

Indian Power Sector: Way Long to the Bright Future

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INTRODUCTION

The Indian power sector is one of the most diversified in the world. Sources for power generation range from commercial sources like coal, lignite, natural gas, oil, hydro and nuclear power to other viable non-conventional sources like wind, solar and agriculture and domestic waste. The demand for electricity in the country has been growing at a rapid rate and is expected to grow further in the years to come. In order to meet the increasing requirement of electricity, massive addition to the installed generating capacity in the country is required.

Power Sector is categorized into three parts.

- **Power Generation** - It involves activities of generation of power at power-plants or power stations. For power generation, conventional sources like coal, hydro, fuel, nuclear power, natural gas etc are used and non-conventional sources like tidal (wind power), solar, hydrogen, biomass etc are used. Nearly 66% of power generation in our country comes from the conventional sources (coal, thermal etc.)
- **Power Transmission** - When generated power is transferred through transmission lines to power stations, sub-stations is called transmission of the power.
- **Power Distribution** - When transmitted power to different designated locations like power stations, sub-stations is distributed to its end users like industries, agriculture, household, commercials etc is called power distribution.

Power Generation

India has the fifth largest generation capacity in the world with an installed capacity of 152 GW as on 30 September 2009, which is about 4% of global power generation. The top four countries - US, Japan, China and Russia together consume about 49% of the total power generated globally. The average per capita consumption of electricity in India is estimated to be 704 kWh during 2008-09. However, this is fairly low when compared to that of some of the developed and emerging nations such US (~15,000 kWh) and China (~1,800 kWh). The world average stands at 2,300 kWh.

Table 1 shows the the Total Installed Capacity in our country and their proportion in the total.

Sector	MW	%age
State Sector	86881.13	41.51
Central Sector	62373.63	29.66
Private Sector	60321.28	28.82
Total	209276.04	

Power Transmission

The current installed transmission capacity is only 13 percent of the total installed generation capacity. With focus on increasing generation capacity over the next 8-10 years, the corresponding investments in the transmission sector is also expected to augment. The Ministry of Power plans to establish an integrated National Power Grid in the country by 2012 with close to 200,000 MW generation capacities and 37,700 MW of inter-regional power transfer capacity.

Power Distribution

While some progress has been made at reducing the Transmission and Distribution (T&D) losses, these still remain substantially higher than the global benchmarks, at approximately 33 percent. In order to address some of the issues in this

segment, reforms have been undertaken through unbundling the State Electricity Boards into separate Generation, Transmission and Distribution units and privatization of power distribution has been initiated either through the outright privatization or the franchisee route; results of these initiatives have been somewhat mixed.

Table 2 shows Top 10 and Bottom 10 States of our country with electricity Per capita consumption (kWh) in 2009-10

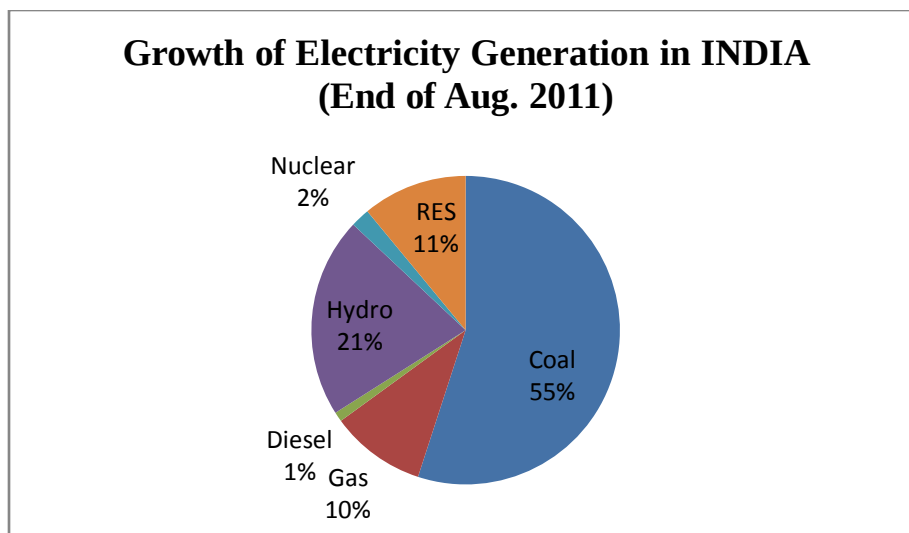
Rank	Top 10 State	Per capita consumption (kWh)
1	Goa	2004.77
2	Puducherry	1864.5
3	Punjab	1663.01
4	Gujarat	1558.58
5	Haryana	1491.37
6	Delhi	1447.72
7	Chandigarh	1238.51
8	Tamil Nadu	1210.81
9	Himachal Pradesh	1144.94
10	Maharashtra	1054.1
Rank	Bottom 10 State	Per capita consumption (kWh)
1	Bihar	117.48
2	Manipur	207.15
3	Assam	209.2
4	Tripura	223.78
5	Nagaland	242.39
6	Uttar Pradesh	386.93
7	Lakshadweep	428.81
8	Mizoram	429.31
9	Arunachal Pradesh	503.27
10	Andaman and Nicobar Islands	506.13

Growth Story of Indian Power Sector

India's electricity generation capacity additions from 1950 to 1985 were very low compared to developed nations. Since 1990, India has been one of the fastest growing markets for new electricity generation capacity. The country's annual electricity generation capacity has increased in last 20 years by about 120GW from about 66GW in 1991, to over 100GW in 2001, to over 185GW in 2011. This growth makes India one of the fastest growing markets for electricity infrastructure equipment. India's installed capacity growth rates are still less than those achieved by China, and short of capacity needed to ensure universal availability of electricity throughout India by 2017..

Indian power sector has made substantial progress in terms of enhancing power generation and in making available power to widely distributed geographical boundaries. The sector is largely coal based with the total Installed Capacity of 99,503

MW (55%) coal based, 17,706 MW (10%) gas based, 1200 MW (1%) diesel generation, 38,206 MW (21%) hydro, 4,780 MW (2%) nuclear and 20,162 MW (11%) from renewable energy sources (See Chart 1)



State-owned and privately owned companies are significant players in India's electricity sector, with the private sector growing at a faster rate. India's central government and state governments jointly regulate electricity sector in India. As of August 2011, the states and union territories of India with power surplus were Himachal Pradesh, Sikkim, Tripura, Gujarat, Delhi and Dadra and Nagar Haveli.

In India's effort to add electricity generation capacity over 2009–2011, both central government and state government owned power companies have repeatedly failed to add the capacity targets because of issues with procurement of equipment and poor project management. Private companies have delivered better results. In 2010, the five largest power companies in India, by installed capacity, in decreasing order, were the state-owned NTPC, state-owned NHPC, followed by three privately owned companies: Tata Power, Reliance Power and Adani Power.

Objectives of the study

- To study various hurdles in the way of bright future.
- To explore various opportunities for the power sector.

RESEARCH METHODOLOGY

The present study is descriptive in nature. The researcher has used secondary facts/data available at different websites of ministry of power, ministry of renewable sources etc.

Findings of the Study

Hurdles in the way of bright future:-

• Electricity Shortages

India suffers from a severe shortage of electricity generation capacity. According to the World Bank, 40% of residences in India are without electricity. In addition, blackouts are a common occurrence throughout the country's main cities. Further compounding the situation is that total demand for electricity in the country continues to rise and is outpacing increases in capacity. Coal shortages are further straining power generation capabilities. In the International Energy Outlook 2011 (*IEO2011*), Env't. Impact Assessment (EIA) projects that electricity consumption in India will grow at an average rate of 3.3% per year through 2035. To meet this growth, India will have to expand their current generation capacity by 234 GW.

- **Rely on Conventional Thermal Power Generation**

Conventional thermal-generated power accounted for more than 80 percent of electricity in India in 2008. Coal predominates, generating roughly 70 percent India's power. India is both the third-largest consumer and third-largest producer of coal in the world. India's domestic coal is low in quality – this renders coal-fired power generation relatively inefficient and necessitates imports of metallurgical coal for steel-making. In the *IEO2011*, EIA projects that the share of natural gas in India's power generation mix will expand from 11 percent in 2008 to 16 percent in 2035.

- **Low Nuclear Power Generation**

The Indian government continues to focus on the development of nuclear power to meet its power generation targets. Although India is not a party to the Nuclear Nonproliferation Treaty (NPT), its 2005 nuclear cooperation deal with the United States, known as the “123 Agreement”, allows for civil nuclear trade between the U.S. and India. This agreement will facilitate India's goal of increasing India's installed nuclear power generation capacity to 20 GW by 2020.

- **Lack of Hydropower and Other Renewables**

As part of India's goal of diversifying its sources of electric power generation and increasing the country's capacity, the government also plans to increase the use of hydroelectric power. International organizations such as the World Bank are providing funding for a variety of hydroelectric projects around the country. However, lack of reliability and environmental and land-use concerns surrounding construction may make it difficult to capitalize fully upon this domestic energy resource.

- **Electricity Theft & Unmetered Supply**

In our country most of the losses occurred to power sector comes from T&D. Apart from that, a great portion of the losses are due to the huge electricity thefts and unmetered supply to different areas such like agriculture and households.

- **Land acquisition and their clearance issues**

Land acquisition policies in our country varies from state to state. Every state has its own land acquisition policies. People oppose the government in many ways like protest, road/rail jam etc. In resulting to it, some of the land deals get cancelled, projects postponed or cancelled or not start. Studies shows that it takes 2-6 years approx. to get clearance from different departments of the government.

- **Shortage of skilled manpower**

Most part of the foreign investment in our country goes to the service sector. Youth is attracted towards the retail/hospitality/management/finance/banking etc. Basic infrastructure like power sector and heavy engineering are somewhere ignored. Therefore power sector is facing acute shortage of skilled manpower, skilled engineers, efficient managerial staff etc. These factors create a big hurdle in the way of bright future of this sector.

Opportunities for the Bright Future:

- **Power Transmission and Distribution**

- Improving Investment Climate-At present 40,000 MW generation capacity is already under execution. Investment of USD 43 billion committed.
- Public sector investments have been stepped up; will need to be supplemented through private investments.
- 100 % FDI in all segments of power sector has been allowed
- Recently power trading also covered
- The Law does not distinguish between domestic and international investors.

- **Private participation-Power Generation**

- Encouraging response of investors.
- Financial closures of 4400 MW Projects-investment of about USD 3.6 Billion
- Financial closures for 2200 MW is at advanced stage of finalization.

- Additional about 10,000 MW appraised. Fuel supply availability critical for financial closure.

- **Development of Alternate Source of Energy**

- Emphasis on Biomass.
- Wind power potential – success story for rapid development. More than 3800 MW added in the last four years.
- At over 5500 MW, Wind capacity 4th largest in the world.
- Development of Mini and Micro hydro electric projects.
- Solar power needs intensive R&D for cost reduction. Extensive development of solar dependent on CDM benefits to offset present high cost.
- Nuclear power presently 3,900 MW- Share of Nuclear power to be enhanced.

According to a research report, renewable capacity might increase from 15.5 GW to 36.0 GW by 2017. The boom in the industry coupled with the large resource gap provides for plenty of employment opportunities in the power sector. The sector is also attractive from the perspective of professional growth and development. The increase in investments in energy efficiencies and renewable energy technologies, India is likely to create 10.5 million job opportunities in the clean energy sector by 2012. The wind sector in India predicted to be worth Rs 60,000 crore in 2020 could create between 150,000 to 250,000 jobs. Similarly, the solar industry, predicted to be worth Rs 32,000 crore, could generate between 117,000 to 235,000 jobs by 2020 and small hydro and biomass sectors are expected to be worth Rs 27,000 crore and Rs 32,000 crore respectively in 2020.

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