



Power Sector in India

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1 Introduction

Power or electricity is very essential constituent of infrastructure affecting economic growth and welfare of the country. Currently, the power sector is at a crucial juncture of its evolution, with many private producers and domestic manufacturers also playing a significant role in various capacities, and greater reliance on markets, subject to regulation. Developers of Power Plants have been facing numerous constraints like coal/gas allocation, environment clearance, land acquisition, financing and funds tie-ups, etc. for last about 4 years. This has resulted in only very few new projects coming up.

2 Performance of the industry

- India is the 5th largest producer of electricity in the world, with Maharashtra as the leading electricity generator among Indian states.
- At an electricity-GDP elasticity ratio of 0.8, electricity will continue to remain a key input for India's economic growth. Electricity demand is likely to reach 155 GW by 2016-17 & 217 GW by 2021-22 whereas peak demand will reach 202 GW & 295 GW over the same period respectively. In India, there has been a shift to renewable power as the same constitutes of 27.25% of the total installed capacity.
- India has a huge hydro power potential of 148 GW, out of which only 42 GW has been realized till date. Steps have been taken to attract investments into the hydro sector and increase the falling share of hydroelectricity in the country's installed capacity mix. Government is planning Hydropower Purchase Obligation (HPO), which will obligate the power distribution companies to purchase power from hydro power plants. This has led to signs of revival in hydro power segment. The Nuclear business is primarily driven by government policies, public perceptions and global dynamics.

3 Installed capacity in India

- For the 12th plan period (FY 13-17), the Government of India has targeted capacity addition of 88,537 MW against which capacity addition of 61,014 MW has been achieved up to FY 14-15. During FY 14-15, a capacity addition of 22,566 MW has been achieved which is 127% of the target of 17,830 MW. Private sector contribution accounts for 59% in the total capacity addition during FY 14-15.
- India is likely to add 600 GW to 1200 GW of additional new power generation capacity before

Fuel	MW	%age
Total Thermal	198,484	69.8
Coal	173,018	60.9
Gas	24,473	8.6
Oil	994	0.3
Hydro (Renewable)	42,623	15.0
Nuclear	5,780	2.0
RES** (MNRE)	37,415	13.2
Total	284,303	

Year 2050. The target for 12th Five-year plan is that of 118.54 GW out of which 88.54GW is to come from conventional sources while the remainder to come from Renewable energy. The government plan is not only on target but seems it will exceed the targeted capacity.

- Break up of Power sector is such that 188.90 GW is Thermal power which is 70.6% of the total installed capacity while Hydro accounts for 41.27GW which is 15.4% of total. The share of Renewable energy is 31.69 GW which is 11.8%.
- India's around 36 per cent of power capacity is in western region followed by 26 per cent in northern region, 24 per cent in southern region, 12 per cent in eastern region, and only 1 per cent in north-eastern and island regions. Western region leads in thermal power and northern region in hydro with 78594.42 MW and 17946.77 MW respectively. Southern region leads in Renewable Energy Sources (RES), with 42 per cent share in all-India aggregate, followed by western region (36 per cent) and northern region (21 per cent).
- Marking a major change from pattern till recently, private sector has increasingly forayed into power infrastructure in recent years. Thus, during the 11th Plan 39 per cent of conventional energy capacity addition was from private sector, while 35 per cent coming from state government utilities and around 26 per cent from central government power companies. Most of the capacity in private sector was in thermal power with 56899.73 MW.

4 Challenges facing the Energy Sector

1. Fuel Security Concerns: Thermal capacity addition is plagued by the growing fuel availability concerns faced by the Industry. While a significant gas based capacity of more than 20,000 MW is idle due to non-availability of gas. Coal supplies by CIL is restricted to around 65% of actual coal requirement by coal based thermal plants, leading to increased dependence on imported coal with the cascading result of high power generation costs.
2. Transmission & Distribution Losses: High distribution-line losses are among the most vexing problems in the Indian power sector. India's aggregate technical and commercial losses average about 32% of electricity which is very high as compared to those developed countries (6-11%). This is a matter of concern as well as potential for saving, which may reduce the demand supply gap. A reduction in Transmission & Distribution losses by 1% would result in a saving in capacity by about 800 MW.
3. Financial Health of State Discoms: Years of populist tariff schemes, mounting AT&C losses and operational inefficiencies have adversely affected the financial health of State Discoms which are currently plagued with humongous out-standing debts.
4. Aging Power Plants and Transmission network: Since most of the power plants and transmission lines have been installed immediately after the independence; they have become old and inefficient. This is the main reason for low growth and transmission rate in electricity generation and transmission during the recent years. Old and inefficient plants and lines need to be replaced or renovated and modernized to achieve the electricity production and demand target.
5. Under-procurement of Power by States: Increasing power generation costs due to limited fuel availability, poor financial health of State Discoms, high AT&C losses have contributed in suppressed demand projections by State Discoms.
6. Interstate Disputes: India is a federal democracy, and because rivers cross state boundaries, constructing efficient and equitable mechanisms for allocating river flows has long been an important legal and constitutional issue. Due to this there is not availability of water all the times to operate hydro plants. Interstate disputes also restrict the excess power exchange between the states.
7. Inimical Financing Environment: Over the last 4-5 years, the lending rates have increased significantly from the time of project appraisal resulting in project cost overrun and hence higher end tariffs.
8. Policy Paralysis: The micro level policies governing the fuel cost pass-through, mega power policy, competitive bidding guidelines are not in consonance with the macro framework like The Electricity Act 2003 and the National Electricity Policy.

5 Government Initiatives

The Government of India has identified power sector as a key sector of focus so as to promote sustained industrial growth. Some initiatives by the Government of India to boost the Indian power sector:

- The Union Cabinet has approved the **Ujwal DISCOM Assurance Yojana (UDAY)** for financial turnaround and revival of power distribution companies (DISCOMs), which will ensure accessible, affordable and available power for all.
 - **UDAY Scheme:** UDAY provides for the financial turnaround and revival of Power Distribution companies (DISCOMs), and importantly also ensures a sustainable permanent solution to the problem. UDAY will rejjg Rs 4.3 lakh crore debt of the utilities besides introduce measures to cut power thefts and align consumer tariff with cost of generating electricity.
 - It empowers DISCOMs with the opportunity to break even in the next 2-3 years. This is through four initiatives (i) Improving operational efficiencies of DISCOMs; (ii) Reduction of cost of power; (iii) Reduction in interest cost of DISCOMs; (iv) Enforcing financial discipline on DISCOMs through alignment with State finances.
 - Under the scheme, state governments, which own the discoms, can take over 75 per cent of their debt as of September 30,2015 and pay back lenders by selling bonds. For the remaining 25 per cent, discoms will issue bonds.
 - UDAY is optional for all States. However, States are encouraged to take the benefit at the earliest as benefits are dependent on the performance.
 - States accepting UDAY and performing as per operational milestones will be given additional / priority funding through Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY), Integrated Power Development Scheme (IPDS), Power Sector Development Fund (PSDF) or other such schemes of Ministry of Power and Ministry of New and Renewable Energy.
 - Such States shall also be supported with additional coal at notified prices and, in case of availability through higher capacity utilization, low cost power from NTPC and other Central Public Sector Undertakings (CPSUs).
- The Ministry of Power has planned to provide electricity to 18,500 villages in three years under the **Deendayal Upadhyaya Gram Jyoti Yojana (DUGJY)**. Out of these, 3,500 villages would receive electricity through off-grid or renewable energy solutions.
 - The earlier scheme for rural electrification, Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY), has been subsumed in the new scheme as its rural electrification component.
 - The major components of the new scheme are feeder separation; strengthening of sub-transmission and distribution network; Metering at all levels (input points, feeders and distribution transformers); Micro grid and off grid distribution network & Rural electrification- already sanctioned projects under RGGVY to be completed.
- **Coal Mines (Special Provisions) Act, 2015:** The act aims to provide for allocation of coal mines and vesting of the right, title and interest in and over the land and mine infrastructure to successful bidders and allottees with a view to ensure continuity in coal mining operations and production of coal. This will help tackle the issue of fuel shortage for power generation.
- The Government of India has resolved the issues regarding transfer of mining leases and grant of forest clearances to the winning bidders of coal blocks. It expects operations to start in about 10 more mines by March 2016, easing coal availability to the projects attached to these mines.
- The Ministry of New & Renewable Energy is implementing two national level programmes, namely **Grid Connected Rooftop & Small Solar Power Plants Programme** and **Off-Grid & Decentralised Solar Applications**, in order to promote installation of solar rooftop systems.
- The Government of Odisha plans to set up a large 1,000-MW solar power park under public-private partnership (PPP) mode involving an investment of about Rs 6,500 crore (US\$ 1 billion).
- **Govt. to invest 1 lakh crore to set up 5 new UMPPs:** Indian government is planning to set up 5 new ultra mega power projects (UMPPs), under the plug and play model, entailing investments of around Rs 1 lakh crore. UMPP is coal-based thermal power project that has 4,000 MW generation capacity. Under the 'plug and play' system coal blocks will be auctioned after they are granted various clearances to speed up and simplify mining and get better valuation. Power Finance Corporation (PFC) is the nodal agency for UMPPs in

the country. So far, 4 UMPPs have been awarded, of which Sasan (Madhya Pradesh), Krishnapatnam (Andhra Pradesh) and Tilaiya (Jharkhand) have been bagged by Reliance Power. Tata Power is operating the Mundra UMPP in Gujarat.

- The Government of India announced a massive renewable power production target of 175,000 MW by 2022; this comprises generation of 100,000 MW from solar power, 60,000 MW from wind energy, 10,000 MW from biomass, and 5,000 MW from small hydro power projects.
- The Government of Telangana plans to set up an incubator centre, in collaboration with University of Austin, Texas, for start-ups in the renewable energy sector, to support new companies entering the renewable energy market.
- A Joint Indo-US PACE Setter Fund has been established, with a contribution of US\$ 4 million from each side to enhance clean energy cooperation.
- The Union Cabinet of India approved 15,000 MW of grid-connected solar power projects of National Thermal Power Corp Ltd (NTPC).
- The Indian Railways signed a bilateral power procurement agreement with the Damodar Valley Corporation (DVC). The agreement was signed between North Central Railway and DVC. This is the first time the Railways will directly buy power from a supplier.
- US Federal Agencies committed a total of US\$ 4 billion for projects and equipment sourcing, one of the biggest deals for the growing renewable energy sector in India.

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