Wind Energy landscape in India and Outlook of 2030

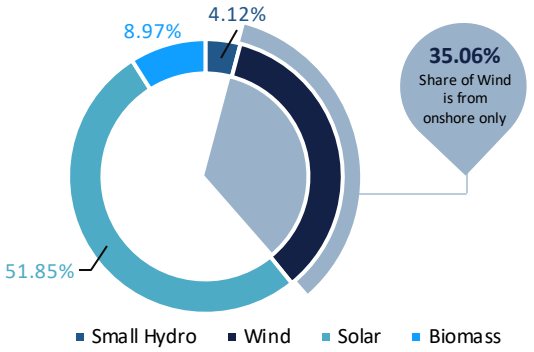
Detailed report on wind energy while tracking the government policies and upcoming projects, nascent players, merger & acquisition with the future outlook.

Overview of Wind energy landscape in India, A Know How

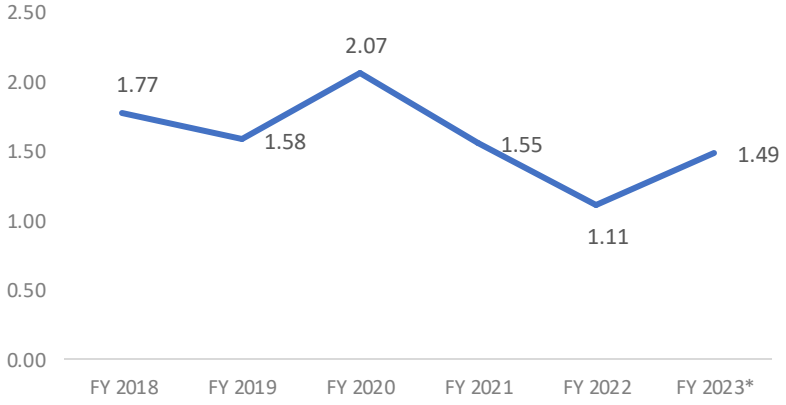
India has a huge target of 140 GW by the end of 2030, in order to complete this GoI announced a target of 8 GW auction per year for wind energy till 2030.

India's renewable energy (RE) sector has gained traction in recent years, that's why the growth is recorded at a CAGR of 14.3% over the last five years till FY 2022. This massive growth helped India reach a milestone of 119.5 GW (as of November 22) of RE capacity. However, falling RE tariffs and government supportive policies etc. are some key factors that gave a huge thrust towards RE sector. In this overall RE capacity, the wind stands at approximately 42 GW, which is the second-most focused sector after solar, which contributes almost 52% of the total RE. Wind energy is an early start for the Indian RE sector, which contributed almost 56.4% of the total RE in FY 2017. The Government of India (GOI) has become more focused onshore in recent years, having set an ambitious target of 60 GW by the end of 2022, which they successfully achieved at 70% in November 2022, with a growth rate of 4.4% from FY 2017 to November 2022. In FY 2020, a total of 2.07 GW of capacity addition was recorded, which is the maximum capacity addition in the last five years. Apart from solar, wind energy is present in the following states as of November 2022: Andhra Pradesh (4.1 GW), Gujarat (9.7 GW), Kerala (5.3 GW), Madhya Pradesh (2.8 GW), Maharashtra (5 GW), Rajasthan (4.7 GW), Tamil Nadu (9.9 GW), Telangana (9.9 GW), and others (0.2 GW). These states have a huge potential of about 998 GW of onshore wind capacity, of which only about 4% has been utilized as of Nov-2022. If we look towards solar and wind, then both are contributing almost 87% of total RE installed capacity. Seeing this GOI come up with the 'National Wind-Solar Hybrid Policy" in May-2018. Additionally, the favorable geographical location of India creates a huge potential for wind offshore as well. The 7,516 km of Indian coastline has an offshore potential of about 127 GW. Realizing the enormous potential, the Government of India set an ambitious target of installing 5 GW of offshore wind energy by the end of 2022. However, the bids are invited for 2 GW offshore, located at the coasts of Gujarat (1 GW) and Tamil Nadu (1 GW), as of April 2022.

Exhibit 1: Share of wind energy in total RE Installed Capacity as of Nov-2022.

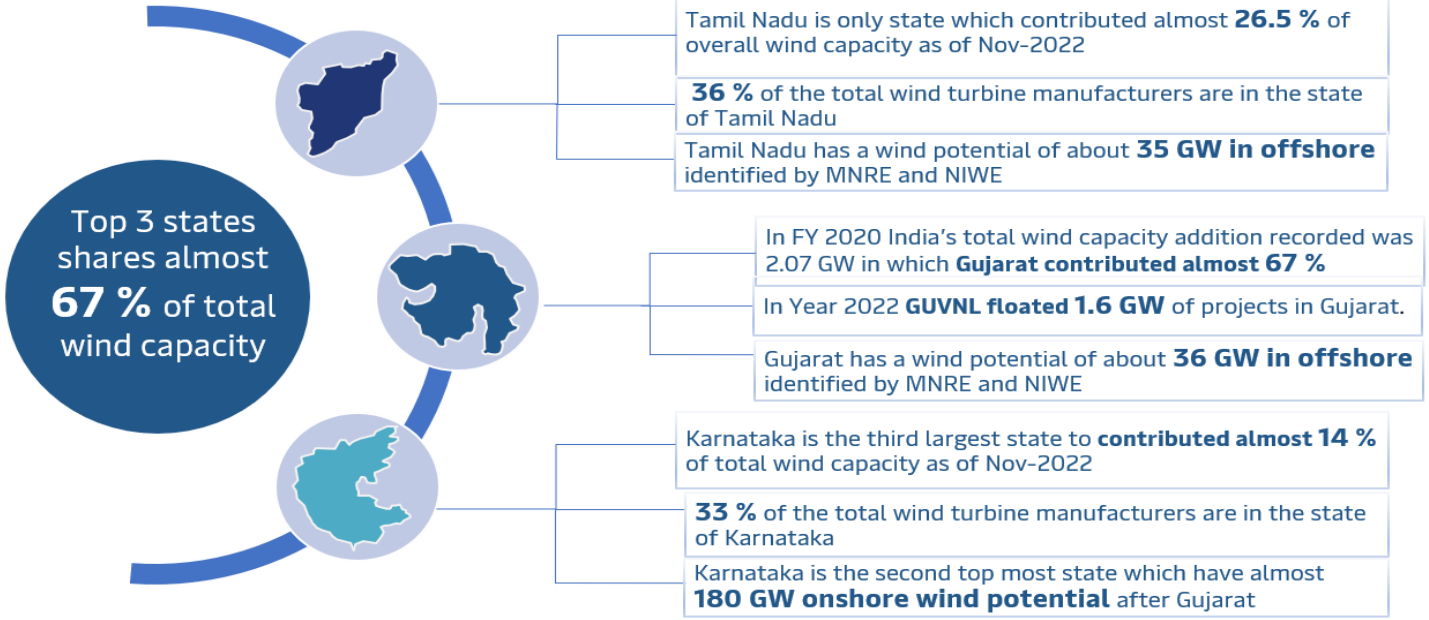


Per Year Wind Capacity Addition (in GW)

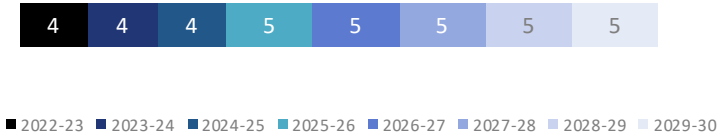


Source: MNRE, CEA, eninrac research

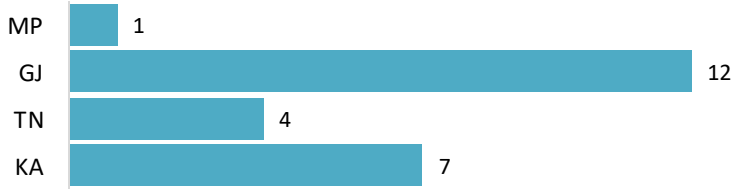
Exhibit 2:-Wind energy outlook in India



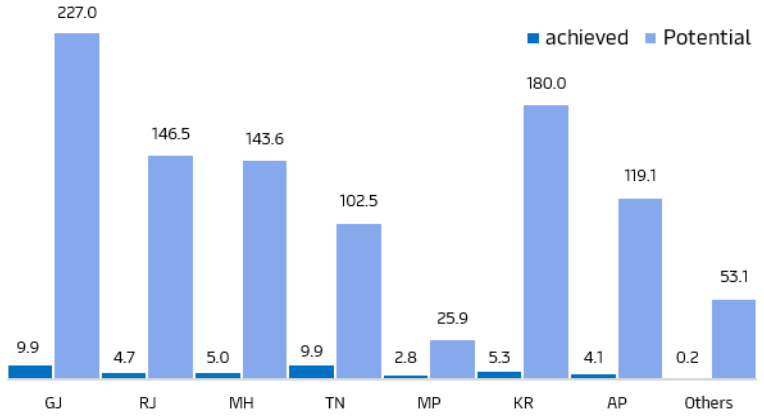
Indicative auction trajectory for offshore wind in India



Upcoming Wind Capacity In India (in GW)



State wise wind energy potential and achieved (in GW)



Source: MNRE, SECI, CEA, eninrac research

Is wind sector of India really getting attraction from industry players globally ?

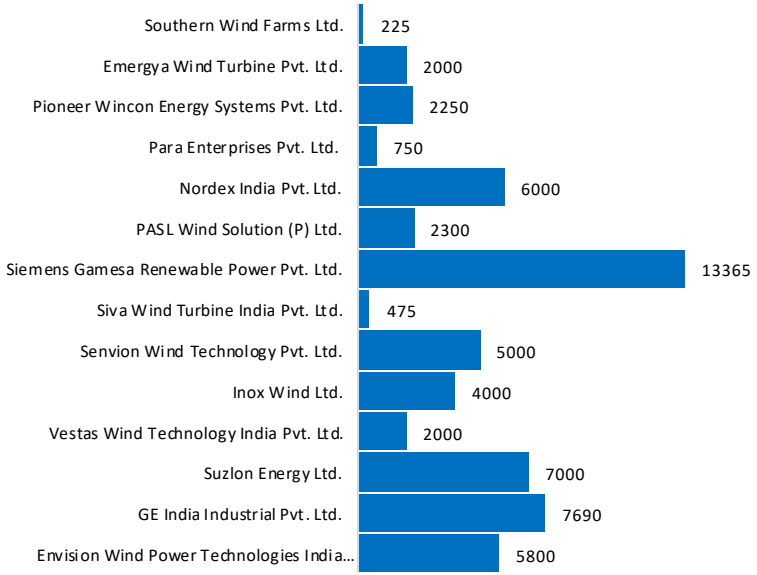
India's wind sector has a huge onshore potential of about 998 GW. In order to harness this potential, India has achieved only 42 GW in total wind capacity as of Nov-2022. The 96% of untapped wind energy has a huge market opportunity for industry players. Regarding offshore, the estimated potential of India is about 127 GW, which will attract domestic as well as international players in the Indian offshore wind energy market. In addition, the GoI is also giving impetus to the wind sector by policies and incentives. The key factors and various schemes and policies of the GoI that have gained attraction in the Indian wind space are as follows:

National Repowering Policy for Wind Power Projects 2022: The main objective of this policy is to utilize the onshore wind energy resource by maximizing energy yield per square kilometer with the latest technology in offshore wind turbines. **The National** Institute of Wind Energy (NIWE) has estimated the repowering potential of about 25.406 GW, which is almost 60% of the total installed capacity.
PLI Scheme: To increase domestic production, GOI came up with 'Revised List of Models and Manufacturers (RLMM)" that are allowed to be used for wind energy projects. In this list, 14 manufacturers are listed with a capacity of approximately 58.85 GW per annum, which is shown in Exhibit 2.

National Wind-Solar Hybrid Policy: This policy framework is for the promotion of a large grid-connected wind-solar PV hybrid system for optimal and efficient utilization of transmission infrastructure and land, reducing the variability in renewable power generation, and achieving better grid stability. Furthermore, this policy seeks to promote new technologies, methods, and solutions involving the combined operation of wind and solar PV plants. As of FY 2022, the Solar Energy Corporation of India (SECI) has invited 4250 MW of bids for solar-wind hybrid projects, of which 201.18 MW have been commissioned so far.

National Offshore Wind Energy Policy: India has a massive offshore wind energy potential of approximately 127 GW along the Indian Ocean's coastline, which is approximately 7200 km long. However, MNRE identified 8 regions of Gujarat and Tamil Nadu to deploy offshore wind projects. These states have a potential of about 70 GW also India has an ambitious target of 30 GW offshore by 2030. To accomplish that target MNRE announced an offshore wind bid trajectory to harness the tremendous potential of offshore wind energy as shown in Exhibit 2. The 4 GW capacity bids for offshore have also been announced by SECI on the coast of Gujarat and Tamil Nadu as of Dec-2022.

Wind turbine manufacturers Under RLMM with there Capacity (in GW)



Source: MNRE, eninrac research

Is wind sector of India really getting attraction from industry players globally? (contd.)

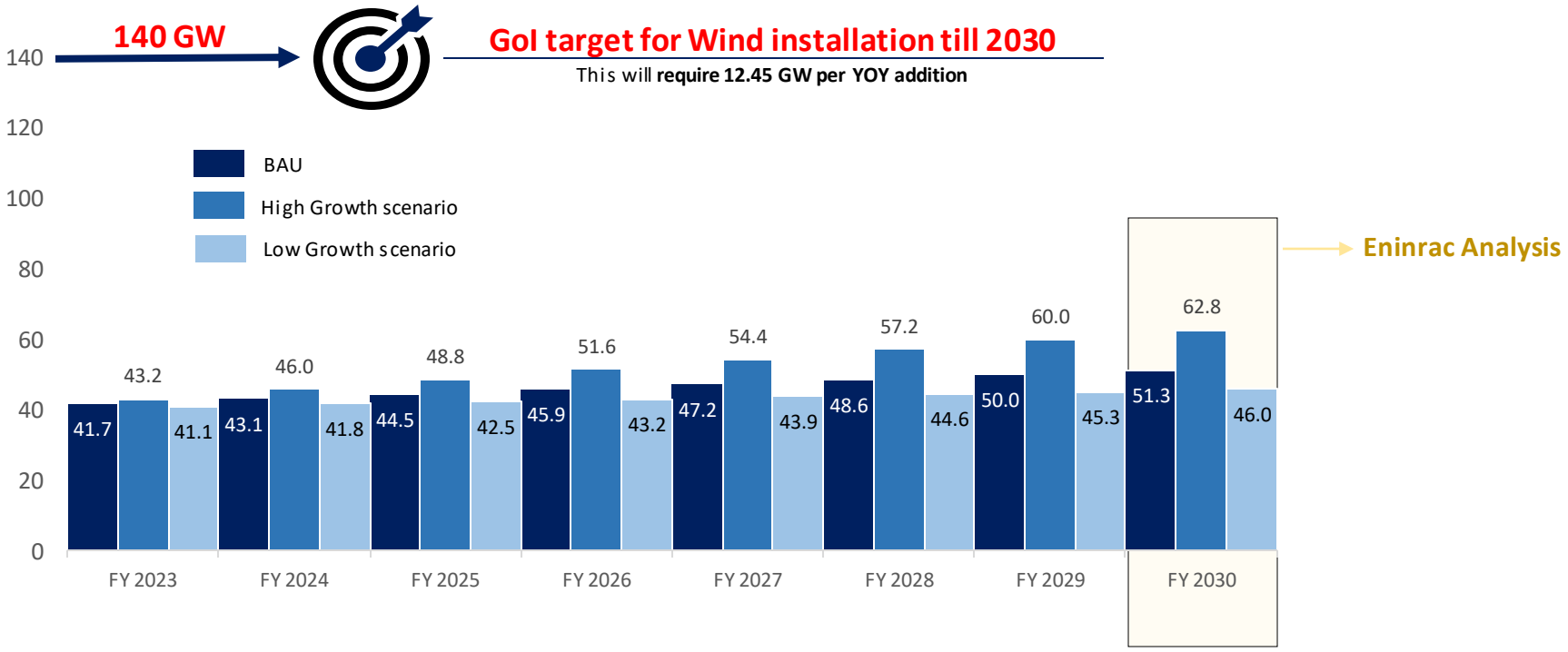
Geopolitical participation of India in the wind space: Due to policies and pushes towards renewables and the wind sector by the GoI, other countries are also showing interest in the Indian wind sector. Here are a few examples: **(1)** UK Research and Innovation (UKRI), which is a UK-based company, has announced new UK-India projects in mutual priority areas for offshore wind energy research in India. (2) On September 20, 2021, India and Denmark signed a memorandum of understanding (MoU) establishing the Center of Excellence for Offshore Wind and Renewable Energy (CoE), with the goal of mobilising significant investment through the adoption of a comprehensive and coherent approach leading to cost-effective offshore wind power. **(3)** RWE Renewables, a German company, has signed a memorandum of understanding with the utility Tata Power Renewable Energy to jointly develop offshore wind projects in India.

Participation of domestic players: On Dec-2022, Torrent Power submitted a non-binding offer for ReNew Power's wind power assets of 750 MW at an equity of around USD 450 million based in Gujarat. Amazon India, which is an e-commerce giant, is also showing interest in the Indian wind sector to construct a solar-wind hybrid project to generate 1690 MW per year. Adani Green Energy Limited (AGEL) has a portfolio of 647 MW of wind in India. AGEL is also bidding on the solar wind hybrid to expand its wind portfolio, and they have successfully commissioned a 450 MW hybrid power plant in Rajasthan on December 20, 2022. PSUs like ONGC and NTPC have shaken hands to explore offshore wind opportunities in India.

Wind energy anticipated installed capacity outlook in India by 2030

The GOI has set a target of 140 GW by 2030, which will require a CAGR growth of 17% from now till 2030. Based on this growth rate India require 12.45 GW per year addition. From previous five years, the average wind capacity addition was 1.4 GW per year from FY 2017 till Nov-2022, 2022. At this rate of 5.67% (BAU scenario) capacity addition, the wind installed capacity will reach up to 51.3 GW by 2030. If we assume a high growth scenario of 2.8 GW per year, India will reach 62.8 GW by the end of 2030. In the case of low growth, which is half of the BAU scenario (0.7 GW per year addition), India will reach 46 GW by the end of 2030. Given the target and the scenarios, it appears that India's massive ambition for wind energy installation capacity is challenging. Looking towards the huge target and BAU scenario, this capacity addition will be between 51.3 GW to 62.8 GW as per the Eninrac analysis.

Exhibit 2: Anticipated Wind Installed Capacity in India by 2030



Key Signpost- How wind segment is a backbone for the RE?

India wind energy market is growing with a CAGR of 4.4 percent between 2017 and 2022. GOI has also come up with supportive policies like GBI, Repowering Policy 2016, National Offshore Wind Energy Policy, National Wind-Solar Hybrid Policy, etc., which gave support to the wind energy sector under the PLI scheme. To increase the domestic production, GOI came up with the "Revised List of Models and Manufacturers (RLMM)," which are allowed to be used for wind energy projects. In this list, 14 manufacturers are listed with a capacity of approximately 58.85 GW per annum. To develop the offshore, the GOI also developed a roadmap to deploy 5 GW of offshore by 2030. The involvement of private companies, such as TATA Power, which has a total installed capacity of 932 MW, JSW, which has an approximately 2 GW wind project under construction, and e-commerce companies such as Amazon Power, which are also constructing solar-wind hybrids to generate 1690 MW per year, demonstrates wind energy's bright future. At Eninrac, our focus is to study the market at multiple layers and unearth the opportunities and challenges for each core segment of industry, be it input, process, or output, with credible data feeds.

Prima facie lack of credible market information is another challenge poised to be addressed and at eninrac our focus is to aim for studying the markets which are multi-layered and have challenges for each core segment of market be it input, process or output. Therefore, we are channelizing our resources to deliver an industry first dossier of its kind for assessment of wind energy landscape & outlook in India for all consumers category with factored market accelerators required in the country.

> For a successful technology, reality must take precedence over public relations, for Nature cannot be fooled.
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> **-Richard P. Feynman**

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