Inspira-Journal of Commerce, Economics & Computer Science (JCECS)
ISSN : 2395-7069 GIF: 2.7273, CIF: 4.964, Volume 05, No. 03, July-September, 2019, pp. 218-222

# POWER SECTOR IN INDIA: ISSUE AND CHALLENGES

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**ABSTRACT**

*Power sector plays a very important role for development in various infrastructure sectors in the country. The existence and development of power infrastructure is essential for sustained growth of Indian economy. For sustainable economic development reliable and inexpensive Power is required. Thus, it is necessary that the growth in Power Sector should be in line with the GDP growth rate of around 6-7%.*

***KEYWORDS**: Per Capita Electricity, Smart Grid, Transmission, GDP, Plant Load Factor.*

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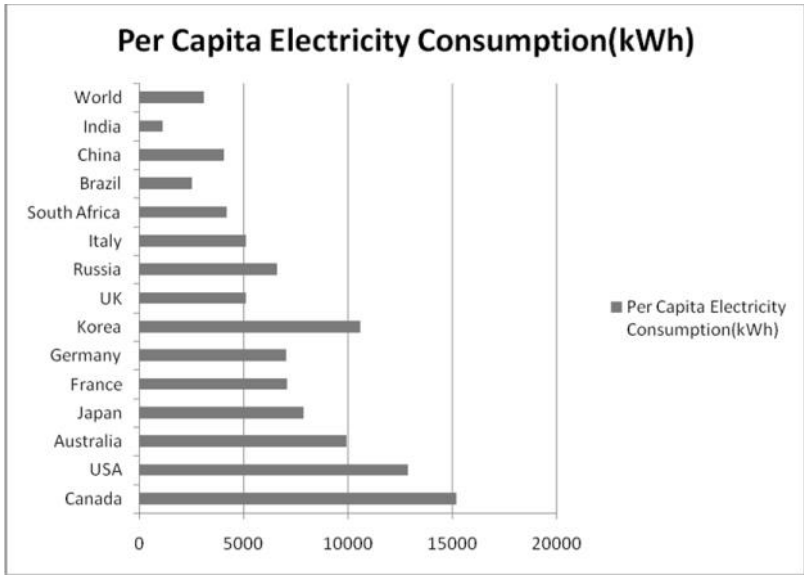
## Introduction

The Indian power sector has grown significantly since Independence and installed generation capacity has increased from 1362MW to 344002 MW in March 2018.Still the gap between demand and supply exist.




Growth of electricity sector in India from 1947 to 2015

Fig.1: Per capita electricity consumption of various countries

Per Capita Consumption=Gross electrical energy availability/ mid year population

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**Challenges in Distribution Sector**

The distribution sector plays an important role in functioning of power sector. The distribution sector provide connectivity of power to the consumer. We should have focused approach on an efficient and well performing distribution sector and improvement of financial health of utilities towards providing reliable and quality power supply. The challenges in distribution sector are as follows:

- **High Aggregate Technical and Commercial Losses**

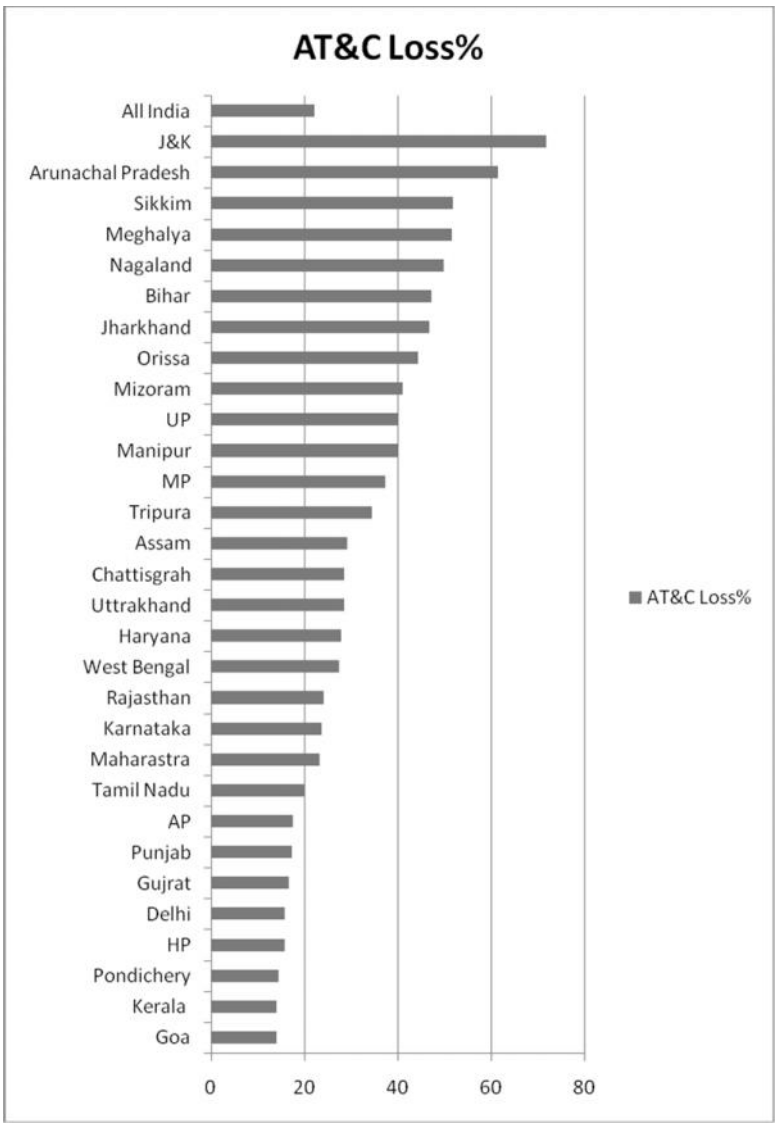


Fig. 2: AT&C Loss % for FY 2013-14

**Measures to Check AT & C Loss**

Various approaches can be followed to reduce AT and C loss

- Private sector participation in Distribution
- SCADA and IT application.
- Use of Remote Meters.
- Distribution Transformer and Feeder-wise Metering.

- Reactive Power compensation by Capacitors.
- Separation of Agriculture and Distribution Feeders.
- Improving Collection Efficiency levels.
- Role of Training

**High Transmission and Distribution Losses**

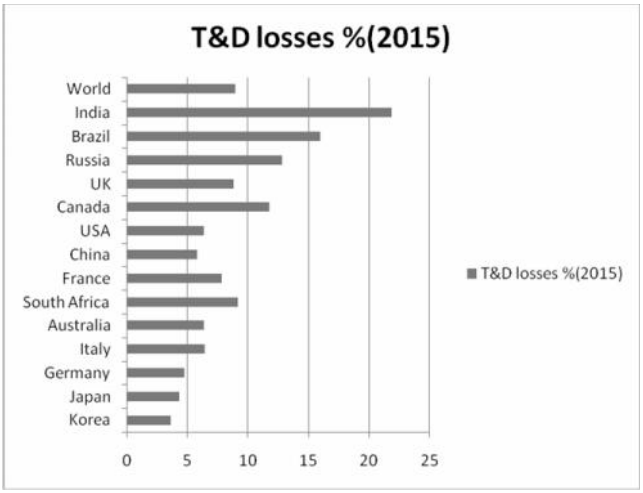


Fig.3: T&D losses% of Various Countries in FY14-15

The financial health of Distribution utilities in the country is a matter of concern. The Aggregate losses (without accounting for subsidy) for all the utilities rose to ' 71,998 Crs in FY2014-15

**Measures to Check Transmission and Distribution Loss**

- Tariff Rationalization.
- 100% metering of consumers.
- Lack of credible database.
- Energy accounting and auditing covering all feeders and Distribution Transformers (DTs).
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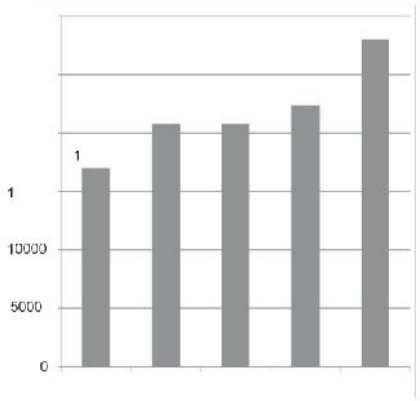
**Challenges in Generation Sector**

Day-to-day the demand of electricity is increasing. To bridge the gap between demand and supply the government has taken measure steps. The total Installed Generation Capacity of India as on August 2015 is 276, 783 MW




Transmission Capacity addition (MW)

**Fig. 5:** Growth in Transmission Capacity addition

Thermal energy contributes its maximum share of total Installed Capacity of India. The share of Hydro is only about 21%. Hydro potential in India is about 86,000 MW at 60% load factor. The ratio of Hydro: Thermal in India is 40: 60. However, the share of Hydro is declining and the current actual Hydro: Thermal ratio is 19:67.

There are many issues which affects the generation sector:

- Shortage in Coal supply.
- Dipping All India average PLF (Plant Load Factor): Exist- ing power plants in the country is operating at low power factor.
- High ash content Coal.
- Securing land and clearances.

**Challenges in Transmission Sector**

The state-sector network grew at voltage level up to 132 kV during the 50s and 60s and then to 220 kV during 60s and 70s. Subsequently, in many states (U.P., Maharashtra, M.P., Gujarat, Orissa, A.P., and Karnataka) substantial 400 kV network was also added as large quantum of power was to be transmitted over long distances.

**Growth of Transmission Sector**

| Particulars | Transmission Lines (Ckt Km) | | Sub-stations (MVA) | |
|---|---|---|---|---|
| | 400 kV | 220 kV | 400 kV | 220 kV |
| End of VI Five Year Plan | 6029 | 46005 | 9330 | 37291 |
| End of VII Five Year Plan | 19824 | 59631 | 21580 | 53742 |
| End of VIII Five Year Plan | 36142 | 79600 | 40865 | 84177 |
| End of IX Five Year Plan | 49378 | 96993 | 60380 | 116363 |
| End of X Five Year Plan | 75722 | 114629 | 92942 | 156497 |
| End of XI Five Year Plan | 113367 | 140164 | 151027 | 223774 |

**Transmission Sector Growth and Challenges**

- **Inter-regional Transmission Capacity Enhancement**

The cumulative Inter-regional Power transfer capacity of National Grid has been enhanced to about 28,000 MW.

The Inter-regional power transfer capacity of National Grid is to enhance about 66,400 MW by the end of XII Plan.

- **Grid Failure**

The Grid consecutively failure on 30th July and 31st July, 2012. While the first disturbance affected only Northern Region, the second one affected Northern, Eastern and North Eastern Regions. However, the essential loads were restored at the fastest pace within few hours of the incidents and power supply was restored progressively and normalized completely on the same day of the incident(s).

- **Smart-Grid Recommendation**

Smart Grid is confluence of Information, Communications and Electrical/Digital technologies. Smart Grid, apart from facilitating real time monitoring and control of power system will also help in reduction of AT&C losses, peak load management/demand response, integration of renewable energy, power quality management, outage management etc.

**Conclusion**

The Indian Power sector has achieved a lot over the last decade in the areas of Policy reforms, Private sector participation in Generation and Transmission, new manufacturing technology and capabilities, but there is still much to achieve and a number of challenges to overcome before the opportunities can be leveraged. We need to overhaul our Coal sector to ensure long- term energy security and maintain economic growth momentum. The opportunities for investment in India's power sector are huge. The policy and regulatory frameworks are well defined. All the segments be it Generation, Transmission, Distribution, electricity trading or equipment manufacturing, are open to Private participation. Several path-breaking regulations such as Standard bidding guidelines, Open access, Multi-year tariff regime and so on, are in place.

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