

India Clean Energy Market Assessment, By Type [Hydro Power and Tidal Power, Wind Power, Solar Power, Geothermal Power, Biomass and Waste, Nuclear Power, Green Hydrogen], By End-user [Residential, Commercial, Industrial, Others], By Region [North, East, South, West & Central], Opportunities and Forecast, 2016-2030F

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Report description:

The adoption of clean energy in India has been driven by various factors like declining costs of solar panels and wind turbines, technological advancements, supportive policies, and increasing public awareness. Governments, businesses, and individuals are embracing clean energy solutions to reduce carbon emissions, improve air quality, and achieve energy independence. India witnessed total capacity addition of 21.6 GW of renewable energy in FY2023.

Moreover, India aims to cut dependency on the import of crude oil to meet growing energy demand. The country imported the third highest dollar value worth of crude oil during FY2022 and consumed 927 Mtoe of energy in 2021. Additionally, during FY2021-22 energy generated from Coal accounted for about 72.92% of the total generation of energy followed by electricity from Hydro, Nuclear and other Renewable energy sources at 8.24% which signifies the dependency on fossil fuels to meet energy demand. Hence the government aims to build supporting clean energy production infrastructure like setting up solar energy farms, wind farms, hydro power, etc. which is propelling the market growth.

In March FY2023, India's total installed renewable capacity touched 168.96 GW, out of which 38.1% comes from Solar Power Capacity, 30.6% from Hydro Power sources, 24.8% from Wind Power and 6.3% from Biomass and waste energy sources.

Clean Energy Sources Offer Ways to Mitigate Climate Change

The United Nations Framework Convention on Climate Change (UNFCCC) and the Paris Agreement have the objective of limiting global warming to below 2 degrees Celsius above pre-industrial levels, with a further aim to restrict the temperature increase to 1.5 degrees Celsius. In order to promote a transition towards clean energy, the Indian government has set an ambitious goal of achieving 500 gigawatts (GW) of installed renewable energy capacity by the fiscal year 2031, meeting 50% of the country's energy needs from renewables and reaching net-zero emissions by 2070. The target includes the installation of 280 GW of solar r

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and 140 GW of wind power.

To support these national objectives, several state governments and Public Sector Enterprises (PSUs) have established their own targets. For instance, Indian Railways has set a goal to achieve net-zero emissions by the fiscal year 2031, which is expected to lead to a significant reduction of 60 million tons of emissions per year. Furthermore, India's widespread UJALA LED bulb campaign has been highly successful in reducing emissions by an impressive 40 million tons annually.

Solar Energy and Green Hydrogen Witnessing Rapid Adoption

India is making notable progress in shifting towards renewable energy sources, which provides a strong foundation for reducing its reliance on fossil fuels. The country has ambitious plans to incorporate 280 gigawatts (GW) of additional solar energy capacity by the fiscal year 2031. In FY2023, wind and solar energy accounted for 92% of India's new power generation capacity. The declining costs of solar power technology and effective collaboration between the government and private sector have played a significant role in the country's expansion of solar energy capacity, positioning it as the fifth-largest solar power user globally in FY2022. Building upon these ongoing efforts, India has taken a significant stride in FY2023 by launching the National Green Hydrogen Mission. This initiative aims to develop a production capacity of at least 5 million metric tons (MMT) of green hydrogen annually, accompanied by the addition of approximately 125 GW of renewable energy capacity. To support this mission, investments totaling USD 98 billion will be made in the country.

Government Initiatives

Indian government plays a central role in the instant growth of the clean energy market and has decided to invite bids for 50 GW of renewable energy capacity annually for the next five years. This includes setting up of wind power capacity of at least 10 GW per annum to achieve its target of a renewable electricity capacity of 500 GW.

Furthermore, the Indian government has also been adopting several measures and introducing favorable policies to promote the domestic manufacturing of renewable energy. In line with this, the government has recently introduced INR 2,440 billion transmission plan which entails 50,890 circuit km transmission lines and 4,33,575 MVA substation capacity, which will be a major boost for the players in the industry to enhance domestic production. The government has further drafted strategies to ensure round-the-clock power for end consumers by envisaging the installation of 515 GW battery storage by FY2031. Additionally, several policies like Jawaharlal Nehru National Solar Mission which aims to install 100 GW of solar power by FY2023 and investment of USD 2.57 billion for a PLI scheme to boost manufacturing of high-efficiency solar modules focuses on timebound capacity addition of renewable energy source boost its clean energy portfolio.

Surge in Investment Fundings in Line with Climate-related Policies

With the push from the Indian government and upcoming renewable energy projects of 54.5 GW has attracted the attention of many private players. The government's climate change-related policies have also encouraged investment in large-scale renewable electricity generation. Investment in renewable energy in India reached a record USD 14.5 billion in FY2023, an increase of 125% over FY2022. In February 2023, Husk Power Systems, a renewable energy company working towards rural electrification, secured a USD 4.2 million loan from the Indian Renewable Energy Development Agency (IREDA).

Moreover, USD 2.4 billion in funds along with USD 36 million additional in the budget is allocated under National Hydrogen Mission for the production of 5 MMT by FY2031. Apart from this, projects like setting up 4 GWh Battery Energy Storage Systems supported through Viability Gap Funding, have attracted both national and international private players.

Further, Perform, Achieve and Trade (PAT) is a regulatory instrument used to reduce Specific Energy Consumption in energy-intensive industries, with an associated market-based mechanism to enhance the cost-effectiveness through certification of excess energy saving. This has pushed large consumption sectors like Cement manufacturing units to reduce their dependency on fossil fuel sources with added tax benefits through carbon certificate trading.

Impact of COVID-19

Although India holds a significant position as one of the largest economies globally, it faced substantial repercussions from the COVID-19 pandemic. The country experienced severe short-term consequences, resulting in a slowdown of projects reaching commercial operation due to various challenges such as delivery limitations and financial obstacles. Nevertheless, despite the initial impact of the pandemic, the government has taken proactive measures to revive the market by promoting solar products and implementing policies in support of this goal. Investments in Indian renewable energy sector reached USD 6.6 billion, surpassing the USD 6.4 billion level record in the 2020-21 fiscal year.

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To come out of the economic slump, Indian government pushed capital investment such as the Rewa Ultra Mega Solar Park in Madhya Pradesh, with a total capacity of 750 MW, which became operational in July FY 2021. It is one of the largest solar parks in Asia and is expected to reduce carbon dioxide emissions by 1.5 million tons annually. Other projects like the Muppandal Wind Farm, Tamil Nadu with a total capacity of around 1,500 MW is one of the largest wind farms in India. These projects boost domestic Indian manufacturers under Atma Nirbhar Bharat Scheme.

Impact of Russia-Ukraine War

The war had some positive impacts on the Indian clean energy market. The rising cost of fossil fuels has made renewable energy more attractive, and there has been an increase in investment in solar and wind power projects. The war has also highlighted the importance of energy security, and India is now looking to diversify its energy imports and reduce its reliance on Russia to procure crude oil. Furthermore, the country has set an ambitious goal of 500 Gigawatt (GW) of renewable capacity by FY2031, the government is promoting the production of high-efficiency solar photovoltaic (PV) modules, the government launched the Production Linked Incentive scheme in FY2023 with an investment of USD 5.49 billion. Hence, the war has resulted in the realization to cut dependency on crude oil to ensure energy security.

Therefore, the Russia-Ukraine war has had a mixed impact on the Indian clean energy market. However, the war has also accelerated the transition to clean energy in India, and it is likely that this trend will continue in the years to come.

Key Players Landscape and Outlook

Major industry participants are actively investing in research and development while expanding their range of clean energy solutions. Governments are increasingly utilizing auctions to procure competitive energy from renewable and clean sources, fostering private-sector competition. In line with promoting clean technology and the adoption of new and renewable energy, the Central government is partnering with companies and startups that provide solar solutions. To reach its target of 500 GW of clean energy by fiscal year 2031, the government has allocated an extra investment exceeding USD 30 billion.

In December FY2022, India's largest energy provider, Tata Power, was awarded a contract by the Maharashtra State Electricity Distribution Company Limited (MSEDCL) to set up a 300 MW wind-solar hybrid power plant. Almost a year prior, Reliance New Energy Solar Ltd. (RNESL) announced two acquisitions to build more capabilities. Both acquisitions – REC Solar Holdings AS (REC Group), a Norway-based firm, and Sterling & Wilson Solar, based in India – exceeded USD 1 billion and are expected to contribute to Reliance's target of achieving the capacity of 100 GW of solar energy at Jamnagar by FY2031.

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