5. 6 GW Wind Energy - Economy

The Union Minister for New and Renewable Energy (MNRE) announced that 6 gigawatts (GW) of new wind capacity is expected to be added by the end of financial year 2025–26

Overview of Wind Energy in India

Global Ranking and Installed Capacity - India currently ranks 4th globally in wind installed capacity, after China, the United States, and Germany. As of August 12, 2025, India's total installed wind capacity stands at 51.67 GW, with 4.15 GW added during FY 2024–25, demonstrating renewed policy momentum and private sector participation.

Contribution to Electricity Generation - Between April 2024 and February 2025, wind energy generated 78.21 billion units (BU) of electricity, accounting for 4.69% of India's total electricity generation. This share is significant considering India's historically fossil-fuel-dependent power mix.

Wind Potential Estimates - According to the National Institute of Wind Energy (NIWE), India's estimated onshore and offshore wind potential is 1,164 GW at a hub height of 150 meters above ground level — indicating a vast untapped potential that can be harnessed to achieve India's climate and energy goals.

Significance of Wind Energy in India

1. Clean and Green Energy Source - Wind energy emits no greenhouse gases (GHGs) during operation, thereby playing a key role in achieving India's Nationally Determined Contributions (NDCs) and the Net Zero 2070 target. It directly helps reduce dependency on coal-fired power, improving air quality and lowering carbon intensity.

2. Rural and Coastal Economic Development - Most wind farms are located in rural and coastal regions such as Tamil Nadu, Gujarat, and Karnataka, contributing to local job creation, infrastructure development, and community-level income generation. Wind projects often spur ancillary industries like component manufacturing, transportation, and maintenance services.

3. Sustainable and Inclusive Growth - Wind energy supports inclusive development by providing electricity access to remote and underserved regions. It fosters energy security, reduces import dependency, and contributes to sustainable industrialization (SDG 9) and affordable clean energy (SDG 7).

4. Catalyst for Innovation and Investment - The wind sector drives technological advancement in turbine design, storage integration, and smart grid management. It attracts foreign direct investment (FDI) and encourages Make in India manufacturing in renewable technology components.

India's Renewable Energy and Climate Commitments

Updated NDC Targets (UNFCCC, 2022)

Emissions Intensity Reduction - India aims to reduce the emissions intensity of GDP by 45% by 2030 compared to 2005 levels.

Non-Fossil Power Capacity - To achieve 50% of cumulative electric power capacity from non-fossil fuel sources by 2030.

Lifestyle for Environment (LiFE) - Promote sustainable consumption patterns under the 'LiFE Movement'.

Long-Term Vision - These targets feed into India's commitment to achieve Net Zero emissions by 2070.

National Electricity Plan (NEP) 2023–32

Envisions a quantum leap in renewable generation, with solar power contributing around 50% of new capacity additions. Wind energy remains a critical balancing resource, offering complementary generation during evening and monsoon months when solar output declines.

Challenges Facing Wind Energy in India

1. Geographic and Site Constraints - High wind potential is concentrated in a few coastal states — primarily Tamil Nadu, Gujarat, Karnataka, and Maharashtra, limiting the national spread. Land acquisition hurdles, forest clearances, and community-level resistance often delay project implementation.

2. Intermittency and Grid Integration - Wind energy generation is seasonal and intermittent, varying with wind speed and climate patterns. This creates grid stability issues, requiring investment in energy

storage, forecasting, and grid management systems.

3. Policy and Regulatory Uncertainty - Frequent changes in bidding mechanisms, tariff structures, and Renewable Purchase Obligation (RPO) targets lead to uncertainty among investors. Offtake issues (delays in Power Purchase Agreements) and curtailment of generation further deter private participation.

4. Data and Resource Mapping Gaps - Despite NIWE efforts, high-resolution wind data for many inland and offshore regions remains outdated or incomplete. Accurate mapping and digital forecasting models are essential for reliable project planning.

5. Financial and Infrastructure Constraints - High initial capital costs and long gestation periods discourage smaller developers. Limited transmission infrastructure in windy areas hampers evacuation of generated power to national grids.

Government Initiatives and Policy Measures

1. National Wind Energy Mission - The mission seeks to accelerate the deployment of wind power with a target of 140 GW installed capacity by 2030. It emphasizes onshore, offshore, and hybrid (wind-solar) projects to enhance system efficiency.

2. Domestic Manufacturing and Local Content Push - India's wind industry currently has 70% local content; the goal is to reach 85% by 2030. Strengthening domestic manufacturing of turbines, blades, gearboxes, and towers aligns with the Atmanirbhar Bharat initiative.

3. Fiscal and Tax Incentives - GST on wind equipment has been reduced from 12% to 5%, lowering turbine installation costs by roughly ₹25 lakh per MW. Additional incentives include accelerated depreciation, infrastructure support, and interest subvention for wind developers.

4. Offshore Wind Development Push - The Union Cabinet has approved a ₹7,453 crore Viability Gap Funding (VGF) scheme for 1 GW offshore projects —

1. 500 MW each off the coasts of Gujarat and Tamil Nadu,
2. Including port infrastructure upgrades to support turbine logistics and maintenance.

5. Global Manufacturing Ambition - Under the ALMM (Approved List of Models and Manufacturers)–Wind framework, India targets -

1. Meeting 10% of global wind demand by 2030
2. Expanding to 20% by 2040, positioning India as a global turbine manufacturing hub and export base.

Way Ahead - Strengthening India's Wind Energy Ecosystem

1. Integrate Energy Storage and Hybrid Systems - Combine wind, solar, and battery/pumped hydro storage to create round-the-clock (RTC) power supply. This enhances grid reliability and optimizes land use.

2. Strengthen Research, Development, and Innovation - Establish Centres of Excellence for Wind Technology in partnership with NIWE, IITs, and global R&D agencies. Focus on advanced turbine designs, offshore technology, and AI-based predictive maintenance.

3. Improve Policy Stability and Coordination - Ensure consistent policy frameworks, long-term power purchase guarantees, and simplified regulatory approvals to attract global investors. Strengthen coordination among MNRE, CERC, and State Electricity Boards for smoother project execution.

4. Enhance Grid and Transmission Infrastructure - Expand Green Energy Corridors and high-voltage transmission lines in high-wind states. Invest in smart grid technologies for better demand forecasting and load management.

5. Promote Offshore and Deep-Water Wind Projects - Offshore wind can deliver higher capacity utilization factors (CUF) and longer operating life. India should prioritize marine zoning, environmental clearance, and port readiness to scale offshore development.

6. International Cooperation and Financing - Leverage partnerships through ISA, IRENA, and G20 Energy Transition Working Groups. Mobilize climate finance, green bonds, and public-private partnerships (PPP) to accelerate investment.

Conclusion

Wind energy represents a cornerstone of India's clean energy transition, providing a sustainable,

domestic, and low-carbon power source that strengthens both energy security and economic resilience. However, realizing its full 1,164 GW potential requires a holistic approach — combining policy stability, R&D, manufacturing capacity, storage integration, and international collaboration. With consistent implementation, India can not only meet its 2030 renewable energy and NDC targets, but also emerge as a global leader in wind power technology and manufacturing.

Source - https - //www.thehindu.com/news/national/tamil-nadu/india-expected-to-add-6-gigawatts-of-new-wind-energy-capacity-joshi/article70221015.ece# - ~ - text=Unio