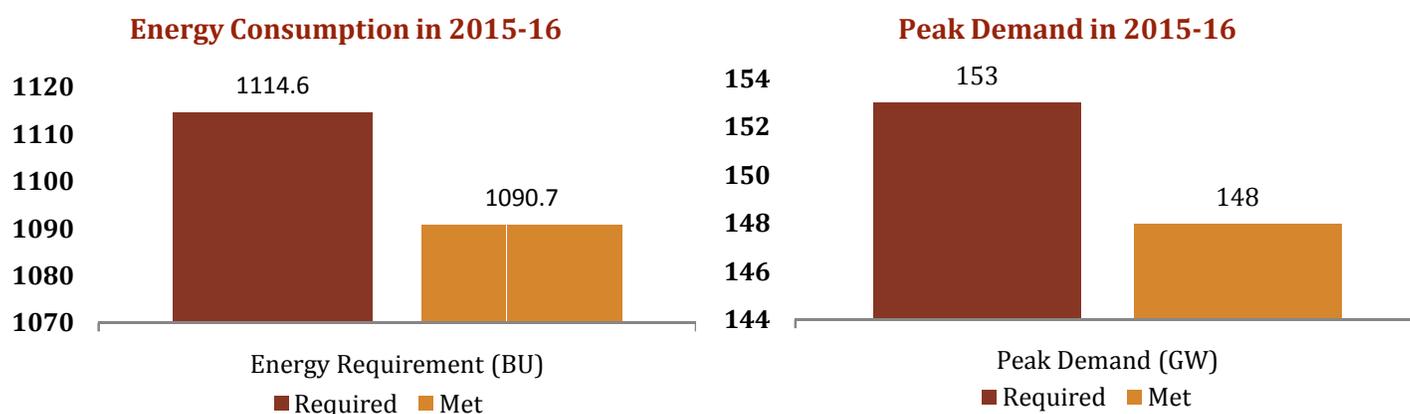


Powering Development

An Overview of the Power Sector in India

With electricity playing a crucial role in sustaining the high growth rates of the Indian economy, the sector continues to be a priority area. Electricity can also play a major role in boosting the growth in the agriculture sector by enabling more efficient irrigation and refrigerated supply chains. Electricity is also a comparatively cleaner and healthier source of lighting in the households. Over the last few decades, India has taken major strides in developing and reforming its power sector. However, meeting the energy needs of the large aspirational population spread over a large geography and a growing industrial sector requires renewed focus on augmenting the existing capacities. Furthermore, greater participation of private sector combined with a robust regulatory mechanism to ensure an equitable access to uninterrupted quality power supply is necessary. The peculiar energy landscape of India also presents a unique set of issues and possibilities which need to be addressed to achieve the vision of “Quality Power for All”. This brief provides an overview of the sector and associated issues.

Scenario of Power Generation



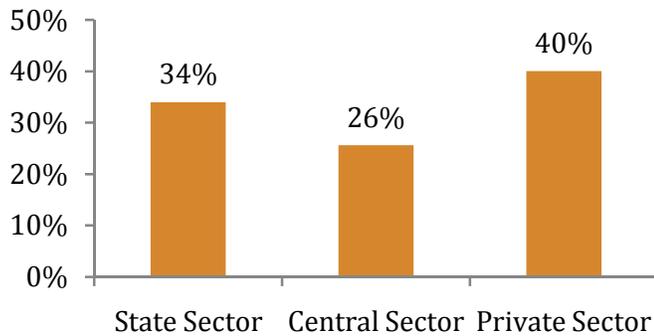
The electrical energy requirement for India in 2015-16 was nearly 1114.6 Billion Units (BU) and is projected to increase to around 1660.7 BU by 2020. The peak electric requirement in 2015-16 was about 153 Giga Watt (GW) and is projected to grow to about 246 GW by 2020. As against the energy requirement in 2015-16, only 1090.7 BU was available leading to a deficit of 2.1%. Similarly, only 148 GW peak power was available resulting in a deficit of 3.2%. This was in spite of the overall generation in the country increased from 1048.673 BU during 2014-15 to 1107.386 BU during the year 2015-16.¹ In 2014-15, the electricity generation was 1048.4 BU, registering a year-on-year growth of 8.4 per cent², exceeding the target of 1023 BU.

¹ Portal of Ministry of Power, accessed at <http://powermin.nic.in/Overview-0>

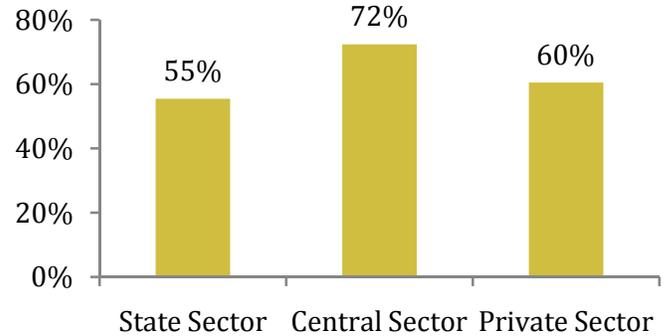
² Economic Survey 2015-16, Volume II, p- 136.

As of March 2016, India had an installed capacity of 298 GW. Of this, the private sector contributed 120 GW (40% of total installed capacity) while the public utilities contributed about 178 GW (59.7% of the total installed capacity). However, the generation facilities have been operating at low load factors due to inadequate supply of coal, obsolete equipment and inefficient operations. The generation plants logged a Plant Load Factor of 62.28% as against a target of 64.35% in 2015-16. Among the generation facilities, the State sector generation facilities were operating at a load factor of 55.4% as against the Central sector facilities which were operating at 72.48%.

Sector Wise Contribution to Power Generation in Percentage

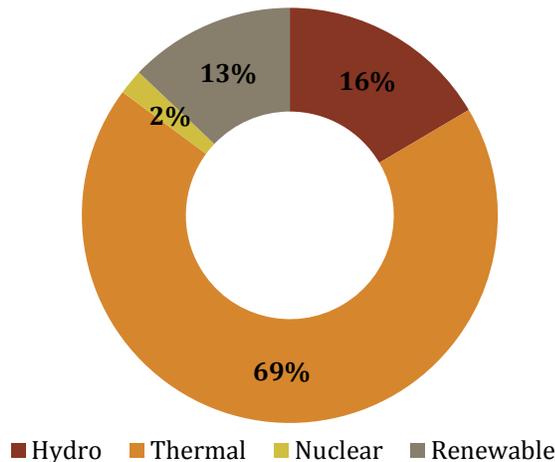


Sector Wise Power Load Factors in Percentage

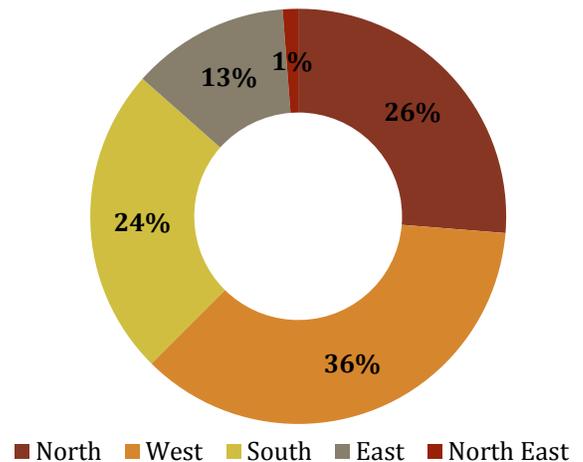


The electricity generation in India is widely diversified with a mix of conventional sources like coal and gas based thermal, hydro and nuclear plants and renewable sources like solar, wind and tidal. Thermal power sources still

Electricity Generation by Source



Electricity Generation by Region



contribute to the maximum proportion of the generation capacity (at 69%) with hydro contributing to 16% and nuclear contributing to 2%. Renewable energy sources contributed to about 13% of the total electricity generation capacity accounting for 31.7 GW. Similarly, the western region contributed to almost 36% of the installed capacity with north and south contributing 26% and 24% respectively.

Some states still continue to suffer from deficit in the actual electricity available as against the required energy. **Uttar Pradesh and Karnataka are among the large states with high electricity supply/demand deficit.**

6 States with Highest Electricity Deficit	
State	Deficit (%)
Jammu and Kashmir	15.3
Uttar Pradesh	12.7
Meghalaya	6.4
Arunachal Pradesh	6.0
Assam	5.8
Karnataka	5.3

The Government has planned for generation capacity addition to meet the growing demand of electricity. The 12th Five Year Plan targeted for a capacity addition of 88,537 Mega Watt (MW) from conventional sources by 2017. **The cumulative capacity addition during the 12th plan, as on December 2015, was 72,240 MW, which constitutes 81.6% of the 12th plan target.** Government has also set an ambitious target of 175,000 MW from renewable sources by the year 2022 out of which more than 100,000 MW is expected to be achieved through expansion of solar generation capacity.

Some of the steps taken to improve generation capacity include:

A new scheme “Ultra-Modern Super Critical Coal Based Thermal Power Technology” to promote clean, efficient thermal power through setting up of Ultra Mega Power Projects (UMPPs) each of which is 4,000 MW

A 10 year tax holiday for undertakings beginning power generation, distribution and transmission by March 2017 to help investors plan investments better

Renovation, modernization and life extension of old, inefficient generating to improve efficiency and better availability of generating units

A scheme for utilization of gas based power generation capacity

Multiple schemes under the Ministry of New and Renewable Energy to encourage development of grid-interactive renewable generation capacity

Generation capacity addition, however, requires substantial investment from private and public sector. Financing such a large project is a critical constraint for any developer. Similarly, lack of environmental clearances, shortage of technical manpower and adequate supply of fuel has resulted into a slower pace of growth in the generation capacity as compared to the potential. The ministry reported that nearly 41 GW planned generation capacity is currently stalled due to various issues.

Scenario of Power Transmission

A robust transmission system is the key to ensure optimal utilization of generation capacity by evacuating power from surplus areas to areas requiring additional power. An efficient transmission system is also necessary to

ensure fall-back power systems in case of failure of a primary generation facility in a particular area. Bottlenecks in transmission networks can often lead to inefficient and suboptimal utilization of generation capacity.

The country has been demarcated into five transmission regions viz. Northern, Eastern, Western, Southern and North Eastern. All regions have been synchronously interconnected and operate as a single grid – **the National Grid. The total length of transmission lines (including inter-regional) in India currently stands at 3,41,551 circuit KMs.** This also includes an addition of over 84000 circuit KMs in the 12th plan period. Similarly, the transformation capacity in the country currently stands at 6,58,949 MVA. **As on 31st March 2016, the total transmission capacity of the inter-regional links is 57,450 MW, which is expected to be increased to 68,050 MW by the end of 12th plan.** However, the transmission capacity is inadequate as compared to the total generation leading to loss of generation.

States like Chhattisgarh are unable to evacuate the excess power. With an expected power generation capacity of 30,000 MW by end of 12th plan, against the state's peak demand requirement of about 3,300 MW, currently there is only 7000 MW of transmission capacity available to evacuate power from the state. Similarly, the inter-regional transmission capacities in the national grid are also limited. Non-South regions of the national grid is surplus to the extent of 2.3% of total regional demand during peak hours while the Southern region is anticipated to face a peak-time shortage of 26% of regional demand. But, the power transmission constraints do not allow for the Southern grid's shortfall to be met by the surplus in the National grid.

Due to the supply constraints, a huge fluctuation in prices of electricity on the exchanges is seen due to lack of transmission capacities. This has also led to lapsing of many power purchases on the energy exchanges. In order to ensure Open Access as intended by the Government, it is imperative that the transmission infrastructure be augmented to meet the rising demand.

However, multiple issues leading to the slow growth in the transmission capacity still continue. The long lead times required for the conceptualization till commissioning of the transmissions project can lead to financial unviability and lack of interest from private players. The process needs to be more efficient and the process for award of projects needs to be streamlined. At the same time, incentives must be given to a developer for faster project execution. Similarly, the delay in acquiring Right of Way and forest clearances has led to stalling of some major projects. The ministry reported that at least 15 major transmission projects were delayed due to right of way or forest clearance issues. Power Grid Corporation of India Ltd. currently plays a dual role of transmission planning (as CTU) and execution of interstate transmission projects leading to a conflict of interest and possibility of unfairness against private and state companies. Similarly, inadequate focus has been given to upgradation of existing lines to avoid the lengthy clearance and land acquisition for new projects.

The government has taken multiple steps to address these issues and boost the augmentation of capacity. These, inter alia, include:

An investment of about Rs. 1,00,000 Crore for further development of inter-State transmission systems during XIIth Plan which includes development of High Capacity Power Transmission Corridors (HCPTCs) apart from inter-regional links for enhancement of National Grid capacity & various system strengthening schemes.

Guidelines and instructions have been issued to State Governments and Ministry of Environment and Forest to expedite the clearances for transmission project. These include guideline on payment of compensation towards damages in regard to the Right of Way (RoW) for construction of Transmission Lines and guidelines allowing working permission for linear projects by State Governments after Stage-I approval.

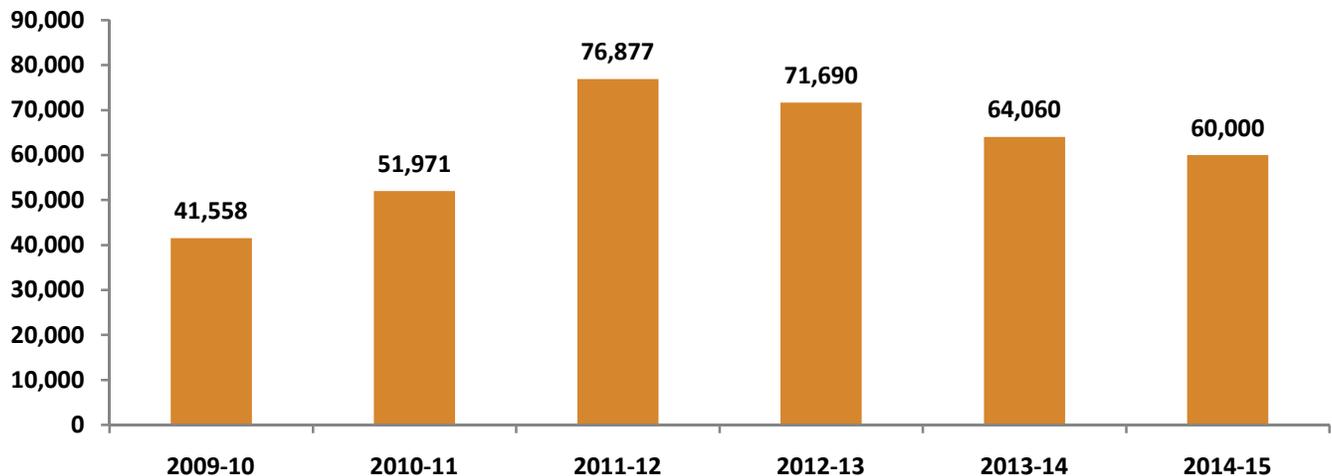
Major transmission projects are being monitored through the PRAGATI project monitoring system.

Delegation of powers to Regional Environmental and Forest Ministry for approval of forest proposals of linear projects including transmission lines irrespective of forest area involved

Scenario of Power Distribution

The distribution space in India is dominated by state-owned utilities, with the private players (around 17 in number) concentrated primarily in the metropolitan areas. The distribution companies are plagued with high debt and losses due to inefficient operations and large under-recoveries coupled with AT&C losses (nearly 30%). The unbundled distribution companies (Discoms) have large accumulated losses and debt in the last few years. **As per estimates, accumulated loss of Discoms stood at INR 3.8 lakh crore in March 2015. The total loss for the last six years stood at INR 3.66 lakh crore³.**

Discom Losses in INR crore



³ http://powermin.nic.in/upload/pdf/Power_Sector_Reforms.pdf

Outstanding Debt of the Discoms was at INR 4.3 lakh crore, as on March, 2015⁴. **As per a report of the Ministry of Power, Coal and Renewable Energy, the average debt interest rate of Discoms is 12 %**. As regulators do not allow for the pass through of interest on past losses in tariff, the Discoms are currently locked into a vicious cycle of debt. As some of the losses are offset by State governments through budgetary support, this also has an impact on the ability of the states to spend on other social sectors. The RBI report on State Budgets noted that the 'discoms and retail distribution continue to be the weakest link in the power value chain'.

The Central government has recently launched the **UDAY (Ujjwal DISCOM Assurance Yojana) for financial revival and turnaround of Discoms**. UDAY aims to empower DISCOMs with the possibility to break even in the next 2-3 years through improving operational efficiencies of Discoms, reduction of cost of power, reduction in interest costs and enforcing financial discipline on Discoms through alignment with state finances.

Salient Features of UDAY Scheme

States shall take over 75% of Discom debt as on September 30, 2015 over two years - 50% of Discom debt shall be taken over in 2015-16 and 25% in 2016-17

Government of India will not include the debt taken over by the States as per the above scheme in the calculation of fiscal deficit of respective States in the financial years 2015-16 and 2016-17

States will issue non-SLR including SDL bonds in the market or directly to the respective banks / Financial Institutions (FIs) holding the Discom debt to the appropriate extent

DISCOM debt not taken over by the State shall be converted by the Banks / FIs into loans or bonds with interest rate not more than the bank's base rate plus 0.1%

State Discoms will comply with the Renewable Purchase Obligation (RPO) outstanding since April 01, 2012 within a period to be decided in consultation with Ministry of Power

States accepting UDAY and performing as per operational milestones will be given additional / priority funding through DDUGJY, Integrated Power Development Scheme, Power Sector Development Fund 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)

States not meeting operational milestones will be liable to forfeit their claim on IPDS and DDUGJY grants

⁴ Press Bureau of India Release on 05-November-2015

In addition to the UDAY Scheme, the Government is also operating the following schemes related to the Power Sector:

1) Integrated Power Development Scheme (IPDS) was launched in December 2014 with the following objectives:

- Strengthening of sub-transmission and distribution networks in urban areas;
- Metering of distribution transformers/feeders/consumers in the urban area;
- IT enablement of distribution sector and strengthening of distribution network

Under this Scheme, as on December 31, 2015, projects worth INR 5134 crore have been sanctioned while those worth INR 196.79 crore have been released.

2) Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) was approved in November 2014 with the following objectives:

- Separation of agricultural and non-agricultural feeders;
- Strengthening of sub-transmission and distribution networks in the rural areas;
- Metering of distribution transformers/feeders/consumers in the rural area;
- Rural electrification.

DDUGJY has an estimated outlay of INR 43,033 crore, including budgetary support of INR 33,453 crore. In addition, the already approved outlay of INR 39,275 crore, including budgetary support of INR 35,447 crore, for continuation of the Rajiv Gandhi Grameen Vidyutikaran Yojana (RGGVY) in 12th and 13th Plans, has also been carried forward to the DDUGJY. The government intends to electrify all the remaining non-electrified villages by May 1, 2018.

Conclusion

Impressive strides have been made in the power sector over the last two years, including among others addition of record generation capacity, long overdue reforms of Discoms, and energizing the development of the renewable sector. The **Electricity (Amendment) Bill, 2014** seeks to address some of these challenges. However, more comprehensive systemic reforms and functional changes are required to realize the vision of “One India, One Market, One Price” and ensure equitable and quality access of power to all.