

Radical Changes in India's Energy Sector

Prof. Dr.K.U.Choudhary

Associate Professor,
Shri Kumarswami Mahavidyalaya, Ausa

Abstract

India's energy sector has undergone major transformations over the last few decades due to rapid industrialization, population growth, urbanization, and environmental concerns. Traditionally dependent on coal and petroleum, India is gradually shifting toward renewable and sustainable energy resources such as solar, wind, hydro, biomass, and green hydrogen. Government initiatives, technological innovation, private investment, and global climate commitments have accelerated this transition. This research paper examines the historical development, recent changes, challenges, and future prospects of energy resources in India.

Introduction

Energy is the backbone of economic development and industrial growth. India, being one of the fastest-growing economies in the world, has witnessed a continuous rise in energy demand. Initially, India relied heavily on conventional energy resources such as coal, oil, and natural gas. However, environmental degradation, climate change, and increasing energy insecurity have encouraged the country to diversify its energy mix toward cleaner and renewable resources. India's energy transition now plays a crucial role in achieving sustainable development and reducing carbon emissions. Energy plays crucial role in the development of Country. India is developing country having highest population in 2025 in the world. Energy requirement is also increasing due to increase in the industrial development, digitization and other developing projects. the traditional method to get energy is fossilized fuel. India is the 3rd largest producer of energy. In that more than 50% energy is obtained from fossilized fuel. Electricity in India is generated by both public and private sector utilities, transmitted through a unified national grid, and distributed primarily by state-owned distribution companies. The sector has undergone significant reforms since the Electricity Act of 2003, which introduced competition, open access, and independent regulation. Despite rapid growth in generation and transmission capacity, the distribution segment continues to face financial stress due to high technical and commercial losses, tariff constraints, and subsidy burdens.

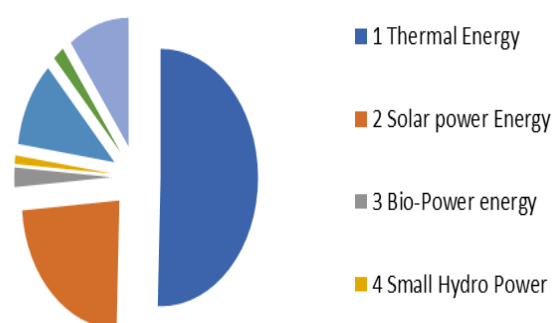
India has also emerged as a global leader in renewable energy deployment, with renewables accounting for 89% of capacity additions in FY 2024-25. The country has set ambitious targets to achieve 500 GW of non-fossil fuel capacity by 2030 as part of its transition toward a low-carbon

energy system. India is also trying to generate green energy and continually promote in solar, bio-fuel, wind energy, etc.

Following information gives information about energy production from various resources in 2024-25.

No	Resource	Production (in G.W)	In Percentage
1	Thermal Energy	240	50.45%
2	Solar power Energy	110.9	23.31%
3	Bio-Power energy	11.6	2.43%
4	Small Hydro Power	5.1	1.07%
5	Wind power Energy	51.3	10.78%
6	Nuclear Power Energy	8.8	1.84%
7	Hydropower Energy	48	10.09%
	Total energy	475.7	100%

Production (in G.W)



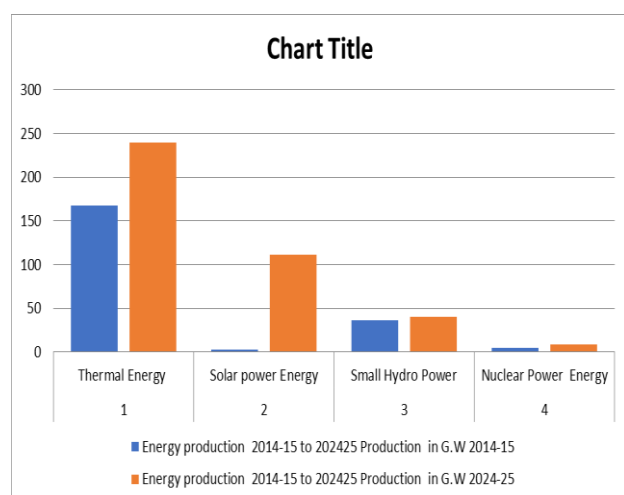
Source:- Ministry of Power

Form the above details energy generation from fossilised raw material is still in above position (50.45%) in 2024-25. India is strongly active to generate green energy as the cost and nature destruction from fossilised raw material is a big problem in future environment. The second largest production in India is solar energy 23.31% and on

third position is wind power energy (10.78%). It is observed that since 2014-15 energy generations is increased significantly as increase in high demand in industrial, commercial, and residential areas. Following figures shows changes in energy generation and use.

Energy production 2014-15 to 2024-25			
Sr. No.	Resource	Production in G.W	
		2014-15	2024-25
1	Thermal Energy	168	240
2	Solar power Energy	2.82	110.9
3	Small Hydro Power	36	40
4	Nuclear Power Energy	4.78	8.78

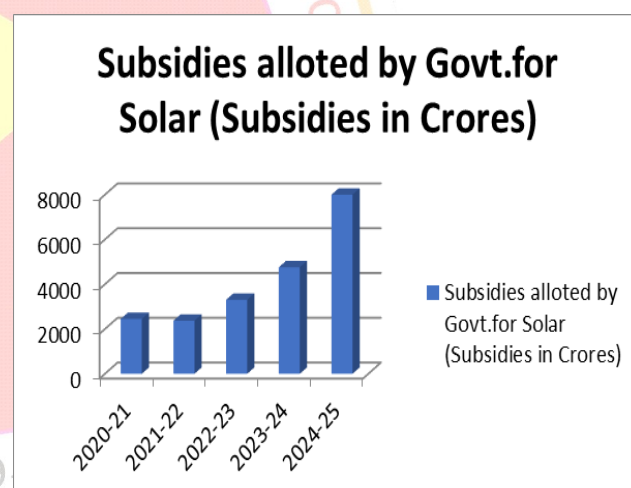
Source:- Ministry of Power



From the above chart it is observed that generation of thermal energy 42.85% in last 10 year, as solar power generation is increased at its highest ever 3932% which indicates a great revolution in green energy generation. Government is also taking imitative to promote green energy. Energy generation by Small hydro projects is also increased by 11.11% since last 10 year. Nuclear power generation is also increased by 83.68%. Over all the total generation of energy is increased by 88.88% in last 10 years. Industrialization is also rapidly increased population consumption is also increased due to increase in use of electronic equipment's, electric vehicles and other electrical equipment's. Indian Government is taking initiative to make Indian consumer self-dependent in energy as they are using energy as well as generating energy resources. Government introduced many schemes to enhance generation of energy by individuals like PM SuryGhar Yojana for rooftop

solar system. Government is offering subsidy to people Rs 30000 per Kilo watt up to maximum subsidy up to Rs 78000. Group housing societies also getting 18000 per kilowatt subsidies for common areas. In PM Kusum yojana for agricultural purpose farmers are getting several subsidies. Farmers need to deposit 10% of the cost for solar pump. Government also made provision of Rs 4500 crore to create mass solar energy production.

Subsidies allotted by Govt.for Solar	
Year	(Subsidies in Crores)
2020-21	2449.65
2021-22	2369.13
2022-23	3304.03
2023-24	4757
2024-25	8000



Form the above chart it is observed that government is continuously encouraging people to use green energy by providing subsidies. In 2020-21, Govt provisions 2449.65 Crores and 2024-25 it increases up to 8000 crores increased by 226%.

Government has taken several steps for promotion of solar energy in the country. These include:

1. Permitting Foreign Direct Investment (FDI) up to 100 % under the automatic route.
2. Waiver of Inter State Transmission System (ISTS) charges for inter-state sale of solar and wind power for projects to be commissioned by 30th June 2025,

3. Declaration of trajectory for Renewable Purchase Obligation (RPO) up to the year 2029-30,
4. Notification of standards for deployment of solar photovoltaic system/devices,
5. Setting up of Project Development Cell for attracting and facilitating investments,
6. Standard Bidding Guidelines for tariff based competitive bidding process for procurement of Power from Grid Connected Solar PV and Wind Projects.
7. Government has issued orders that power shall be dispatched against Letter of Credit (LC) or advance payment to ensure timely payment by distribution licensees to RE generators.
8. Notification of Promoting Renewable Energy through Green Energy Open Access Rules 2022.
9. Notification of "The electricity (Late Payment Surcharge and related matters) Rules 2002 (LPS rules).
10. Launch of Green Term Ahead Market (GTAM) to facilitate sale of Renewable Energy power including Solar power through exchanges.

Conclusion :-

1. Use of green energy is increased as Government is providing subsidies.
2. Dependency on oil and petroleum based energy has been decreased in last five years.
3. Government is now able to divert foreign exchange to productive and other capital revenue things.
4. Peoples get promoted to increase their savings in energy sector.

References:-

1. <https://mnre.gov.in/en/solar-overview/>
2. Renewable energy need of India- Dr.S.K.Gupta
3. Ministry of new and renewable energy.
4. Solar Energy in India – Vision IAS.