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Research Article

CHALLENGES AND ISSUES IN INDIAN POWER SECTOR

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A R T I C L E I N F O

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A B S T R A C T

Electricity is an essential source for the development of a country. India ranked third in production and consumption of electricity in the world. India's power sector has an installed capacity of 347.22 GW. The electricity demand in India has increased rapidly and it expected rise further in future. Despite the country has surplus energy, it facing many problems in serving electricity to all citizen. Basically the purpose of power sector is to provide uninterrupted power supply to all, but not yet been able to give power connection for all the citizen. Currently India power sector facing lot of challenges and issues regarding debt, fuel concern, financial issues, power cuts, environmental damage, energy theft etc. 90% of the coal fired power plants are in violation of emission norms notified by the ministry of environment forest and climate change. Energy theft concerned, Indian power sector lose around Rs.1,15,020 crore every year and it reduces the GDP around 1.5%.(A world bank estimate). Transmission and distribution losses also a major issue in this sector. According to various reports, despite the country ranks fifth in the world in terms of installed capacity, still more than 300 million people do not have access to electricity. The losses make rise to a vicious cycle-utilities running into losses leading to an increase in power tariff leading to more burden on the end users which ultimately results in to more unscrupulous ways to energy theft. The major challenges and issues are discussing briefly in this article.

INTRODUCTION

Electricity is an essential source for the development of a country and power sector plays a key role in a country's economic growth. India ranked third in production and consumption of electricity in the world, as of March 2018[1]. India generate 1486.5TWH (Trillion Watts Hour) electricity in the year 2017-18[2]. As on 31 December 2018, Indian power sector has an installed capacity of 347.22 GW[3]. The power generation sources range from conventional sources by using fossil fuels, non-conventional sources such as solar, wind and agriculture and domestic wastes.

In India, the electricity demand has increased rapidly and it expected to rise further in future. To meet the rising demand, needs addition of power generating capacity. Despite the country has surplus energy, it facing many problems in serving electricity to all needy. The credit of the Indian power sector also very poor and the Rs.11.7 lakh crore debt of power sector already under severe stress.

Basically, the purpose of power sector is to provide an un interrupted power supply to all the citizen of the country. But not yet been able to give power connection for all the citizen so far.

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100% households electrification in rural and urban areas and the bad financial condition of distribution companies (discoms) are the major challenges of power sector currently. Besides fuel issues, water scarcity, and power theft, less power demand growth, quality of fuel, availabilities of transmission infrastructure also the issues facing by the power sector in India.

Current Scenario

In India, the power sector is mainly governed by the ministry of power. Other than PSUs (Public Sector Undertakings) and state level corporations in generation, distribution and transmission, private sector enterprises also play a major role and about 54.35% of the total installed capacity is generated by private sector- *Indian power sector.com*.

Due to a favorable investment policy offered by the government over the last one decade, the private sector contributing 54.35% of the total electricity whereas 45.65% produced by state owned power plants[4].

As on 31 December 2018, India's installed power capacity is 347.22 GW. The various sources of power generation is shown in the Table [1] and Figure [1].

The government efforts to encourage renewable energy make the dependency of coal based power generation from 60% to 56%. As per CEA (Central Electricity Authority)

reports, India has an energy surplus of 6.8% during the year 2017-18. This energy surplus does not mean generating more power than requirement. It means, the country's power generating capacity is more than it demanded, since production depends on demand which is linked to consumer's access to electricity and their ability to pay. The average electricity consumption in India in 2017-18 is shown in the Table [2] and Figure [2][5].

India's solar power installation reached 25000MW making a milestone in its 2022 target. The Table [3] and Figure [3] illustrates the installation trends of renewable energy in India.

Despite having surplus power generation capacity, the inadequate infrastructure for supply electricity kept the country still power deficit. To overcome this issue and supply power to all by March 2019, government launched a scheme called '***Power to all***'. The scheme will ensure continues and un interrupted electricity.

Challenges and Issues

Debt

The power sector has a debt burden of Rs.11.7 lakh crore. Of this, Rs. 3.5 lakh crore are already under stress which is primarily to the generation sector and of this, about Rs. 2.5 lakh crore have the potential of being written off as bad loan- *The bank of America – Meril Lyneh report.*

The Rs. 11.7 lakh crore debt distributed in various wings of power sector is shown in the Table [4] and Figure [4].Of the Rs. 3.5 lakh crore strssed loan, most of the components are to the generation sector alone – *Reported by B of A. ML research analyst* ***Amish Shah*** *and* ***Sriharsh Singh***.

The loan of distribution sector, which were earlier stressed, are now better off given quasi-state guarantees and restructuring under the government's Ujwal Discom Assurance Yojana (UDAY) scheme[6].

Fuel Concern

The capacity addition of thermal power plants are affected by growing fuel requirement. More than 20,000 MW gas based capacity is ideal due to non-availability of gas. The Coal India Limited (CIL) restricted the coal supplies to around 65% of actual coal requirement for coal based thermal plants make them more dependence on imported coal, results high power generation cost – www.hindustan *power projects.com.*

Financial Issue

The government's free electricity connection and populist tariff schemes, and operational inefficiencies are severely affect the financial health of state discoms which are already mount debt burden. The total losses of Indian discoms for the year 2017-18 was about Rs. 17,352 crore. This is mainly due to Aggregate Technical and Commercial (AT & C) losses. As per ministry of power data, the current AT & C losses in India are 23.03% and these losses are as low as 5-10% in some other countries across the world.

Electricity Theft

Every year Indian power sector lose around Rs.1,15,020 crore by power theft - *A report of Northeast group*. Moreover the report says as for as electricity concern India is the top loser than any other country in the world. In India, the state Maharashtra alone losses Rs.19,880 crore every year by energy theft. Power theft reduces India's GDP by around 1.5% - *A World Bank estimate*. A recent study by NDTV also concluded that 40% of electricity in India is still unpaid.

Transmission and Distribution losses

It is one of the major issues of the power sector in India. The average transmission and distribution losses exceed 25% of total power generation and is almost 2.5 times the world average. Many factors behind this such as energy sold at low voltage, sparsely distributed loads over large rural areas, inadequate investment in distribution system, lack of infrastructure etc. The losses make a rise to a vicious cycle – utilities running in to losses leading to a increase power tariff, leading to more burden on the end users which ultimately results in to more un scrupulous ways to energy theft[7].

Ensure 100% Electrification

To ensure 100% households electrification in rural and urban areas, the government launched Soubhagya Yojana on 16th September 2017, with the target of giving every households access to electricity by 31 December 2018. Till August 2018, 91% of the rural Indian households have received electricity. In October 2018, Bihar state completed its target under this scheme[8]

Political Giveaways

Giveaways is the biggest problem in Indian power sector apart from the power theft. The irregularity and delay in disbursement of state subsides assured to domestic and agriculture consumers. The lack of political will across governments to rationalize tariffs and slash these subsidies is a long running problem. The power subsidy alone stands at over Rs. 90,000 crore. There has been a sharp growth in electricity use in the agriculture sector since 1980s. 17% of the total electricity consumption *(1,73,185 million units in 2016)* is supplied either free or at subsidized rates, and a large part of it is notmetered [9].

Problems in Contract

Normally, the discoms procured power from generating companies through long term contracts *(up to 25 yes)*. These contracts legally bind the discoms in to paying a lump sum annual amount for fixed cost to the generating companies and a variable cost as per unit charge. Even if the discoms do not draw power from the generating companies for a particular period, they have to pay the fixed charge as per contract. This surplus power is backed down, if it cannot be sold. That means, without generating electricity, the power generators lie ideal at that time, incurring fixed cost[10].

Social and Environmental Damage

India generates three fourth of its power needs from coal. Excessive coal fired power generation is the greatest source of atmospheric waste which leads substantial health and environmental damage. The excessive health cost borne by the population is estimated at Rs. 2,54,890 crore a year. The excessive emission of green house gases add another Rs. 1,00,110 crore in a year. The net social and environmental costs of excessive coal consumption reach about 1.7% of GDP a year. [11].

In India 90% of the coal fired power plants are in violation of emission norms notified by the Ministry Of Environment Forest and climate change (MOEF). With the revised norms,

install antipollution equipments in line to reduce the emission is the major constraint of the power generating companies currently. It is estimated about one crore per MW as installation cost and space requirement also an another problem. This huge capital investment make customer over burdened by tariff raise. Initially given 2 years to ensure the reduction of emission from 7th December 2015 *(up to 2017)*. However it has been extended another five years (*up to 2022*) for compliance of revised norms.

Power Cut

Power cut is one of the India's most significant barrier of development.

The impact of power shortage on downstream rural households and firms is the second largest source of economic cost estimated at 1.42% of GDP in a year[12].

It includes the potential income losses of un-electrified households and firms that are already connected to the grid but affected by power cuts.

Lack of Gird Capacity

In the Indian power sector, the transmission capacity does not match with the generation capacity. As per global best practice recommends that, for every MW of generation capacity added 7 MVA of power transformation capacity in transmission and distribution be built. In India, only 3MVA is added. Due to lack of grid capacity, Tamil Nadu lets substantial wind generation capacity idle or under operate during summer[13].

Government Measures Against the Issues

- A high level committee chaired by NITI Aayog member Ramesh Chand recommended that, let farmers pay for the power used as per meter and this subsidy will be reimbursed under Direct Benefit Transfer (DBT) [14].
- In July 2016, the Chief minister of Tamil Nadu, asked Prime Minister, to speed up the construction of an inter-state green energy corridor, that would allow renewable power to be transmitted and used on other states instead of being wasted.
- The central government has pledged an investment of crores of rupees for creating smart grid infrastructure.
- Prime Minister Narendra Modi announced Rs.29,000 crore to funding for smart metering programme. These measures may reduce power tariff in India. Additionally, Rs.57, 000 crore is announced for loss reduction programme and many projects are now under way across India.

SUGGESTIONS AND CONCLUSION

- Power distribution companies should raise awareness among the public on the use of electricity. They should take up full effort to curb the power theft and regularize illegal connections.
- Coal production to be ramping up by both public and private sector in a time bound manner. Participation of private sector in coal production to be increased and regulatory framework, clearance and approvals for allocation to be eased. To formulating these reforms infrastructure needs to be improved.
- On technical parameters, India needs to put in place an incentive mechanism, where production and distribution companies are bench marked and rewarded or punished. If correctly implemented this, it will bring down inefficiencies significantly.
- For financial restructuring of distribution companies (discoms), the government already launched UDAY scheme and many state discoms are reducing their losses under this scheme, but that required to be done more aggressively. If their losses reduced, India could easily become a power surplus country.
- To overcome the challenges of power sector in India, the government implemented many schemes, but it is important that these schemes should be implemented more effectively and efficiently.
- The government is taking serious efforts to achieve 175 GW capacity in renewable energy by 2022. It remove the stress on non renewable source. Due to the better steps taken by the government in terms of power generation, if the power theft, free power, over dependency on fossil fuels, losses in power transmission and distribution are solved, the target can be achieved easily.
- To achieve the emission target with the terms of Paris agreement, it is mandate to adopt new emission standards and no option to power generating companies to make any excuses. The government should also support power generators financially by subsidizing the anti pollution equipments and allowing to recover this capital investment in the tariff without comparing tariff with renewable sources which is available at lesser tariff at power grids.
- Construct roof top solar power generation along with mini wind mill on all government owned buildings.
- Develop community based small power plants in villages to fulfill their energy demand.
- 35.5% of India's population still live without access of electricity. It is the time to think on micro level, so that we decrease the dependency on macro power generation and distribution system.
- To attract private investment in renewable power projects, the green energy corridor is very important for India.
- To encourage more people to adopt renewable power generation in view of 100 GW solar capacity target, the government could lower the interest rates and provide attractive long-term financing options through banks.

Table 1 The contribution of various sources in power generation

Sl. No.	Source	Percentage of contribution in installed capacity (%)
1	Thermal	64
2	Hydro	13
3	Nuclear	2
4	Wind	10
5	Solar	7
6	Others	4

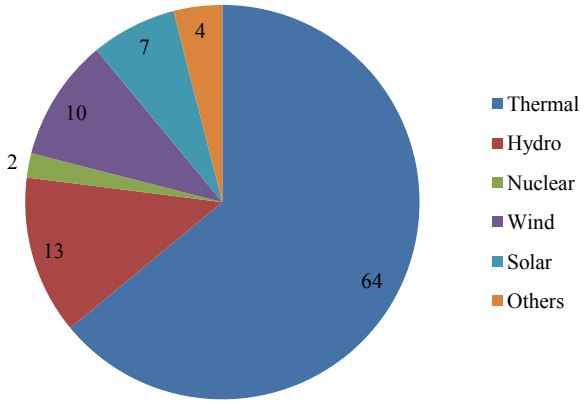

Figure 1

Source: Central Energy Authority (CEA)

Table 2 The average electricity consumption in India in 2017-18

Sl. No.	Consumption	Percentage (%)
1	Residents	24.20
2	Industrial	41.48
3	Agriculture	18.08
4	Commercial	05.51
5	Traction	1.27
6	Others	9.46

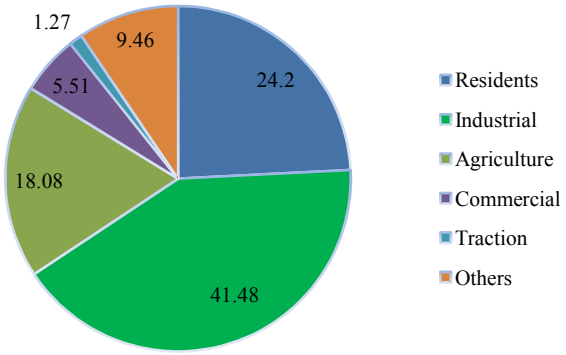

Figure 2

Source : Central Energy Authority (CEA)

Table 3 India's renewable power installation trend

Sl. No.	Source	Installed capacity	Installed capacity as on July 2018 in MW	Installing target on 2022 in MW
1	Solar	21651	25000	1,00,000
2	Wind	34145	34393	60,000

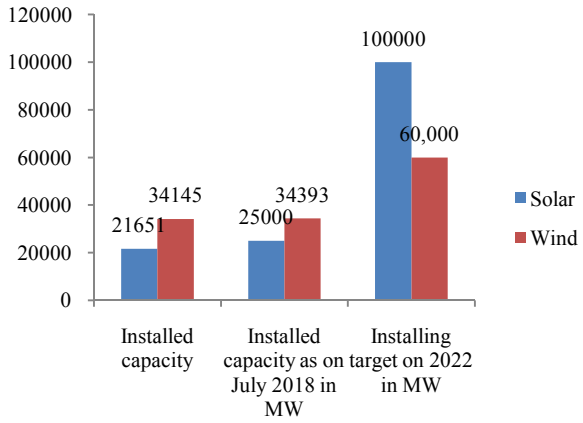

Figure 3

Source: Ministry of new and renewable energy, Mercom India Research, Indian wind Turbine Manufacturer Association

Table 4 The distribution of debt in various wings of Indian power sector

Sl. No.	Sector	Debt in lakh crore	Percentage of debt (%)
1	Generation	5.0	42.74
2	Distribution	4.0	36.75
3	Transmission	2.4	20.51

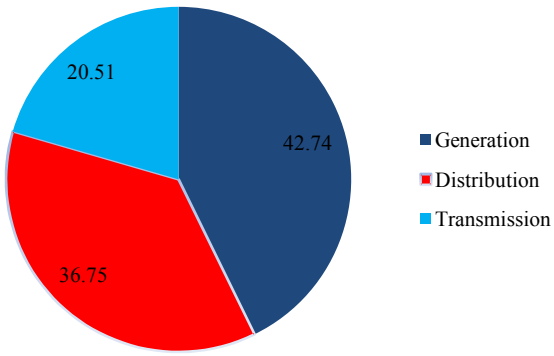

Figure 4

Source: Central Energy Authority (CEA)

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