

## Energy Statistics in India

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**Abstract** - The Indian power system is widely distributed as large geographical features. Also its main goal is that the every consumer & utilities are smoothly working with high power quality. But the areas where electricity was not generated in that areas electrification is also challenging task. Also electrical power is generated then it is transmitted through High Tension (HT), Low tension (LT) transmission lines. Accordingly it is distributed at particular area. There should be regulatory inspection required for proper distribution of electrical power. Hence Ministry of power is the apex body in India which gives authority & responsibility to Power sector council of India to visualize the overall work. Also promote the private sector involvement in power generation. For this state, central, private & all India regulation is required. Hence due to broad range of trends, Liberalization, deregulation (or regulation) and privatization, Public-Private partnership and all processes are implemented wherever necessary. Also according to Accelerated Power Development and Reform Program (APDRP), restructuring & proper distribution of electrical power is effectively implemented to reduced Transmission and Distribution (T&D) losses. Hence overall energy scenario in India is very important that definitely elaborate the overall electrical power generation from installed capacity from various power plants all over in India by sector wise. Also renewable energy sources can be effectively used for the generation of electricity. The main objective is that to reduced much dependency over fossil fuels as well as decreasing pollution. The main aspect is that the electrical energy generation in ecofriendly manner.

**Key Words:** Accelerated Power Development and Reform Programme (APDRP), High Tension (HT), Low tension (LT), Regulatory Commission (RC), Transmission and Distribution (T&D) losses

### 1. INTRODUCTION

In recent years the electrical power demand is increases but considering our conventional power system & its structuring the power losses takes place while Transmission and Distribution (T&D). It is further considered as Transmission and Distribution (T&D) losses. Also appropriate High tension (HT) & Low tension (LT) lines are used for distribution of electrical power wherever necessary. In earlier stage the main source of electrical power generation was coal due it's abundantly availability in India. But in the twenty century world energy council laid down the guidelines for ecofriendly power generation. Also this council sets open, transparent & inclusive start up programme for energy scenario up to 2040. For this, the council is just not policy maker but also senior energy leader

throughout the world. In India this reflection gives potential to ministry of power. Accordingly bureau of energy efficiency is policy making organization & sets up appropriate goals in the revolutionary phase. Power sector council is apex body to implement & execute the goals setup by the bureau. During the phase of globalization & industrialization one more socio-economic factor primarily considered. Which will decides & modified the objective of power sector council. As it coalfields in India are large. Abundantly coal is available and its vast use in power generation was quite serious. Simultaneously petrol, diesel, natural gas is also in practice for electrical power generation. Since pollution level due to burning of coal & other fuels is a major issue. Hence, instead of such a fossil fuel other renewable sources utilize for power generation. Due to which pollution level in environment decreases as well as per kW cost of power utilization will be decreases. The utility is get directly benefitted from this method. The main advantage in this change is that the dependency over fossil fuel is not decreases but it can be reduced step by step manner. As everyone is well known that fossil fuels over the earth becomes depleting in next hundredth of year. For the same this idea will master solution. Every year goal is setup for installing various power plants overall India. Accelerated Power Development and Reform Programme (APDRP) is the reforming, restructuring the infrastructure. According to the newly installed power plants, initially the involvement from private sector is negligible. But after 1990 open access policy of economics from ministry of finance private organization are willingly participated in this APDRP programme. The region wise, zone, state wise, central & All over India survey per year effectively implemented. The survey should broadly take place further commercial energy & non-commercial energy, renewable energy & non-renewable energy. Also some guidelines are laid down for nuclear power plants. The view of mankind safety, private agencies & organizations are strictly away from nuclear power plants operations & technology. The central government i.e. government of India is the one & only authority to operate these plants. Up to The 31 Dec. 2018 electrical power generation from installed power plants in MW with percentage & overall study is describes in this paper.

### 2. OVERALL ENERGY SCENARIO

#### A. REVIEW STAGE

We all very well had known that the India is the fasted economy with vast geographical nature. Hence according to this the different states & union territories are engaged to fulfill the demands of electrical power. The various sources

are available for electricity generation. Hence we elaborate the detailed by step by step manner.

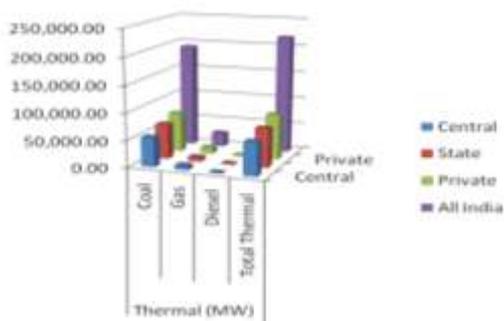
**i) THERMAL POWER PLANTS (TPP)**

The fossil fuels are the main source of electricity generation from the invention of it. The Indian government is implemented this techniques since British colonial government is ruled over India. After independence the nature of fossil fuel is change to generate electricity. Hence coal is the primarily use for it. Then developing technology will use gas, diesel etc. for the same as a byproducts. Today the state, private sectors & central government are also implies the techniques of electricity generation from fossil fuels. This will shows tabulated format as bellows:

Sector	Thermal (MW)			
	Coal	Gas	Diesel	Total
Central	55,335.00	7,990.83	0	64,825.83
State	66,685.50	7,457.95	463.93	75,307.38
Private	77,142.38	10,980.60	534.27	86,196.68
All	199,162.88	26,429.38	998.20	22,6329.89

Table: 1- Thermal Power generation in MW

The table: 1 data is should be graphically plotted as bellows.



Graph: 1- Thermal Power generation in all sectors

As we consider this data the percentage of electricity generation from fossil fuels is very large amount. The net power generation is about 68.31 %. The coal, gas & diesel thermal power generation in percentage is as given in Table: 2

Sub-Sources	Thermal (MW)			
	Coal	Gas	Diesel	Total
Percentage	60.13	7.95	0.26	68.31

Table: 2- Thermal Power generation in Percentage

**ii) NUCLEAR POWER PLANTS (NPP)**

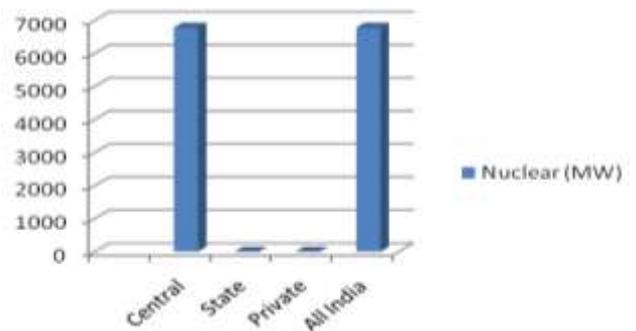
The radio-active elements such as uranium, thorium etc. are also using for generation of electrical energy. But such radio-active elements are very harmful for mankind. As it is aware very well that what happened in world war-2 in 1945

at Hiroshima & Nagasaki in Japan. Hence Government of India taking all powers in hand & only central government authorize to run nuclear power plants for generation of electrical power. No any state or private agency interferes regarding nuclear power plants & its technology. As the electrical power generation from nuclear energy is very less. But it may be increased by installing more units of nuclear power plants throughout overall the India. Since nuclear power plays vital role in development of any country, by fission & fusion the source of energy can be starts by implementing nuclear reactors manufactured by of latest technology. The Table: 3 show that the all sectors involvement in nuclear power generation with 2.59 % contribution from all installed capacity in India.

Sector	Nuclear (MW)
Central	6,980.00
State	0
Private	0
All India	6,980.00
Percentage	2.59

Table: 3- Nuclear Power generation with % & MW

As we consider this data the percentage of electricity generation from nuclear elements is very small extent amount. The net power generation is about 2.59 %. The graphical representation for the same is as given in Graph: 2



Graph: 2- Nuclear Power generation in MW at all sectors.

From the graph: 1, it is clear that there is No any state or private agency interference with 0% generation. Hence they are not authorizing for the same.

**iii) RENEWABLE POWER PLANTS (RPP)**

As we are well knows that the fossil fuels may decay in next 120 years. Hence all universe should searching the another sources should be finding out to meet the increasing day by demand. As the population goes on increasing continuously hence demand for the electrical power is also increases. Hence the sources which will continuously such as Kinetic Energy stored in Water, solar energy, Wind energy, Geo-thermal Energy, Tidal Energy & so on implement for

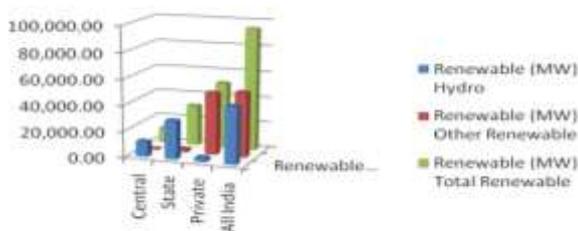
generation of electricity. For the same technologies & infrastructure are also invented for smooth working of such plant.

Table: 4 Shows that the total renewable power generation with MW capacity against total installed capacity from all other sources & involvement of all sectors.

Sector	Renewable (MW)		
	Hydro	Other Renewable	Total Renewabl
Central	12,651.	0	11,951.42
State	30,683.	2,176.90	31,959.90
Private	35,144.	49,041.10	52,685.10
All India	78,448.	51,218.00	96,596.42

Table: 4- Renewable Power generation in MW

The table: 4 data is plotted graphically is as follows with considering all categories viz., central, state, private & All India.



Graph: 3- Renewable Power generation in MW at all sectors

As we consider this data the percentage of electricity generation from renewable energy sources is moderately lies between thermal power plants (TPP) & Nuclear power plants (NPP). The net power generation is about 32.07 %.

Sector	Renewable (MW)		
	Hydro	Other Renewable	Total Renewable
Percentage	14.52	17.55	32.07

Table: 5- Renewable Power generation in Percentage

### B. FINAL STAGE

Now, it is very clear that the various plants & various sources are adopted for fulfillment of electrical power generation. The percentage (%) of the same is categorized earlier in this paper. The fossil fuels are main source of electrical energy generation. In the twenty century India is totally depends upon it. The coal is the mostly utilized for it. As Indians containing plenty of sources for coals. Near about 84 % power generation is coming out from burning of coal. Hence it is most commonly & widely used. But during the

phase of globalization the pollution of environment is primarily considering. There should lots of stages to utilize coal in thermal power plants such as unearthed through mining, processing over it, transportation & so on. Also the overall efficiency of thermal power plants lies in between 70 % to 80 %. There was is also risk of open handling of coal in summer season & coal storage in rainy season.

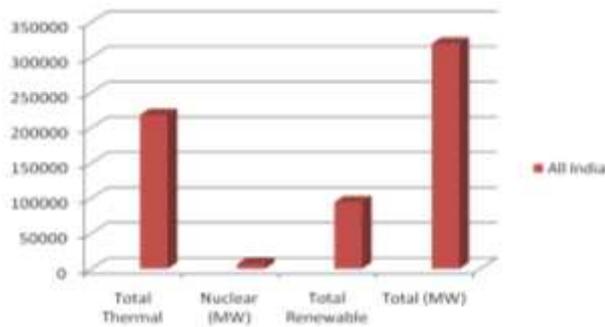
During the same period science & technology find out the different sources can be utilized for electrical energy generation. Also by using different appropriate technology the electrical energy can be generate with better efficiency & reduced per kW cost. The pollution is also under control or the plants should be mostly ecofriendly is the main aspect while implementation the sources from which renewable power should be generate.

Indian government takes initiative regarding this issue. Also promote private sectors to lead the energy generation through renewable energy sources. TATA Powers, ENERCOM, SUZLON etc. most of them. Afterwards other industries & organization also participating. Now dependency over the thermal power plant is much decreasing & it is near about 68.13%. Day by day it is reduced slightly. Currently the total generation from all installed generating station is 327,806.30 MW. The detailed scenario should be tabulated as follows.

Sector	Total Thermal (MW)	Nuclear (MW)	Total Renewable (MW)	Total (MW)
Centra	64,825.83	6,980.0	11,651.42	83,457.25
State	75,307.38	0	31,659.90	106,967.2
Privat	86,196.68	0	51,185.10	137,381.7
All	22,6329.8	6,980.0	94,496.42	327,806.3
(%)	68.31	2.59	32.07	100.00

Table: 5- Total Power generation in India in MW

We also mention this generation in percentage wise in graphical manner. Which gives clear idea about dependency over fossil fuels, how much scope is yet to improve renewable energy plants to fulfillment of demand of nonstop able power i.e. electrical power, Also plan to execute in which manner dependency over the coal should be reduced. The Percentagewise graph is as shown bellows



Graph: 4- Total installed capacity for electrical power generation in India

## Conclusion

The electrical power is the key for development. But the up to this stage the energy scenario is not satisfactory because the dependency over the fossil fuels is about 68.31%. These will result in unreliability of power supply as well as power quality gets affected. Since the growing phase of industrialization as per unit cost is also quite high. But there is scope for in which sector electrical energy generation should be improved. Accordingly, nuclear power plants get maximized. Also the modern techniques for energy conservation are needs to implement. In Short up to 2020 the power for basic requirement is fulfilled partially. Hence with effectively plans made by bureau & World council follow then & then only up to 2040 the dependency over coalfield, petrol, diesel, natural gas etc i.e. fossil fuels must be completely out of practice. Which will tends to lead the socio-economic power generation with minimum price of electrical power generation.

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