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India's renewable energy targets till 2030: A policy review

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Abstract

Aligning with the commitments made at COP26 in Glasgow in November 2021, India's Renewable Energy (RE) targets highlight a firm dedication to sustainable development and climate action by aiming a 500 GW non-fossil fuel-based capacity by 2030 across solar, wind, hydro, biomass, and other renewable sources (PIB 2022). Additional objectives include meeting 50% of energy demand from renewables, reducing emissions by one billion tonnes, and cutting emissions intensity of India's GDP by 45% (over 2005 levels) as part of the Nationally Determined Contributions (NDCs) (PIB 2022).

Keywords: Renewable resources, reducing emissions, sustainable development, hydro power, solar energy

Introduction

Since 2015, India has experienced a substantial increase of 396% in its installed RE capacity (including large hydro power) till March 2024, which now stands at 190.57 GW (Invest India 2024) ^[5]. This includes 81.81 GW from solar, 45.88 GW from wind, 10.35 GW from biomass/co-generation, 5 GW from small hydro, 0.58 GW from waste to energy, and additionally, 46.92 GW from large hydro sources (Invest India 2024) ^[5] (Figure 1).

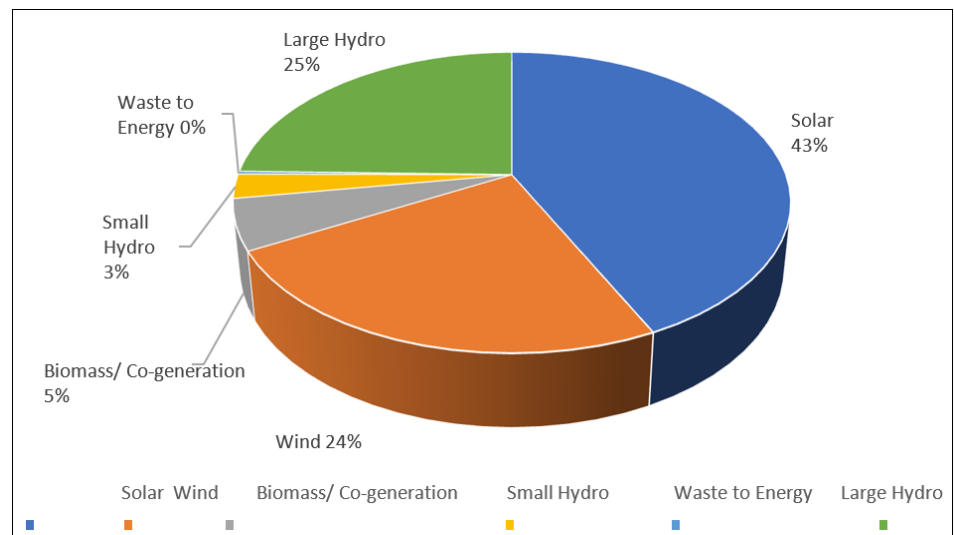


Fig 1: Sector-wise installed RE capacity in India (as on March 2024)

India has launched a number of policies and schemes to enhance the adoption of RE. One of the major government schemes to promote solar uptake is the Pradhan Mantri Kisan Urja Suraksha evam Utthaan Manabhiyaan (PM-KUSUM). Launched in March 2019 by the Ministry of New and Renewable Energy (MNRE), and extended till March 2026, the scheme aims at ensuring energy security for farmers in India (Government of India n.d.; PIB 2023g) ^[8] by promoting small grid connected solar energy power plants and solar-powered agricultural pumps (PIB 2023f) ^[17]. This demand driven scheme include de-dieselisation of the farm sector, providing water and energy security to farmers, increasing the income of farmers and curbing environmental pollution (PIB 2023c) ^[14].

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It targets a solar power capacity addition of 38.8 GW, with a total central financial support of INR 34,422 crore, as of December 2023 (MNRE n.d.a) ^[6]. One of the key steps taken towards the implementation of the scheme is the Central Financial Assistance (CFA) of 30% of the benchmark cost or the tender cost, whichever is lower, with a state government subsidy of 30% for the pump (MNRE n.d.b) ^[7].

The Union Cabinet also approved the Production Linked Incentive (PLI) scheme in April 2021 to promote domestic manufacturing of high-efficiency solar PV module, reducing import dependency in the country (MNRE n.d.c) ^[8]. The Solar Parks development policy rolled out in December 2014 has approved 50 solar parks with a total capacity of about 37.49 GW across 12 states as of December 2023 (PIB 2023e) ^[16].

Recently on 13th February, 2024, Prime Minister Modi announced the launch of rooftop solar scheme – PM Surya Ghar Muft Bijli Yojana, with an investment of INR 75,021 crore – which aims to provide 300 units of free electricity every month to 1 crore households who opt to install rooftop solar electricity unit (PIB 2024c; PIB 2024b) ^[21, 20].

To promote clean energy through hydrogen, MNRE is executing the National Green Hydrogen Mission, which received approval in January 2023 with a budget of INR 19,744 crore (PIB 2024a) ^[19]. This initiative aims to establish Green Hydrogen production facilities of at least 5 MMT annually by 2030 (PIB 2023a) ^[12]. As part of this mission, the Strategic Interventions for Green Hydrogen Transition (SIGHT) program has a planned disbursement of INR 17,490 crore up to 2029-30, supporting domestic manufacturing of electrolyzers and Green Hydrogen production (MNRE n.d.d) ^[9].

In 2015, the Green Energy Corridor (GEC) project was approved by Power Grid Corporation of India Limited (PGCIL) to establish dedicated transmission infrastructure for large scale solar and wind power plants for both Inter State Transmission System (ISTS) and Intra State Transmission System (InSTS), along with the setting up of Renewable Energy Management Centre (REMC) and the control infrastructure like, reactive compensation, storage systems, etc. (Ministry of Power n.d.). On October 2023, the government further approved the second phase of the GEC ISTS, including approval for a 13 GW RE project in Ladakh, targeted to be set up by FY 2029-30 (PIB 2023d) ^[15].

In the wind energy sector, India is developing offshore wind energy capacity by leveraging its strategic coastal position. Initial assessments indicate a potential of about 70 GW off the coasts of Gujarat and Tamil Nadu (PIB 2024a) ^[19].

Additionally, the Indian Carbon Market aims to decarbonize the economy by pricing GHG emissions through carbon credit trading, creating a competitive market to monetize clean energy investments (PIB 2023b) ^[13].

While these policies and schemes have been crucial in furthering the RE agenda, additional steps can be taken to accelerate the progress. One of the key tool could be additional subsidy support to facilitate the scale up of solar manufacturing, green hydrogen initiatives, and by promising decentralised RE technologies. However, subsidies in RE have seen a significant decline, dropping by 59% to INR 6,767 crore in FY21 from their peak of INR 16,312 crore in FY17 (CEEW 2022) ^[2]. This reduction correlates with a slowdown in deployment during COVID-19 lockdowns and

the achievement of cost parity in grid-scale solar PV and wind energy. Such targeted subsidies could play a vital role in advancing India's RE agenda and fostering sectoral growth.

State Distribution Companies (discoms) in India have also experienced a troubling trend. As of FY 2020-21, nationwide losses of discoms reached INR 5.16 lakh crore, with 67% of them being concentrated in just 5 states – Tamil Nadu, Rajasthan, Uttar Pradesh, Madhya Pradesh, and Maharashtra (ETPI, 2023) ^[3]. Efficient distribution is crucial as it acts as a key link between clean electricity generation and the end consumer. Failing to implement necessary reforms in this distribution system before 2030 could potentially jeopardize the achievement of transition targets (Ahluwalia, 2024) ^[11].

To expedite state-level transition pathways, it is imperative to fortify the regulatory ecosystem, prioritize in-depth state-level studies, and bolster data availability and transparency mechanisms. For instance, regulators can increase accountability and attention on crucial areas like demand side management, publishing quarterly reports on quality of supply and service of RE, among others (ETPI 2023) ^[3].

Renewable Purchase Obligations (RPOs) also play a vital role in India's RE transition, mandating entities to buy a portion of their energy from renewables. They can boost demand, attract investments, diversify energy sources, reduce fossil fuel dependency, and provide revenue certainty for renewable projects, driving innovation, creating jobs, and fostering economic growth. Hence, there should be clear and standardized RPO compliance frameworks and targets across the states.

Lastly, focusing on capacity building, skill development, and training programs to support the clean energy workforce and industry growth could help achieve the RE targets.

Conclusion

Thus, India's RE targets would need implementation of targeted subsidies, collaboration across ministries, clear and coherent RPO frameworks, capacity building, and reskilling, among others. This will be pivotal in achieving the targets and establishing a resilient and sustainable energy landscape for future generations.

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