this category of applications, TPC was choosing high-end consumers, according to MERC.

The difference in rates between the two suppliers is primarily driven by the power purchase price and consumer mix. Despite having a competent power purchase price, RInfra continues to lose consumers to TPC and has an unfavourable consumer mix. With cross-subsidy of more than Rs 1,000 crore, it supplies 2.2 million low-end consumers (75 percent of low-end consumers are in Mumbai) who receive supply at rates significantly lower than the cost of supply. However, TPC has a negligible number of such consumers. To maintain the average rates, rates for each consumer category have to be significantly higher in the case of RInfra.

However, this case has come under much controversy due to a surging migration of bulk consumers to TPC, the cheaper supplier, when the state government allowed open access to customers above 300 kw a month. Through an order in August 2012, Maharashtra Electricity Regulatory Commission (MERC), ruled that only residential consumers using up to 300 units (KW) a month, will be allowed to migrate from RInfra to TPC. Thus, putting a cap on Open Access. RInfra had filed a petition before MERC seeking relief on account of certain issues affecting its customer base and financial viability due to switchover by consumers to TPC. MERC thus issued an order to allow changeover[85] in Mumbai for a particular set of consumers.[86] TPC termed this MERC order, which put a cap on open access, as a decision against competition, since the migrating industrial consumers can be acquired as a part of their license.

MERC, defended its intervention by justifying the particular order to ensure a level playing field between distributing companies besides taking care of the interests of

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[84] Accesses on 30.11.2011

[85] From Reliance Infra as the supplier to Tata Power

[86] Only for the residential category of consumers and that too only for the consumers who consume electricity up to 300 units (300 kW) a month (whose average monthly consumption over the previous 12 months is up to 300 units)

low-end consumers. The regulator in its order added that it will monitor the progress of consumer additions by TPC (switchover and new connections) on a quarterly basis, and both RInfra and TPC would be required to submit the desired information for every quarter.

Thus, despite the regulations allowing customers choice of their electricity supplier, customers are unable to realise these due to the issues arising from cross subsidisation of electricity across different consumers and the resulting intervention by the MERC.

C. Measuring the Benefits of Competition through Case Studies

Nathan India has conducted a case study of four states: Gujarat, Bihar, Tamil Nadu and Maharashtra. These four states have been selected on the basis of a recent rating exercise undertaken by credit rating agencies ICRA and CARE at the behest of the MoP. Nathan India shortlisted these states based on discussions with various stakeholders such as officials in certain discoms of Gujarat, officials in the MoP, executives of private sector power companies, representatives from Confederation of India Industry (CII) and our own assessment.

The following electricity companies have been selected from the public sector for our study:

- *Tamil Nadu:* The Tamil Nadu Generation and Distribution Company (TANGEDCO)
- *Bihar:* The Bihar State Power Holding Company Ltd (BSPHL)
- *Maharashtra:* The Maharashtra State Electricity Distribution Company Ltd.
- *Gujarat*: Dakshin Gujarat Vij Company Ltd, Uttar Gujarat Vij Company Ltd, Paschim Gujarat Vij Company Ltd, and Madhya Gujarat Vij Company Ltd.

The following electricity companies have been selected from the private sector for our study:

- Tata Power Company Ltd (TPC)
- Reliance Infrastructure (RInfra)
- Adani Power Ltd
- Lanco Infratech Ltd

In this study we look at the distribution segment, which has been particularly chosen because it is still largely controlled by the states and political economy plays a dominant role in the functioning of the sector.

iv. Cross State Comparison of Performance Parameters:

In this section, we compare four states - Gujarat, Bihar, Maharashtra and Tamil Nadu - across parameters that reflect their performance in the electricity sector. The four states differ considerably in terms of their performances based on these parameters. One factor responsible for this is the difference in the commencement of unbundling of SEBs in these states. While the process was initiated as early as 2005 in Gujarat and Maharashtra, it started only in 2010 in Tamil Nadu and in 2012 in Bihar.

As can be seen from the below table, both Gujarat and Maharashtra have benefitted from early unbundling in terms of being able to make profits albeit by using the subsidy grants from the central as well as state governments. After subsidies, Gujarat

had a profit of Rs 642 crore in 2010-11 and Maharashtra had a profit of Rs 150 crore. This is in contrast to Tamil Nadu's loss of Rs 1,788 crore and Bihar's loss of Rs 8,144 crore.

Benefits have accrued in terms of the power supply position in Gujarat and Maharashtra. As aforementioned in this report, both Gujarat and Maharashtra have experienced a decrease in the power supply deficit. Between 2008-09 and 2011-2, the power deficit has fallen from 9.8 percent to 0.4 percent in Gujarat, and 21.4 percent to 16.7 percent in Maharashtra. In contrast, the power supply position has deteriorated in Bihar and Tamil Nadu. In Bihar, the deficit increased from 16.4 percent in 2008-09 to 21.3 percent in 2011-12. Similarly, for Tamil Nadu the deficit increased from 7.8 percent in 2008-09 to 10.5 percent in 2011-12 respectively.

That unbundling has had an immediate positive effect on the health of the distribution segment can be seen in the case of Maharashtra. Just before unbundling of the utilities in Maharashtra there was a shortfall of over 4000 MW in demand for power, transmission and distribution losses were to the tune of 35 percent and the percentages of revenue collection from consumers were only upto 85 percent. Besides, there was lack of effective control because of the large size of Maharashtra State Electricity Board (MSEB) and with diverse utilities under its ambit.[87]

Post unbundling, in 2006, the demand supply gap was reduced through demand side management. Further, distribution losses were reduced by three percent and revenue collection increased by 15 percent in 2005-06, from Rs 12,105 crore in 2004-05. Modern management practices through better retail services and consumer redressal mechanism helped further in effective unbundling. Theft of electricity was another area which saw considerable decrease. While in 2004-05 the MSEB saved Rs 19 crore on account of controlling power theft. By December 2005, this rose to Rs 40 crore.[88]

Gujarat's power situation, in the years prior to the Gujarat Electricity Industry (Reform and Re-organisation) Act, 2003, was grim. In 2000-01Gujarat State Electricity Board (GSEB) recorded a loss of Rs 2,246 crore. Transmission and distribution losses were around 35.27 percent along with frequent load shedding. Further, single feeder lines that ran through rural villages were erratic with only 12-15 hours of power supply and power thefts were upto 20 percent in urban areas and 70 percent in rural areas.[89]

After unbudling two feeder lines were supplied to the rural villages as part of the Jyoti Gram Yojana scheme. In 2005-06 the SEB posted a net profit of about Rs 200 crore. Net profit further rose to Rs 533 crore in 2010-11. The transmission and distribution losses fell to about 20 percent in 2010-11.[90]

Further, an analysis of the tariff rates also reflects differences across these states in terms of rationalisation of tariffs. As can be seen from the table, the average electricity tariff rates in Gujarat and Maharashtra both lie within +/-20 percent of the cost of power supply. This is in line with the mandate of National Tariff Policy (NTP), which is to make tariffs reflective of the cost of power supply. As regards Bihar and Tamil Nadu the difference, however, is outside of the stipulated range.

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[87] *www.mahadiscom.in/compliance/chang_power_sect.shtm*
[88] *Ibid*
[89] *http://businesstoday.intoday.in/story/gujarats-power-sector-turnaround-story/1/21750.html*
[90] *Ibid*

An analysis of the consumer category-wise tariff rates reflects high disparity between tariff rates for agricultural, industrial and commercial consumers across the respective states, thus highlighting the cross subsidy burden on the states. In case of the cross subsidised sectors like agriculture, the difference between tariffs and cost of power supply is as high as 100 percent for Tamil Nadu. This might be attributed to the role of the respective state governments in controlling the tariff rates in their states to secure votes from the population that largely depends on agriculture for living. These huge gaps between cost and tariff also show why losses for the discoms in Bihar and Tamil Nadu are so high and why there is no incentive for private players to enter the market.

Table 11: Comparison of Performance Parameters across States

Parameters	Gujarat	Maharashtra	Tamil Nadu	Bihar
Unbundling/Restructuring Year	2005	2005	2010	2012
Number of Unbundles Entities in Generation, Transmission and Distribution segments	7	4	3	5
Generation	1	1		1
Transmission	1	1	1	1
Distribution	4	1	1*	2
Holding Company	1	1	1	1
Number of Private Entitites in Power Sector	25	74	29	**
Generation	22	70	28	
Distribution	3	4	1	
Power Supply Position (Percentage) (2011-12)	-0.4***	-16.7	-10.5	-21.3
Commercial Profit / Loss with Subsidy (INR Crore) (2012)***	642*	150*	-8,144	-1788
Commercial Profit / Loss without Subsidy (INR Crore) (2012)*****	-458*	150*	-10426	-2,868
Unit Cost of Power Supply (Paise per Kwh)	427	480	514	775
Average Tariff for Sale of Electricity (Paise per Kwh)	398	466	353	374
Difference Between Cost of Power Supply and Average Electricity Tariff	-7%	-3%	-31%	-52%
Average Tariff for Agriculture Sector (Paise per Kwh) (2012)	176	215	0.04	81
Difference Between Cost of Power Supply and Agricultural Tariff	-59%	-55%	-100%	-90%
Average Tariff for Industrial Sector Paise per Kwh) (2012)	532	515	530	545
Difference Between Cost of Power Supply and Industrial Tariff	25%	7%	3%	-30%
Average Tariff for Commercial Sector (Paise per Kwh) (2012)	572	736	695	612
Difference Between Cost of Power Supply and Commercial Tariff	34%	53%	35%	-21%

Source: Ministry of Power, Central Electricity Authority, Planning Commission Report: Annual report 2011-12 on the working of state power utilities and electricity departments. Figures represent Annual Plan figures for 2011-12. CMIE Data on number of private entities in states based on the entity's registered address

Note:
**One entity for distribution and generation.*
***For Bihar, CMIE had no information on private companies, possibly because unbundling started in the state only in 2012*
****Gujarat is a surplus power state as per a Speech by Saurabh Patel, Gujarat Energy Minister dated 5 February 2013.*

**** *For Bihar losses with subsidies are higher than losses without subsidies. This is official data and is not explained in the report.*
***** *For Maharashtra, losses with and without subsidies are same despite positive subsidies being granted by the state government. This is unexplained in the text.*

The analysis thus indicates the benefits of unbundling accrued to states such as Gujarat and Maharashtra with regard to power supply, profit, and tariff coverage. While low tariffs generally benefit consumers, tariffs that do not cover costs are anti-competitive as they act as entry barriers, preventing new firms (especially for-profit, private firms) from entering the market. Besides, tariffs that are not in line with the forces of demand and supply often result in supply shortages. Appropriate regulatory intervention in areas such as tariff setting can also reduce the subsidy burdens on the state and the central government.

The next section compares the four states in light of performance of state distribution utilities in these states respectively using the first ever integrated rating done in March 2013 by rating agencies, Investment Information and Credit Rating Agency of India (ICRA)/CARE Ratings (CARE) along with the Ministry of Power. The rating analysis was done keeping in view that 90 percent of the country's distribution business comes from the ailing state distribution sector. The rating methodology has focused on efforts made by respective discoms in improving their operational efficiencies and financial performance[91]. According to the MoP, "[t]he methodology adopted has attempted to objectively adjudge the performance and award marks to various performance parameters of these utilities. In certain parameters, marks have been assigned for both current levels of performance and relative improvement from year to year".[92]

The ICRA/CARE integrated ratings are based on scores assigned both on the basis of absolute and relative improvement in operational and financial performance parameters. Ranging between zero and 100, the scores reflect very low operational and financial performance capability for the discoms falling in the 0-20 score distribution point and very high operational and financial performance capability for those falling in the 80-100 score distribution point.

Maximum weightage was assigned to financial performance parameters such as subsidy received, cost coverage ratio, AT&C losses, financial planning. Parameters carrying negative scores included parameters like not auditing accounts, SEBs unbundling, not filing a tariff petition and, deterioration of AT&C loss.[93] The following chart gives the summary of rating parameters.

Table 12: Summary of Rating Parameters

Parameters	Positive Weight	Negative Weight presentation
1. Financial performance		
i. Coverage Ratio	15	-
ii. AT&C Losses	12	5
iii. Subsidy Support	10	-
iv. Interest Coverage Ratio	5	-
v. Debt Equity Ratio	5	3
vi. Sustainability	9	-

[91] First Integrated Rating, Ministry of Power
[92] *Ibid*
[93] First Integrated Rating for State Power Distribution Utilities

Parameters	Positive Weight	Negative Weight presentation
vii. Receivables	4	-
viii. Payables	3	3
2. Audited Accounts	5	12
3. Cross Subsidy	0	2
4. Reform measures – Unbundling & Corporatisation	0	5
5. Regulatory Environment	15	15
6. Forward Looking parameters	5	1
7. Incentive / Bonus marks	12	-
Total	**100**	

Source: First Integrated Rating for State Power Distribution Utilities

Table 13: Parameters Definition

Parameters	Definitions
Coverage Ratio	(Revenue realised from sale of power +Other income + Subsidy received) / Total Expenditure booked *Revenue realised from power = Opening receivables (power sale) – Closing receivables (power sale) + revenue from sale of power booked during the year*
AT&C Losses (%) for SEBs/PDs/ Discoms	((Net input energy (Mkwh) – Energy Realised (Mkwh)) x 100)/ Net input energy (Mkwh)
Net input energy (*Mkwh*)	Total input energy*(adjusted for transmission losses and energy traded)*
Energy realised (*Mkwh*)	Net sale of Energy (Mkwh) x Collection Efficiency
Net sale of energy (*Mkwh*)	Total energy sold(*adjusted for energy traded*)
Collection Efficiency (%)	((Net Revenue from Sale of Energy – Change in Debtors for Sale of Power) x 100) / Net Revenue from Sale of energy
Net revenue from sale of energy (Rs. cr)	Revenue from sale of energy (*adjusted for revenue from energy traded*)
Interest Coverage Ratio	(PAT + Depreciation, Amortisation + Interest charged to operation) / Interest charged to operation
Debt Equity Ratio	Total Borrowings /Total Networth *Total Borrowings = Long term debt + Short term Debt* *Total Networth = Equity + Reserves + Accumulated Profits, Losses – Miscellaneous expenses not written off*
Fixed Assets to Total Debt Ratio	Net Fixed Assets / Total Debt
Receivables (*no. of days*)	(Debtors for sale of power x 365) / Revenue from sale of power
Payables (*no. of days*)	(Creditors for purchase of power x 365) / Cost of purchase of power

Source: First Integrated Report for state power distribution utilities

Accordingly, grades have been assigned to 39 utilities as mentioned below, ranging from A+ at the high end to C at the low end. The highest grades of A+ have been assigned to the four discoms of Gujarat. This is followed by one discom each in West Bengal and Maharashtra with each getting a grade points of A (only). While A+ reflects a score distribution point of 80-100, depicting very high operational and financial performance capability, A shows a score distribution point of 65-80 depicting high operational and financial performance capability. B reflects a score distribution point of 35-50 meaning below average operational and financial performance capability. C depicts a 0-20 score distribution point.

Table 14: Ratings Assigned to Utilities

Name of Utility	Rating Agency	Grade
Dakshin Gujarat Vij Company Limited	ICRA	A+
Uttar Gujarat Vij Company Limited	ICRA	A+
Madhya Gujarat Vij Company Limited	ICRA	A+
Paschim Gujarat Vij Company Limited	ICRA	A+
West Bengal State Electricity Distribution Co. Ltd.	ICRA	A
Maharashtra State Electricity Distribution Co. Ltd.	ICRA	A
Bangalore Electricity Supply Company Limited	ICRA	B+
Mangalore Electricity Supply Company Limited	ICRA	B+
Southern Power Distribution Company of AP Limited	CARE	B+
Eastern Power Distribution Company of AP Limited	CARE	B+
Hubli Electricity Supply Company Limited	ICRA	B+
Kerala State Electricity Board	CARE	B+
Central Power Distribution Company of AP Limited	CARE	B+
Himachal Pradesh State Electricity Board Limited	CARE	B+
Gulbarga Electricity Supply Company Limited	ICRA	B+
Chhattisgarh State Power Distribution Company Ltd.	CARE	B+
Punjab State Power Corporation Limited	ICRA	B+
Northern Power Distribution Company of AP Limited	CARE	B
Assam Power Distribution Company Limited	ICRA	B
Chamundeshwari Electricity Supply Corporation Ltd	ICRA	B
Uttar Haryana BijliVitran Nigam Limited	CARE	B
Tamil Nadu Generation and Distribution Corporation Ltd.	ICRA	B
Dakshin Haryana BijliVitran Nigam Limited	CARE	B
MP PashchimKshetraVidyutVitaran Company Ltd	CARE	B
MP PoorvKshetraVidyutVitaran Company Limited	CARE	B
Bihar State Power Holding Company Limited	ICRA	B
MP Madhya KshetraVidyutVitran Company Limited	CARE	B
Tripura State Electricity Corporation Limited	CARE	C+
Uttarakhand Power Corporation Limited	CARE	C+
Jaipur VidyutVitran Nigam Limited	CARE	C+
Jodhpur VidyutVitran Nigam Limited	CARE	C+

Name of Utility	Rating Agency	Grade
Ajmer VidyutVitran Nigam Limited	CARE	C+
Meghalaya Energy Corporation Limited	CARE	C+
Jharkhand State Electricity Board	CARE	C+
PurvanchalVidyutVitaran Nigam Limited	ICRA	C+
PaschimanchalVidyutVitaran Nigam Limited	ICRA	C
DakshinanchalVidyutVitran Nigam Limited	ICRA	C
Kanpur Electricity Supply Company Limited	ICRA	C
MadhyanchalVidyutVitran Nigam Limited	ICRA	C

Source: First Integrated Report for state power distribution utilities

The following table compares discoms in the selected states across a variety of parameters including the share of subsidy to different consumer sectors, revenues, tariff rates, commercial profit and loss etc. For instance, in Gujarat the separation of discoms has not only led to efficient distribution but consumers also have benefited on account of uninterrupted power supply as the discom adhering to the lowest System Average Interruption Frequency Index (SAIFI)[94] gets rewarded by the state government.

Table 15: Comparison of Parameters across State Discoms

Parameters	Gujarat	Bihar	Maharashtra	Tamil Nadu
Unbundling/Restructuring Year	2005	2012	2005	2010
Open Access	Implemented			
Submission of Audited Accounts	FY 2012	FY 2012	FY 2012	-
Cost Coverage of Revenues	Strong	< 80 %	Weak	Low
Revenue Collections	Satisfactory	Weak	-	Satisfactory
T&D Losses (Percentage of Availability) (2012)	22	35	22	17
AT&C Losses (Percentage of Availability) (2012)	22	43	23	18
Average Tariff for Sale of Electricity (Paise per Kwh)	398	374	466	353
Average Tariff for Agriculture Sector (Paise per Kwh) (2012)	176	81	215	0 (*Free Power to Agriculture*)
Average Tariff for Industrial Sector (Paise per Kwh) (2012)	531.84	545	515	530
Unit Cost of Power Supply (Paise per Kwh)	427	775	480	514
Sales Revenue as a Ratio to Cost (Percentage) (2012)	93	48	97	69
Share of Interest in Total Cost (Percentage) (2012)	5	22	3	13
Commercial Profit / Loss with Subsidy (INR Crore) (2012)	642	-8,144	150	-1,788
Commercial Profit / Loss without Subsidy (INR Crore) (2012)	-458	-2,868	150	-10,426

[94] SAIFI is the average interruption frequency index

Parameters	Gujarat	Bihar	Maharashtra	Tamil Nadu
Per Capita Consumption of Electricity (Kwh) (2009-10)	1,615	122	1,028	1,132
Share of Agriculture to Total Sale of Power (Percentage) (2012)	29	13	20	18
Share of Revenue from Agriculture in Total Sales Revenue (Percentage) (2012)	13	3	9	0
Share of Industry to Total Sale of Power (Percentage) (2012)	40	28	43	36

Source: Planning Commission Report: Annual report 2011-12 on the working of state power utilities and electricity departments

As can be seen from the table above, in 2011-12, the share of revenue from agriculture in total sales was 13 percent in Gujarat, compared to 0 percent in Tamil Nadu (where electricity is free to agriculture) and 3 percent in Bihar. In turn, Gujarat also provided 29 percent of total electricity to the agriculture sector *vis-à-vis* Bihar, which gave only 13 percent and Tamil Nadu which contributed 18 percent.

Further, the unbundling of the SEBs has a strong link to efficiencies. Both Maharashtra and Gujarat are reaping benefits of unbundling since 2005. Bihar, which finished unbundling in 2012, lags behind in terms of performance.

v. TAMIL NADU

ICRA assigns a rating of B to the Tamil Nadu state discom, called Tamil Nadu Generation and Distribution Corporation Ltd. The discom is one of the worst state discoms in terms of power supply and AT&C losses. Due to political considerations, the state government did not opt for tariff revisions between 2003 and 2010. It was only in 2010 that the Tamil Nadu Electricity Board (TNEB) was reorganised into the Tamil Nadu Generation and Distribution Corporation Ltd (TANGEDCO) and the Tamil Nadu Transmission Corporation Ltd (TANTRANSCO).These two entities continue to play a dominant role in the state's power sector, despite their being private players like PPN Power Generation Company Pvt Ltd and Lanco Tanjore Power Company Ltd operating in the state's generation segment.

The state continues to give free power to agriculture and has a high amount of regulatory assets with a carryover period of over three years.[95] The state utility has not been paying off its debt to banks resulting in poor cost coverage. Additionally, it has a high dependence on the state government for tariff subsidies. These, combined with poor progress on consumer metering and shortage of power supply, make the discom very vulnerable and leaves less prospects of recovery and growth.

TANGEDCO recently filed for financial restructuring, which will result in offloading around Rs 24,400crore of losses. The discom is expected to close FY 2013 with net losses of Rs 7,000crore.[96] In 2012 the total accumulated losses of erstwhile TNEB stood at Rs 54,000crore with the financial loan outstanding (total debt) at Rs45,000 crore.

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[95] A regulatory asset is an asset owned by the utility but is regulated by the regulator. In a large number of cases the agency grants the utility the privilege of deferring the costs or revenues associated with the asset to the company's balance sheet to future years

[96] First Integrated Rating for State Power Distribution Utilities

Tamil Nadu has been facing an annual electricity deficit of about 4,000 megawatt (MW) and the demand far exceeds the supply. Since 2005, the addition in generation capacity has been around 330 MW but demand has escalated by almost 10 times.[97] According to news reports with summer setting in, scheduled power cuts have risen from eight or 10 hours a day to 12 and, in some parts, even 20 hours a day in the western and southern districts.[98]

The crisis has affected the industrial and agricultural consumers besides thousands of micro, small and medium enterprises (SMEs), which include weaving and textile units.[99]

vi. BIHAR

It was only in November 2012 that the Bihar State Electricity Board (BSEB) was unbundled into five companies. Two distribution companies were created: the North Bihar Power Distribution Company and the South Bihar Power Distribution Company, in addition to a separate company each for generation and transmission – Bihar State Power Generation Company and Bihar State Power Transmission Company respectively. The fifth company - Bihar State Power Holding Company Limited (BSPHCL) – is the holding company that has shares of the above mentioned four companies. BSPHCL was given an ICRA/CARE rating of B.

The SEB continues to portray a dismal picture with coverage costs through revenue at less than 80 percent, high AT&C losses, inefficiencies, poor management and a large dependence on funding through debt. Accumulated losses from the past have also led to a negative net worth of the utility.[100]

The state leads others in theft of electricity with a T&D losses as high as 43 percent. It has a high number of dysfunctional transformers and low capacity power grids, along with 72,000 km of dilapidated wires[101], high regulatory assets to be covered in three years and a high dependence on the Centre for coal linkages.

vii. MAHARASHTRA

Maharashtra, along with Gujarat, was one of the early states to unbundle its utilities. The Maharashtra State Electricity Distribution Company (MSEDCL) was created in 2005. MSEDCL shares an A grade in the integrated rating by CARE and ICRA. MSEDCL supplies electricity to 1.93 crore consumers across categories such as industrial and residential users outside of Mumbai city.

MSEDCL has adopted measures to improve its operational efficiencies including undergoing a fuel cost adjustment and has seen steady improvement in AT&C losses through strengthening the network. Additionally, it has managed to reduce distribution losses from 35 percent to 17.28 percent in five years after adopting practices such as energy accounting and feeder metering.[102] The discom has also taken

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97 www.livemint.com/Politics/9TBREitNPMEgmBMUd7NaKN/Power-crisis-Dark-days-in-Tamil-Nadu.html
98 http://articles.timesofindia.indiatimes.com/2013-03-25/chennai/38009454_1_unscheduled-cuts-power-cuts-outages
99 www.firstpost.com/politics/why-tamil-nadus-power-crisis-could-be-jayalalithaas-undoing-565781.html
100 Supra Note 95
101 The Telegraph, 30 December 2012
102 MSEDCL website

several measures to improve consumer facilitation including round the clock centralised customer care centre and ensuring minimum outages.

Maharashtra also rides high on alternative sources of energy. Nuclear plants are a source of cheap power to MSEDCL. The cheapest power supplied to the state is by Tarapur nuclear plant at Rs 1.06 a unit, followed by Kakraparatomic power plant at Rs 1.41 a unit.[103] Cheaper sources of power may result in lower tariffs for consumers.

To address issues of theft and non-payment in Bhiwandi, for instance, MSEDCL adopted anti-theft measures by implementing a franchisee model for electricity distribution by bringing in Torrent Power.[104] The same model of distribution is now being implemented in other districts such as Jalgaon, Aurangabad and Nagpur.

Concerns, however, remain. These include high net losses, and debt and subsidy burden. Also, the cost of supply is variable as MSEDCL depends a lot on short term power purchase.[105]

viii. GUJARAT

Gujarat's electricity sector was also unbundled in 2005 into seven companies: Gujarat UrjaVikas Nigam Limited (GUVNL) - the holding company; Gujarat State Electricity Corporation Limited (GSECL) – the generation company; Gujarat Energy Transmission Corporation Limited(GETCO)– the transmission company; and four power distribution companies - Dakshin Gujarat Vij Company Ltd (DGVCL), Uttar Gujarat Vij Company Ltd (UGVCL), Paschim Gujarat Vij Company Ltd (PGVCL), and Madhya Gujarat Vij Company Ltd (MGVCL). All the state's discoms got a grade of A+ by the integrated ICRA rating.

Gujarat has surplus power with an installed capacity of 17,169 MW from conventional sources (increased from 9,561 MW in 2007) and a peak demand of 12,348 MW[106]. Almost 75 percent of Gujarat's electricity is produced by coal, gas and hydro sources. Additionally, all five units of MundraUltra Mega Power Project (UMPP)[107] by TPC have become operational (the 5th one in March 2013) thus adding to the total capacity. Gujarat has lined up 5810 MW of capacity through competitive bidding at rates ranging between Rs 2.25-2.29 per unit, of which it has begun receiving 3200 MW of power. The remaining is expected to be received by 2015-16.[108]

Below is a description of the four major discoms in Gujarat:

- DGVCL is a profit making company. Its tariffs are cost reflective. While its distribution losses are 11.6 percent, they show a declining trend. A major concern is the failure of the Gujarat government to pay subsidies to the company, which now has reached Rs 1,450 crore.[109]

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[103] The Times of India, March 6, 2013

[104] A franchisee model is a public, private partnership in distribution to tackle problems such as those relating to infrastructure, customer orientation, high technical and commercial losses and weak financial position

[105] Supra Note 102

[106] Speech by Saurabh Patel, Energy Minister, Gujarat, February 05, 2013

[107] UMPPs are very large power generation projects, approximately 4000 MW each involving an estimated investment of about US$4bn

[108] *Ibid*

[109] The Times of India, 23 March 2013

- UGVCL's distribution losses stand at 10.05 percent and it is also a profit making organisation. The discom has a comfortable cost coverage ratio and capital structure, fuel and power cost adjustment framework is present and healthy cash collections from consumers are keeping the discom viable.[110]
- MGVCL is making operational profits, follows cost reflective tariffs and has strong cost coverage and collection performance besides reaping the benefits of unscheduled interchange. MGVCL also sells surplus power to GUVNL which in turn does trading.[111] AT&C losses of the discom stand at 14.6 percent and are declining.
- PGVCL, just like MGVCL, reaps the benefits of strong cost coverage, profitable operations, cost reflective tariffs and satisfactory collection performance. Besides, it also sells surplus power to GUVNL.

Since the Gujarat government pays only 90 percent of the budgetary allocation for subsidy, each discom is trying to improve its profitability. The four discoms compete with each other on efficiencies. The discom with lowest interruption is rewarded by the state government. Gujarat's four discoms made some serious efforts to turn around their losses, which were as high as Rs 3,000crore before the Electricity Act of 2003, according to a senior official at Gujarat UrgaVikas Nigam Ltd, the holding company under which all discoms are covered.

The state is one of the first to allow Open Access as per the Electricity Act of 2003. The state has also implemented an intra-state availability based tariff (ABT), a pre-requisite for commercial/energy settlement of Open Access consumers. At present, 183 consumers are availing of short-term Open Access, apart from medium- and long-term consumers.[112] ABT was started by CERC to discipline grid operation and tap tripping and inefficiencies.

SSome of the efforts made by the Gujarat government for bringing in efficiencies include the following:

- Feeder bifurcation (*Jyoti Gram Yojana*) where feeders for rural and agriculture consumptions have been separated;
- Improving customer services, curbing theft, IT initiatives;
- T&D loss reduction, introducing High Voltage Distribution System (HVDC); and
- Adoption of *Kisan Hit Urja Shakti Yojana* (KHUSHY) has played a key role resulting in the introduction of smaller size distribution transformers for individual consumers and reduction in burning of motors.

ix. SUMMARY: KEY STRENGTHS AND CONCERNS

The above case studies indicate that unbundling generates efficiencies in the functioning of the restructured SEBs as reflected in the examples of Maharashtra and Gujarat. The unbundling however must be accompanied with appropriate regulation and reform for efficient supply of electricity to be achieved. As elaborated in section V (C), in Maharashtra and Gujarat unbundling was accompanied by corporatisation, a franchise model was adopted for Bhiwandi in Maharashtra, power theft was addressed in both Maharashtra and Gujarat and in Gujarat meters were separated for rural areas

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110 Integrated Rating of State Power Distribution Utilities

111 First Integrated Rating of State Power Distribution Utilities

112 *Ibid*

and agriculture. The following chart summarises the key strengths and concern areas for the each of the discoms in the four states.

Table 16: Key Strengths and Concerns of State Discoms

Discoms	Rating	Key Strengths	Key Concerns
Gujarat			
Uttar Gujarat Vij Company Ltd	A+	Consistent Profitable Operations; Strong Cost Coverage; Healthy Cash Collections; Comfortable Capital Structure; Cost Reflective Tariffs; Operational Fuel & Power Purchase Cost Adjustment (FPPCA) framework; Timely Submission of Audited Accounts; Timely Subsidy Support from the State Government; Financial Flexibility	Increasing Dependence on Tariff Subsidy from State Government; Delay by UGVCL in Filing of Tariff Petition for FY 2013-14
Paschim Gujarat Vij Company Ltd	A+	Consistent Profitable Operations; Strong Cost Coverage; Healthy Cash Collections; Comfortable Capital Structure; Cost Reflective Tariffs; Operational Fuel & Power Purchase Cost Adjustment (FPPCA) framework; Timely Submission of Audited Accounts; Timely Subsidy Support from the State Government; Financial Flexibility	Increasing Dependence on Tariff Subsidy from State Government; Delay by PGVCL in Filing of Tariff Petition for FY 2013-14
Madhya Gujarat Vij Company Ltd	A+	Consistent Profitable Operations; Strong Cost Coverage; Healthy Cash Collections; Comfortable Capital Structure; Cost Reflective Tariffs; Operational Fuel & Power Purchase Cost Adjustment (FPPCA) framework; Timely Submission of Audited Accounts; Timely Subsidy Support from the State Government; Financial Flexibility	Increasing Dependence on Tariff Subsidy from State Government; Delay by MGVCL in Filing of Tariff Petition for FY 2013-14
Dakshin Gujarat Vij Company Ltd	A+	Consistent Profitable Operations; Strong Cost Coverage; Healthy Cash Collections; Comfortable Capital Structure; Cost Reflective Tariffs; Operational Fuel & Power Purchase Cost Adjustment (FPPCA) framework; Timely Submission of Audited Accounts; Timely Subsidy Support from	Increasing Dependence on Tariff Subsidy from State Government; Delay by DGVCL in Filing of Tariff Petition for FY 2013-14

Discoms	Rating	Key Strengths	Key Concerns
		the State Government; Financial Flexibility	
Bihar			
Bihar State Power Holding Company Limited	B	Satisfactory Progress in Terms of Reforms (Unbundling of Functional Lines; Effective functioning of the Bihar Electricity Regulatory Commission; Operational FPPCA framework; Timely Submission of Audited Accounts; Timely Subsidy Support from the State Government; Implementation of Reform Measures such as Special Courts for Anti-Theft Measures, Unbundling of Utilities, Setting up of Consumer Grievance Forums, etc	Weak Financial Position (Coverage of Costs through Revenues at less than 80 percent); High and Increasing AT&C losses; Huge Unmetered Consumption and Deterioration in Collection Efficiency; Unfavorable Capital Structure; High amount of receivables.
Maharashtra			
Maharashtra State Electricity Distribution Company Limited	A	Timely Submission of Audited Accounts; Improvement in AT&C losses due to Network Strengthening, Anti-Theft Measures etc; Timely Subsidy Support from the State Government; Successful Implementation of Distribution Franchisee Scheme; Fuel Adjustment Cost (FAC) Mechanism with a Ceiling in place; Compliance with non-solar Renewable Purchase Obligation (RPO) levels in place	Weak Cost Coverage Ratio; High Leverage due to High Debts; High Dependence on Tariff Subsidy from State Government; Delays in Tariff Determination; Under recovery in FAC; Dependence on Short Term Sources of Power due to Power Deficit in the State.
Tamil Nadu			
Tamil Nadu Generation & Transmission Corporation Limited	B	Financial Restructuring Plan in Place; Reducing Dependence on Expensive Power Purchase from IPPs by Setting Own Power Generation Projects; Healthy Cash Collections; Improvement in AT&C Losses; Operational FPPCA; Low Level of Receivables; Completion of FY2012 Audited Accounts; Reorganisation and Corporatisation of Tamil Nadu Electricity Board.	Delays in Servicing Bank Loans; Low Cost Coverage Ratio; Increasing Dependence on Tariff Subsidy from State Government, hence Exposure to Government's Credit Risk; Unsatisfactory Progress on Consumer Metering and Continuance of Free/Subsidised Power Schemes; Slippage in Commissioning of Projects leading to High Cost Power; Cash losses, Poor Capital Structure.

Source: First Integrated rating of state utilities

A comparative analysis of the four states reveals that adhering to the principles of competition has resulted in benefits. For instance, in Gujarat all four discoms have been showing consistent profitable operations, healthy cash collections and cost reflective tariffs. In Maharashtra, although a consistent profitable operation is not seen anti theft measures and network strengthening, besides reduction in AT&C losses have resulted in a good grade for the discom. Tamil Nadu's performance has, however, been marred by delays in servicing bank loans and free/subsidised power to certain sections. Bihar also landed with a B grade on account of high AT&C losses, high unmetered consumption and poor revenue collections.

D. Case Study: Private Players

i. TATA POWER COMPANY (TPC)

a. Incorporation

TPC is firmly established in all the segments of the power chain namely, fuel exploration, generation, transmission, distribution and trading. Tata entered the power sector with the establishment of Tata Hydroelectric Power Company in 1915. Since then, it has gone on to become one of India's leading integrated power companies with a significant presence outside the country, namely in Cyprus, South Africa, Mauritius, Singapore and Jakarta.

b. Generation

TPC generates about 6,900 MW of power from thermal, hydroelectric, solar, wind and geothermal energy. In the renewable sector, TPC has invested in innovative projects that focus on clean energy, like power generation through biomass gasification at Karjat, through concentrated photovoltaic in Maharashtra and sanctioning of projects that test high altitude winds and micro wind turbines for generation.

c. Transmission

TPC operates and maintains 1,200 circuit kilometers of high tension circuit lines throughout the country. The company recently acquired a 51percent stake in the 12,000 crore project called the Tala Project in a joint venture with the Power Grid Corporation of India. The JV called Powerlinks Corporation of India has been formed to bring surplus power from the Tala Hydro Project in Bhutan to the Northern Belt.

d. Distribution

TPC has a consumer base of over 1.5 lakh consumers in Mumbai and sells 12,000 MU a year. TPC supplies power to Birhanmumbai Electricity Supply and Transport (BEST), Bhabha Atomic Research Centre (BARC), railways and refineries while also to medium sized industries and large commercial and residential complexes. In Mumbai, TPC has successfully established the "Islanding System" which ensures that the city is host to uninterrupted power supply. In Delhi, TPC supplies electricity to 8 lakh consumers in Delhi and faces a peak load of 1,050 MW. Tata is present in Delhi through an agreement with the State Government of Delhi as North Delhi Power Ltd. It provides electricity in North and North West Delhi. TPC is now looking to invest in distribution in other states as well.

e. Trading

Tata Power Trading Company (TPTC) is a wholly owned subsidiary of TPC. It was constituted in 2003, right after the passing of the Electricity Act, 2003, the first company to get a power trading license in India. The company has an extensive presence in bilateral trading in all types of contracts (short/medium/long) and helps bridge demand and supply gaps.

Benefits from pro competitive policies: TPC has been one of the beneficiaries of pro competitive policies through the Electricity Act 2003. It started a discom in Delhi along with the state government as mentioned above. Open access policy in distribution further benefited TPC. In 2011-12, about 120,000 customers switched from RInfra to TPC. Of these, the residential segment accounted for 88 percent, followed by the commercial segment (11 percent) and the industrial segment (1 percent). Details of this have been discussed earlier under sub head "Open Access Case Study-Navi Mumbai."

Open access and MERC's approval of tariff rationalisation made TPC more competitive *vis-à-vis* rivals and enabled TPC to sell cheap power to consumers. A recent survey reflects that those who switched from RInfra to TPC saved up to 46 percent on monthly bills.[113]

ii. RELIANCE INFRASTRUCTURE (RINFRA)

a. Incorporation

The Reliance Group is present in the power sector through RInfra and Reliance Power Ltd (RPower). It entered the power sector with the incorporation of Bombay Subarban Electricity Supply Company (BSES) in 1929. As this company came to the Anil Dhirubhai Ambani group after the Ambani brothers separated their businesses, its name was changed to Reliance Energy Ltd. The name was changed again in 2007 to RInfra. RInfra is present in almost all the segments of the electricity supply chain, namely generation, transmission, distribution and trading. Rpower was established in 2007 in order to manageall future generation activities undertaken by the Group. It was set up with the aim of spreading the group's electrical operations all over India and overseas.

b. Generation

With five fully operational generation plants, RInfra presently has a capacity to produce 941 MW of electricity. RPower Ltd, along with its subsidiaries is building 13 plants holding a combined capacity of 33,480 MW. With the establishment of Rpower, the Reliance Group has also entered the fuel business. Rpower is developing Coal Based Methane (CBM) blocks to fuel gas based production. It is also involved in the exploration of several coal blocks and methane and oil blocks allotted to the group by the Government.

c. Transmission

In the transmission sector, RInfra has been a front runner in availing facilities under the government schemes. The transmission division is called the Reliance Power Transmission Ltd (RPTL) and is a fully owned subsidiary of RInfra. RPTL was able to acquire the Western Region Strengthening Scheme (WRSS) sanctioned by the Government of India, on a Build-Own-Operate basis (BOO) which has made it the first

[113] http://articles.timesofindia.indiatimes.com/2013-09-25/mumbai/42391659_1_power-tariff-rinfra-power-bills

ever private licensee to build and operate inter-state transmission lines. The company is currently building transmission lines as a part of the ParbatiKoldam Transmission Line Project in Himachal Pradesh in a joint venture with the Power Grid Corporation of India and has also acquired the Terempura and Talcher II Lines. In addition to this, the company has undertaken massive capital investments in maintaining and improving the existing transmission lines in Mumbai. The company has been granted a transmission license in Mumbai for 25 years, effective from August 16, 2011.

d. Distribution

RInfra in the distribution sector is the largest private player and by self proclamation provides electricity to 2 out of 3 homes in Delhi and Mumbai. It has a consumer base of 2.9 million in Delhi and 3.1 million in Mumbai. The company is responsible for distributing 5000 MW of electricity to 5.2 million consumers. The company has managed to keep distribution losses at 12.3 percent which is one of the lowermost figures in the country. In March 2013, RInfra upgraded the Supervisory Control and Data Acquisition (SCADA) System on its network that will help improve the monitoring and controlling of power systems. The Maharashtra Electricity Regulatory Commission (MERC) granted RInfra a fresh license for distribution in the state on August 16, 2011.

e. Trading

As the Electricity Act of 2003 opened the electricity trading sector and recognised it as a distinct activity, RInfra entered the sector with the establishment of Reliance Energy Trading Private Ltd (RETPL). The company was reconstituted as a public limited company in 2004 and was renamed to Reliance Energy Trading Ltd. (RETL). RETL trades electricity between state utilities, captive producers, independent producers and renewable energy sources, among others. During the year 2012, the company traded 4060 Million Units (MU) of electricity. It has registered a CAGR of 41 percent in the past five years and has consistently held a position in the top 5 electricity trading companies as listed by CERC.

Benefits from pro-competitive policies: RInfra benefited from pro-competitive policies in transmission, distribution and trading. With the acquisition of WRSS through competitive bidding it became the first private transmission utility to set up 100 percent privately owned inter-state transmission line. After unbundling of utilities it set up discoms in Delhi and Mumbai with a consumer base of around 3 million in each of the two cities, besides it entered trading once the Electricity Act 2003 opened up the sector.

iii. ADANI POWER LTD

a. Incorporation

The company, a subsidiary of Adani Enterprises, was incorporated as Adani Power Ltd in 1996. In 2002, it was made a private limited company and was called Adani Private Power Ltd. However in 2007, after turning into a public limited company, it went back to being called Adani Power Ltd. The company is currently present only in generation and transmission segments.

b. Generation

Adani has seven sanctioned power plants with a cumulative capacity of 6600 MW. The thermal power plants are located at Mundra (Gujarat), Tiroda (Maharashtra), Kawai

(Rajasthan), Pench (Rajasthan), Dahej (Gujarat) and Bhadreshwar (Gujarat). The solar energy plant is a 100 MW project being developed in Sundernagar, Gujarat. Out of all these, only two plants, situated at Mundra and Tiroda are presently commercially in operation. The Mundra power plant with a sanctioned capacity of 4620 MW (as of February 2012) is set to become the largest privately owned thermal power plant in the world. Adani Power ambitiously aims to expand its capacity to 20,000 MW by 2020.

c. Transmission

Adani entered the transmission sector by developing the 430 km Mundra - Dehgam transmission line which is the longest line built by a private player in the country. The company is now in the process of building a 500 km transmission line for Haryana Power Generation Corporation Ltd.

Benefits from pro-competitive policies: Adani Power's UMPP in Mundra got a new start in April 2013, when CERC allowed it to temporarily hike electricity tariff from its 4,000-plus MW power station, which uses coal imported from Indonesia. A change in regulations in Indonesia led to increase in prices of coal, thus making Adani's UMPP unviable. The CERC justified the move based on unforeseen circumstances that rendered the prior arrangement between a generator and distribution utilities unworkable.[114] Adani Power has also benefited from open access in transmission.

iv. LANCO INFRATECH LTD

a. Incorporation

Established in 1986, Lanco is a relatively new player in the Indian power sector.

b. Generation

Lanco has seven sanctioned thermal power projects located in Andhra Pradesh, Tamil Nadu, Karnataka, Chhattisgarh, Uttar Pradesh and Maharashtra. In addition, Lanco has six hydro-electric plants. Moreover, Lanco has established wind energy plants, cumulatively having a capacity of 13 MW in Tamil Nadu and Karnataka and has already established long term Power Purchasing Agreements (PPA) with the two state governments. Lanco also has four solar energy power plants in India and has long term PPAs for 141 MW of power.

Lanco has a thermal capacity of 4,334 MW and a renewable capacity of 146 MW, totaling to 4,480 MW. An additional capacity of 4,898 MW is already under construction and 7,103 MW under development.

c. Transmission and Distribution

Being a relatively new player in the power market and its strategy and plans include possible entry into the power transmission and distribution sectors.

d. Trading

National Energy Trading and Services Ltd (NETS), previously known as Lanco Power Trading Ltd, was incorporated in the year 2005-06. With a turnover of INR 2562 crores in the financial year 2012-13, NETS is one of the major power trading firms of the country.

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[114] www.financialexpress.com/news/nowhere-near-a-power-trip/1142661

Benefits from pro-competitive policies: Lanco has benefited from license free generation (it has seven sanction power generation projects) and trading allowed through the Electricity Act 2003. In 2012-13 NETS registered 23 percent growth (YoY) with registered trading of 6137 million units.

V. SUMMARY OF PRIVATE SECTOR PLAYERS

An overview of the business practices of these firms and their coverage indicates satisfactory performance in terms of electricity supply and revenue generation. However, there are many issues that private companies operating in different sectors of the electricity supply chain face compared to public companies. For instance, insufficient availability of coal has adversely affected the profitability of TPC's Maithon Power Project in Jharkhand. In the second quarter of fiscal 2013, Maithon Power Limited (MPL), the 74:26 Joint Venture between Tata Power and Damodar Valley Corporation(DVC), faced a net loss was Rs41.4 crore. This was largely due to lower generation in both unit 1 and unit 2.[115]. Despite entering into a FSA with CIL, the company faces a shortage of coal.

According to news reports, TPC has written to the Planning Commission, to recommend to the Central government that TPC be allowed to divert coal from its Mandakini captive mine in Odisha to the Maithon project, as a stop gap arrangement, or else it will have to import coal.[116] A committee headed by the Planning Commission member, BK Chaturvedi is looking into the coal distribution policy and suggesting ways to enhance captive coal mine production. Limited supplies of coal, and high prices of imported coal, have led to higher costs of production of electricity for private players.

Private companies have also struggled to develop Ultra Mega Power Projects (UMPPs). UMPPs are very large projects, approximately 4000 MW each, involving an estimated investment of about US$4bn. Currently, 12 UMPPs have been sanctioned by the government of India by competitive bidding process.[117] The UMPPs have been set up keeping in mind increases in demand, which has been doubling every 10 years, and that consumers will benefit due to economies of scale.However, poor availability of coal has also affected the efficient operation of UMPPs. Almost 70 percent of the cost of such projects is fuel cost. To fuel an UMPP, power generation companies had bought coal mines in countries such as Indonesia and promised low tariffs to discoms through PPAs.

However, a change in Indonesian laws governing coal made the PPAs unviable to sell electricity at the promised tariffs. As such, UMPPs have been incurring losses because tariff regulations by the central and the state governments have not allowed private players to pass on the increases in the cost of production of electricity to the tariff rates. However, in April 2013, the CERC allowed TPC and Adani Power to temporarily raise electricity tariff from their UMPPS which use coal from Indonesia. This order has given these companies some relief.

The hurdles faced by private players such as access to coal and tariff setting restrictions must be reduced in order for competition in the sector to grow. Private companies tend

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115 www.hdfcsec.com/Research/ResearchDetails.aspx?report_id=2989098

116 www.business-standard.com/article/companies/tata-power-seeks-diversion-of-surplus-coal-113091200677_1.html

117 Live Mint article dated November 19, 2012. Imported coal-based UMPPs may not benefit from price pooling. www.livemint.com/Industry/BfCnKbCYBloXy5LzAm8JIJ/Imported-coalbased-UMPPs-may-not-benefit-from-coalprice-po.html

to score higher than the state-owned generating, transmission and distribution companies due to their more professional management systems, better revenue collections and diversification into areas such as power trading. Most of the above mentioned companies are either already present or are aiming to be present in all areas of the electricity supply chain such as generation, transmission, distribution and trading. As such, an expansion of private players would benefit competition.

VI. ISSUES AND RECOMMENDATIONS

Taking cue from the performance of various indicators used in the earlier sections, we finally discuss the major issues in promoting competition in the electricity sector, and provide plausible recommendations to improve some of the issues.

A. Recommendations

i. REDUCING THE GOVERNMENT MONOPOLY OVER COAL THROUGH AUCTIONS AND POOLING

Auctions can be considered an effective method for allocating coal blocks, as mining companies bid according to how much they value the license. Competitive bidding also provides a level playing field in coal extraction. In its 2012 report, the CAG said that the central government had the authority to auction coal mines between 2004 and 2009 but chose not to. The result was that both government-owned companies and private companies paid less than what they would have for 99 mines under an auctioning system, thus bypassing competition.

In the future, the government should consider auctioning coal mines, thus bringing competition into the sector. The government has recently approved auction of Coal blocks and worked out the methodology for auction by competitive bidding of the coal blocks.[118] However, care has to taken by the government and regulators that bids submitted justify the value of coal blocks. Or else, the purpose of auctioning may be defeated and the recent debacle that was witnessed in the case of spectrum allocation in telecom through very low bids, may be repeated. Secondly, the pooling of domestic and international coal prices can be used as an important tool for reducing the vagaries arising from fluctuations in international coal prices.

According to the Cabinet Committee of Economic Affairs (CCEA), under the pooling of coal prices, power plants would pay a uniform, average price for both domestic and imported coal. This would raise fuel costs for those that have secure contracts with CIL and reduce coal prices for plants that import coal. This process would reduce the dominance and near monopoly of CIL as the price of domestic coal is one third the cost of imported coal. Such a move would also benefit private players such as Tata Power, RInfra and Adani who have set up UMPPs and are largely dependent on imported coal. This recommendation has been in progress, but a final decision has been delayed due to differences between the Coal and Power Ministries on how the impact of higher imported coal prices will be shared between CIL and power companies.[119] The Central government has still not approved the pooling of prices as a parliamentary standing committee on coal and steel has opposed it, saying that it may result in a pass over of imported coal prices to end (power) consumers. Besides, the Coal Ministry is yet to respond to the parliamentary panel on this issue.[120]

The view of the CEA that power plants equidistant from the coast and coal mines should be supplied imported coal and that CIL should supply coal to power stations

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118 http://pib.nic.in/newsite/pmreleases.aspx?mincode=42
119 *Ibid*
120 www.financialexpress.com/news/govt-to-rethink-coal-price-pooling/1160918

located near coal mines should be considered by the government. This pooling mechanism may help reduce transportation costs of coal by 50 percent.[121]

ii. ENCOURAGEMENT OF PRIVATE MINING AND CORPORATISATION OF COAL INDIA'S SUBSIDIARY

The government should take more concrete steps to encourage the setting up of private mines so as to increase availability of coal for electricity generation. The Ministry of Environment & Forests needs to play a bigger role in giving quick clearances for setting up of these mines. Some of the recent mines that have come up for commercial use include the Sasan mine of RInfra linked to its UMPP and NTPC's PakriBarwadih. The Planning Commission had envisaged around 100 million tonnes of coal coming from the private sector in the Eleventh Five Year Plan (2007-12). However, the achievement is lower than anticipated, at only 35-36 million tonnes.

iii. ENSURING UNBUNDLING IN THE ELECTRICITY SUPPLY CHAIN

There is a need to undertake measures that would ensure the unbundling of SEBs in all of the states. While progress has been made in some states such as Gujarat, Maharashtra, West Bengal and Orissa others such as Tripura, Uttarakhand, Himachal Pradesh, Jammu & Kashmir, Meghalaya and Mizoram still have ways to go. Further, regulations that have been misused by state governments to delay this process must be amended.

iv. IMPLEMENTING OPEN ACCESS

Currently in the distribution sector, the networks of power lines supplying electricity to consumers' houses are mostly owned by state utilities. Besides creating confusion about tariff rates (how much should be charged for the use of power lines and how much for the supply of electricity), this also hinders the implementation of open access. For instance, in the US, municipalities and counties negotiate with suppliers other than the traditional suppliers and make collective bargaining on behalf of retail customers and industrial units. This ensures quality of electricity supplied to end consumers.

To ensure appropriate implementation of Open Access, a review of the existing policies and regulations, and adherence to the same is very critical. Further, rationalisation of wheeling charges and cross subsidy surcharges, as per guidelines in the Electricity Tariff Policy, is a prerequisite to encouraging demand for Open Access. Further learning from international experiences of the benefits of Open Access in consumer welfare in other countries in Open Access can also be considered imperative for increasing competition in the sector.

v. REFORMING SUBSIDIES

Efficient and alternate ways of providing subsidies to the agriculture sector or to the poor must be designed and implemented to benefit poor households without proving detrimental to the functioning of private players in the electricity distribution sector. Private public partnerships in such reforms can lead to a more efficient distribution of power, as demonstrated by the Delhi government's collaboration with TPC in granting

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[121] Live Mint article dated November 19, 2012. Imported coal-based UMPPs may not benefit from price pooling. *www.livemint.com/Industry/BfCnKbCYBloXy5LzAm8JIJ/Imported-coalbased-UMPPs-may-not-benefit-from-coalprice-po.html*

a subsidy of Re 1 per Kwh to poor[122] households. This programme offers assistance to the poor directly using government finances without adding undue burdens on the power distributing company. As mentioned in earlier sections, in Gujarat three phase quality power is supplied to rural areas with separate feeders for power supplied for agriculture purposes and those for rural households.

vi. RATIONALISING TARIFFS

Tariff rationalisation is essential in order to ensure the financial viability of the state utilities, and to promote private entry into the market for electricity distribution. To this end, there is a need to clearly define and demarcate the powers of the State governments in tariff setting and controlling. Currently, tariff setting is done by the SERCs at the behest of the state government, although a formula based tariff mechanism exists. There is an urgent need to adhere to a formula based tariff setting mechanism that is based on the dynamics of market forces. For instance, if fuel prices increase, then the tariff rates should increase in the same regard in order to cover the increased costs of production, and vice versa.

vii. RESOLVING DOMAIN ISSUES BETWEEN REGULATORS

Differences have cropped up between CERC and the CCI regarding jurisdiction over anti-competitive practices in the power sector. On one hand, Section 60 of the Electricity Act of 2003 states that an appropriate commission may issue directions to a licensee or a generating company if they abuse their dominant position or are part of a combination that is likely to cause an adverse effect on competition in the electricity sector. But through the Competition Act of 2002, the CCI also has the mandate to eliminate practices that adversely impact competition. The central government should clearly indicate who has jurisdiction in the domain of competition in the electricity sector, and should make any necessary amendments to the Electricity or Competition Acts.

viii. MAKING UMPPS MORE VIABLE:

So far 12 UMPPs have been sanctioned by the government but they face fuel shortages and losses due to their inability to set tariffs reflective of their costs. However, a recent move by CERC shows a move in the right direction towards encouraging the growth of UMPPs. Recently the CERC allowed Adani Power to temporarily increase tariffs from its Mundra project and subsequently passed a similar order for TPC. Such allowances for tariff revisions due to supply and demand conditions must continue in order for the UMPPs to remain viable business ventures.

This is a positive intervention by the regulator as this will have long term benefits for the end consumers. The project developers, while taking into account the risk factors, had not foreseen such a development such as changing laws in Indonesia. If the projects shut down, the generation market suffers and it is the customer who is denied access to better services.

[122] Poor are defined as people using less than 150 kwh per month in normal seasons and 200 khw per month during peak summers and winter

ix. FRAMING A STRONG NCP TO ENSURE COMPETITION NEUTRALITY

We recommend putting a NCP in place with an effective NCPC and with competition neutrality being practised in every department dealing with power. A series of reforms since 1991 have led to creating uneven scenarios across various sectors in the economy. While some sectors such as telecom are able to embrace a competition culture, others such as electricity cannot.

In such a situation, an overarching NCP will help harmonising efforts made the central and state governments to bring competition to the sector. This will also lower fiscal and regulatory barriers that exist at each of these levels and thus create a national market which will be competitive at different levels. We also recommend making effective changes in the Electricity Act 2003 and National Tariff Policy, which will in consonance with this objective.

x. MISUSE OF THE POWERS GIVEN TO STATES UNDER SECTION 11 OF THE ELECTRICITY ACT 2003

According to Section 11, appropriate state governments may specify that a particular generating company may, in extraordinary circumstances, operate and maintain any generating station in accordance with the directions of the government. This has become a norm rather than an exception. The government should take necessary actions to amend the section so it is used only as intended. The matter has been referred to the judiciary.

xi. PRIVATE SECTOR PARTICIPATION IN RETAIL BUSINESS

The government should consider involving private sector companies in outsourcing retail business such as bill collections from customers, running customer care centres and other related activities in the distribution sector. Most developed countries practice this model.

Setting up call centres helped the West Bengal's discom, WBSEDCL, tremendously since 2006. Five call centres started handling functions such as uploading new customer details and addressing complaints. SMSes and e-kiosks further facilitated customers. Outsourcing will bring in efficiencies by ensuring accountability as the outsourced company would just be focusing on matters related to retail businesses. If they do not perform they run risk of losing their contracts.

B. Conclusion

The Indian government needs to make a concerted effort to encourage competition in the electricity sector. This will require efforts to be made by the CERC, the SERCs, state governments, and state owned discoms to implement those sections of the Electricity Act of 2003, the NEP and the National Tariff Policy that are aimed at maximising consumer welfare, in letter and spirit. Action should be taken by the concerned regulators against those not abiding by the laws.

While several provisions for consumer welfare have been spelt out in the above mentioned laws and policies, misinterpretation of such provisions by the respective departments overseeing different provisions have created ambiguity.

For instance, despite the fact that Open Access is a must for competition and is defined by the Electricity Act, 2003, still the opinions of the Attorney General, Solicitor General, the Law Ministry and the Planning Commission[123] on Open Access have been sought and applied by various state governments and regulators in implementing Open Access in their respective states. This ambiguity has stalled the Open Access process in India, despite all leading economies such as the UK and the US practicing it effectively. Moreover, certain other provisions such as Section 11 of the Electricity Act of 2003 have been referred to the judiciary for a correct interpretation. Such ambiguities need to be addressed in the larger interest of consumers and the NCP be formalised to set guidelines for imbibing competition in the sector.

[123] Position paper on open access by the Forum of Regulators, May 2012