

A STUDY ON RENEWABLE ENERGY SOURCES AND ITS GENERATION IN INDIA

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ABSTRACT

Most of the power is generated in India by using Conventional Energy Sources like coal and crude oil-based power plants which tend to generation of Greenhouse Gases emission. Also these conventional sources are in limited quantity and will diminish after the excess use. The result of such utilization tends to focus on Renewable Energy Sources. This article reviews the introduction to renewable energy its utilization and the policies issued by the authorities of India. It starts by defining the basics of renewable energy and scope over conventional energy sources. It additionally exhibits the multi-criteria evaluation of various sustainable power sources and makes out imperative determinations.

Keywords: *Conventional Energy Sources, Greenhouse Gases, Renewable Energy Sources, etc.*

1.INTRODUCTION

Renewable energy source in India goes under the domain of the Ministry of New and Renewable Energy (MNRE). More up to date Renewable energy sources are focused to develop enormously by 2022, including a dramatically increasing of India's vast breeze control limit and a right around 15 overlay increment in solar power from April 2016 levels. Such goal-oriented targets would put India among the world pioneers in Renewable energy source utilize and put India at the focal point of its International Solar Alliance venture advancing the development and improvement of sunlight based power globally to more than 120 nations.

India was the primary Country on the planet to set up a service of renewable energy sources, in the mid-1980s. India's general introduced capacity has achieved 329.4 GW, with renewables representing 57.472 GW starting at 14 June 2017. 61% of the renewable power originated from wind, while solar based contributed about 19%. Large hydro introduced limit was 44.41 GW as of 28 February 2017 and is directed independently by the Ministry of Power and excluded in MNRE targets.

From 2015 onwards the MNRE started setting down significant plans for the renewable power source area under its ambit to make a quantum bounce, expanding on solid establishments officially settled in the country. MNRE inexhaustible power targets have been up scaled to develop from just shy of 43 GW in April 2016 to 175 GW by the year 2022, including 100 GW from sun powered power, 60 GW from wind control, 10 GW from bio power and 5 GW from little hydro power. The Ministry of Power has declared that no new coal-based limit expansion is required for the 10 years to 2027 past the 50 GW under various phases of development and liable to come

online in the vicinity of 2017 and 2022. The aggressive targets would see India rapidly getting to be noticeably one of the main efficient power vitality makers on the planet and outperforming various created nations. The administration expects to accomplish 40% combined electric power limit from non-renewable energy source sources by 2030. The Fig. 1 shows the average energy consumption in various countries depending on specific use of industry, transportation and agricultural purpose.

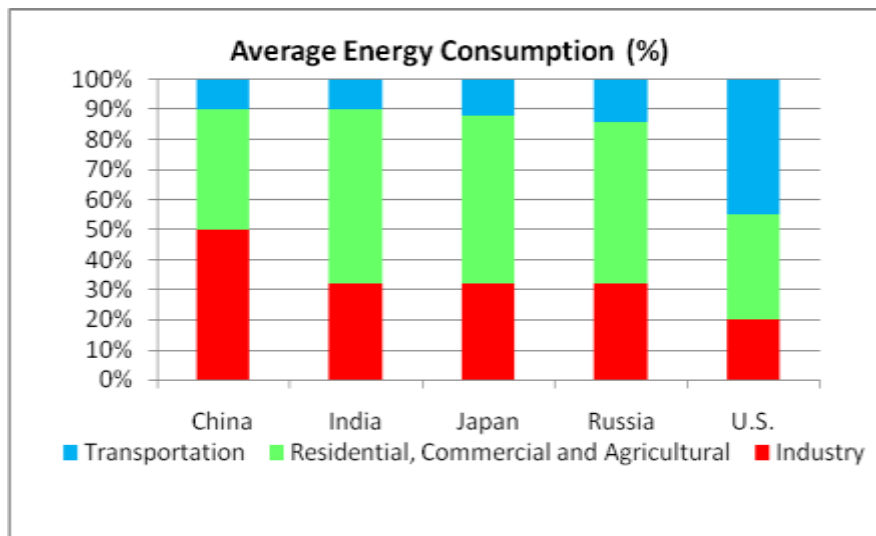


Fig. 1 Average Energy Consumption in Various Countries

1.1 Importance of Renewable Energy Sources

A comparison between renewable sources of energy and oil resources based on availability, regeneration, emission, transportation, etc. is given in the Table 1. It implies that how and why renewable resources are the important for the country in the energy field. The renewable sources are easily available over the non-renewable sources and can be easily regenerated as compare to oil sources. The renewable sources generate zero or less emission as compare to non-renewable sources.

Though the renewable sources are more advantageous than non-renewable sources they have practical limitations like they cannot be stored for long time and they involve high capital investment. They are affected by the environmental and climate changes. Solar energy is the greatest source for generation but the energy conversion may not achieve even 50% of initial solar energy during cloudy days.

II. RENEWABLE ENERGY SOURCES

2.1 Hydroelectric Power

Rainfall is good indication for persons especially in those areas where water is available to make energy conversion. Such energy conversion is called as hydroelectric energy. In India, heavy rainfalls are observed in Bihar, Uttaranchal, Punjab, J&K, Gujrat, etc. Therefore these states have greater efforts on hydroelectricity (Fig. 2). This is most useful source and efficiency of conversion is nearly 80%.



2.2 Wind Power

Like water, electrical energy can also be generated by using moving wind. The wind turbines used to convert wind power into the electrical power. This conversion is least efficient (around 30%) and more land area required for such wind turbine plant. The running cost is also high as compare to other sources. Some of the wind turbine plants located in Maharashtra, Gujrat and Tamil Nadu (Fig. 3). The observed capacity in India for wind power is around 20000 MW.

Table 1 Comparison of Renewable and Non-Renewable Energy Sources

Sr. No.	Factors Considered	Renewable Energy Sources	Non-Renewable Energy Sources
1	Availability	Unlimited	Limited
2	Regeneration	Can be Regenerated	Can't be Regenerated
3	Emission	Zero or Minimum	Highly produce greenhouse gases
4	Environmental effect of use	No measurable effect	Harmful to environmental
5	Distribution	Easy	Require more efforts
6	Area	Large area required	Small area required
7	Climate change	Dependent	Independent
8	Cost	High running and maintenance cost	Low cost
9	Energy Supply	High Energy Once Generated	Limited Supply

2.3 Solar Power

The sun is most important energy source on earth. Averagely, the radiations falling on earth surface generates 1400 w/m² heat energy. The energy conversion efficiency by solar energy is about 15%. It requires large lands and high capital investment following lower running and maintenance cost. The installed capacity of solar plants in India is around 1680 MW situated in Tamil Nadu, Gujrat, Orissa and Rajasthan (Fig. 4).

2.4 Geothermal Power

It is produced by geothermal energy source. Innovations being used incorporate dry steam control stations, flash steam control stations and binary cycle control stations. Geothermal energy is presently utilized in 24 nations, while geothermal heating is being used in many nations.

In the twentieth century, interest for power prompted the thought of geothermal power as a generating source. Ruler Piero Ginori Conti tried the main geothermal power generator on 4 July 1904 in Larderello, Italy. It effectively lit four light bulbs. Later, in 1911, the world's first business geothermal power station was worked there. Trial generators were worked in Beppu, Japan and the Geysers, California, in the 1920s, yet Italy was the world's just mechanical maker of geothermal power until 1958. Currently in India, no any geothermal power station because of geographical view.

2.5 Bio-mass Power

Biomass has dependably been an essential energy hotspot for the nation considering the advantages it offers. It is sustainable, broadly accessible, and carbon-impartial and can possibly give critical work in the ruler zones. Biomass is additionally fit for giving firm energy. Around 32% of the aggregate essential energy use in the nation is as yet gotten from biomass and over 70% of the nation's populace relies on it for its energy needs. Ministry of New and Renewable Energy has understood the potential and part of biomass energy in the Indian setting and consequently has started various projects for advancement of effective innovations for its utilization in different divisions of the economy to guarantee determination of most extreme advantages.

The present accessibility of biomass in India is assessed at 500 million metric tons for every year. Studies supported by the Ministry has assessed surplus biomass accessibility at around 120 – 150 million metric tons for each annum covering rural and ranger service deposits comparing to a capability of around 18,000 MW.

2.6 Nuclear Power

Nuclear power is the fourth-biggest wellspring of power in India after thermal, hydroelectric and renewable sources of electricity. As of 2016, India has 22 nuclear reactors in operation in 8 atomic power plants, having an aggregate introduced limit of 6,780 MW. Nuclear power created a sum of 35,000 GWh of power in 2016. 6 more reactors are under development with a joined age limit of 4,300 MW.

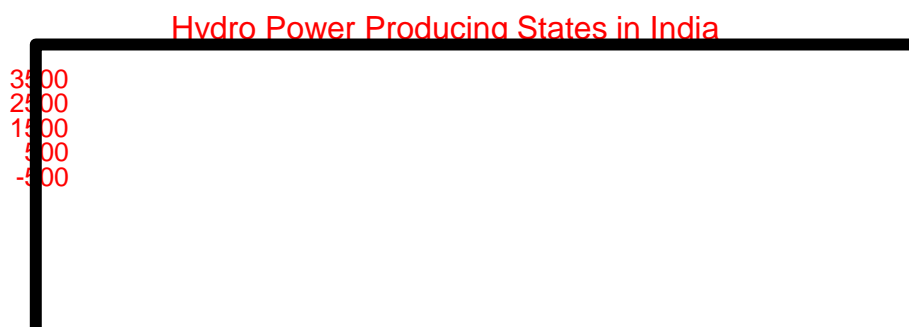


Fig. 2 Hydro Power Producing States in India

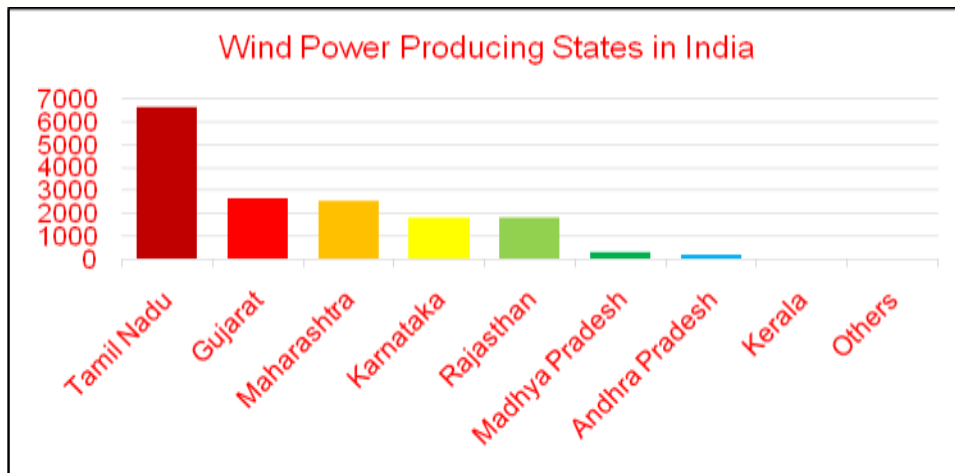


Fig. 3 Wind Power Producing States in India

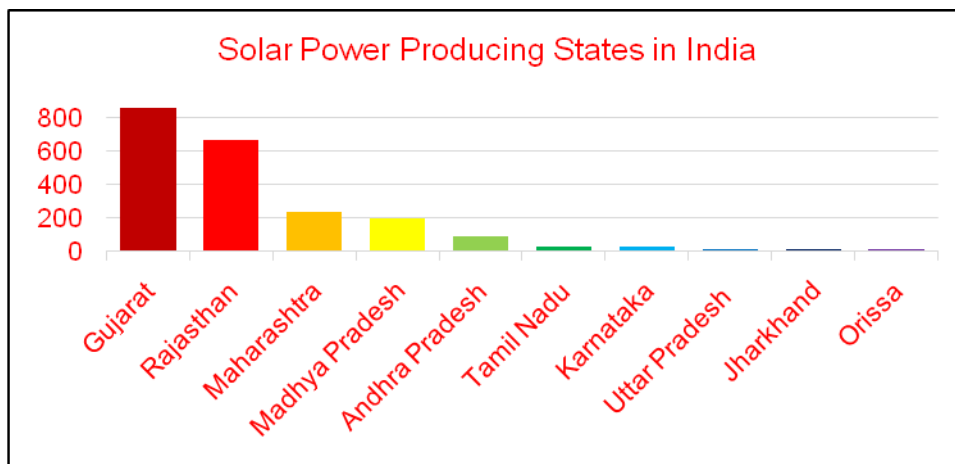


Fig. 4 Solar Power Producing States in India

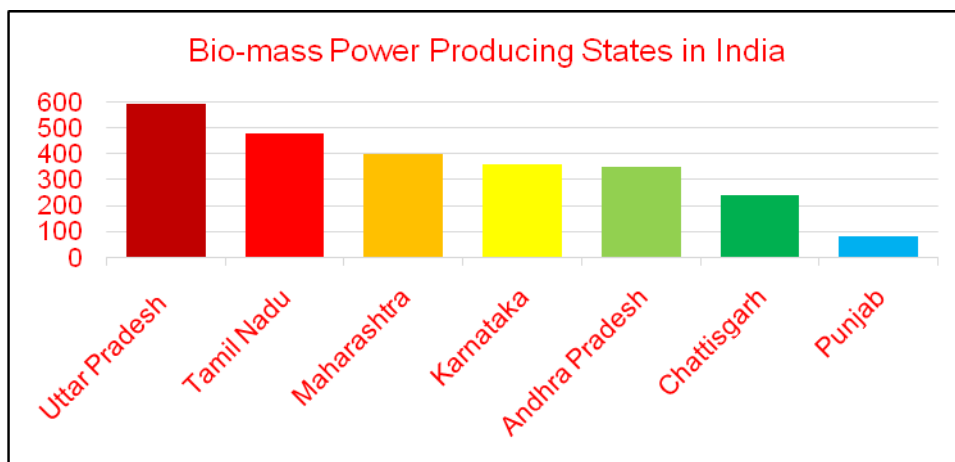


Fig. 5 Bio-mass Power Producing States in India

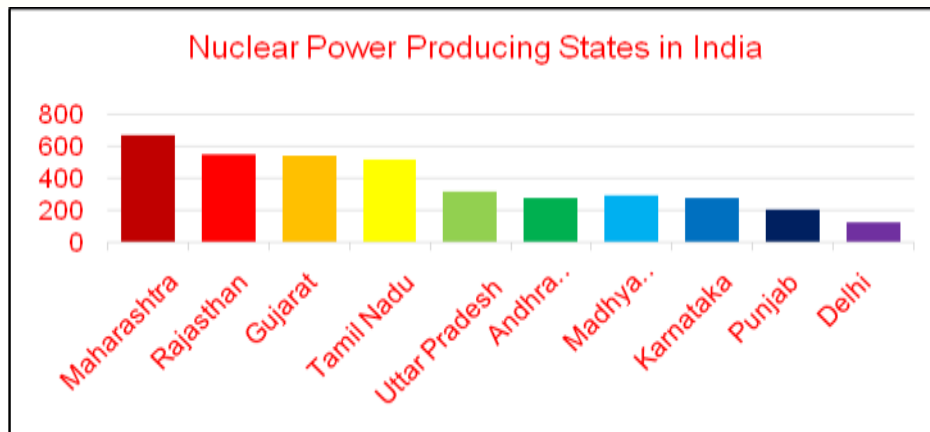


Fig. 6 Nuclear Power Producing States in India

III.POLICIES OF INDIA AGAINST RENEWABLE ENERGY SOURCES

The energy policy of India is generally characterized by the nation's extending energy crisis and expanded concentrate on creating alternative sources of energy, especially nuclear, solar based and wind energy. India positions 81 position in general energy independence at 66% of every 2014. The Ministry of New and Renewable Energy (MNRE) is the nodal Ministry of the Government of India for all issues identifying with new and renewable power source. The wide point of the Ministry is to create and convey new and renewable power source for supplementing the energy prerequisites of the nation.

The part of new and renewable power source has been accepting expanding essentialness as of late with the developing worry for the nation's energy security. Energy independence was recognized as the real driver for new and renewable power source in the nation in the wake of the two oil stuns of the 1970s. The sudden increment in the cost of oil, vulnerabilities related with its supply and the unfriendly effect on the adjust of installments position prompted the foundation of the Commission for Additional Sources of Energy (CASE) in the Department of Science and Technology in March 1981. The Commission was accused of the obligation of detailing arrangements and their execution, programs for improvement of new and renewable power source separated from planning and strengthening R&D in the segment. In 1982, another office, i.e., Department of Non-regular Energy Sources (DNES), that consolidated CASE, was made in the then Ministry of Energy. In 1992, DNES turned into the Ministry of Non-ordinary Energy Sources. In October 2006, the Ministry was re-dedicated as the Ministry of New and Renewable Energy.

Today, MNES working well in seeking position of nation in global world. MNES sanctions various large level and small level projects to obtain efficient way to utilize such renewable energy sources by sponsoring to various companies.

IV.CONCLUSION

Taking a gander at the present situation, a renewable energy system in nation like India is the need of great importance for maintainable advancement. In light of the Inequality in energy supply, renewable power source has the likelihood of turning into the establishment for the nation's future energy need. An examination on the

interest for new inexhaustible advancements plainly demonstrates a move in inclination towards these advances as a source of energy- wind, biomass, and geothermal, tidal and marine, hydropower, sun powered photovoltaic. The notoriety of inexhaustible advancements can be noted by proceeded with quick development, in spite of monetary breakdown and money related emergency. Presentation and utilization of renewable power source on an extensive scale will help in handling issues like energy crisis, varieties in fuel costs and help India to act naturally manageable. India is as of now confronting energy emergency the same number of parts still make do without power. Future development in sustainable power source will require new innovation, good strategies sponsored by imaginative financing. The Indian government ought to understand the long haul advantages of sustainable power age and stamp it top need amid their financial development designs. They should build their money related help for sustainable power source in an assortment of ways which incorporates reserves for showing undertakings and advance certifications.

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