

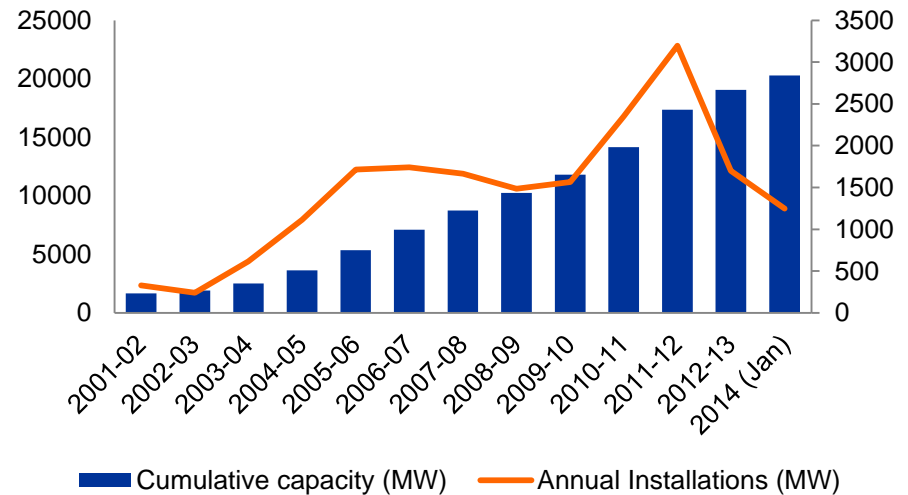
National Wind Energy Mission

(Proposed)

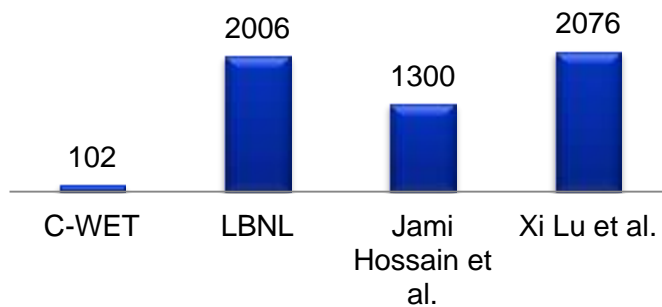
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Background

1. 21,000+ MW wind on ground, 6% by capacity in 2007-08 → 9% in 2013-14
2. Indigenous manufacturing capability of ~ 10,000 MW per annum
3. Indian costs per MW of onshore wind amongst the lowest in the world
4. Yet, deployment ≤ 3,200 MW per annum, huge untapped potential



Potential estimates (GW)



Rationale for National Wind Energy Mission

1. After more than 20 GW of capacity, wind development has slowed down
2. Limited capacity to absorb wind power locally by wind-rich states; limited offtake by other states
3. Given the strategic importance of wind resource, accelerating its deployment becomes an equally shared onus between all the host as well as procuring states
4. All wind-rich, wind-deficit states and the Centre need to work in tandem to create a strong development ecosystem keeping in mind the concurrence of the subject
5. Collaborative efforts to ensure that wind power is nationally accepted, the power generated is integrated and delivered across the country in an efficient and cost-effective manner
6. The Mission aims to provide all stakeholders the essential boost and allow rapid scale-up

Objectives of the Mission

- Creating necessary implementation frameworks for deployment on a large scale
- Ensuring long term policy certainty
- Enabling market certainty
- Enabling coordination among states for aggressive off-take of wind power
- Facilitating dialogue and collaboration amongst all stakeholders
- Encouraging utilization and expansion of domestic manufacturing capabilities as well as exports
- Providing assistance in research for new areas, technologies, and applications (offshore, small wind turbines, repowering etc.) that hold promise of scale, scope, efficiency, and environmental and consumer benefits

Mission Targets

RE will constitute 25% of electricity mix (power generation) by 2030 (NAPCC trajectory)

- 7-8% from solar (100 GW by 2027)
- 2-3% from other RE (biomass/SHP)
- Rest ~15% to come from wind (approx 12% from wind by 2027)

(in MW)

Wind power Category	Phase 1 (2014-2017)	Phase 2 (2017-2022)	Phase 3 (2022-2027)	Total (2014-2027)	Cumulative capacity in 2027
<i>On-shore wind</i>	12,000	40,000	60,000	112,000	132,000
<i>Off-shore wind</i>	100	1900	8,000	10,000	10,000
<i>Small wind</i>	5	20	75	100	100

In addition to grid scale land based resources, impetus will be provided to offshore and small wind

1. Wind Resource Assessment (WRA)

The Mission seeks to achieve an improved resource data regime and to ensure public access to credible onshore and offshore resource data

- Accelerate validation of country's onshore wind power potential
- Update wind resource maps and database every two years
- Identify high wind potential zones/parcels for large-scale capacity deployment
- Expand wind resource assessment in new states
- Accelerate offshore wind potential estimation
- Undertake small-wind as well as repowering potential estimation activities
- Increase private sector participation in WRA

2. Manufacturing and exports

- India's wind turbine manufacturing > 10 GW per annum
- Immediate (and existing) opportunity to enhance exports
- Scale manufacturing to meet future domestic (envisaged up to 12GW per annum) and export requirements
- Potential to earn revenues through exports (low cost equipment)
- Focus of the Mission on:
 - Boosting exports of wind turbines
 - Improving domestic supply chain for critical components – being imported right now
 - Manufacturing medium to low wind regime turbines
 - Developing small-wind technologies for Indian conditions
 - Developing offshore wind capabilities – for domestic use and neighbouring countries

3. Project development

Mission to focus on alternate project deployment frameworks:

- “RE investment zones” approach could minimize generation and integration costs of wind power
- The zoning exercise would help in:
 - Accelerated project deployment, easy land procurement
 - Creation of common infrastructure
 - Central grid transmission enabling balancing through national level resources
 - Mitigation of variability in generation and its impact on the grid
 - Creating government-owned resource data to rationalize tariffs
 - Better scheduling and forecasting practices at zone level
 - Optimal use of resource-rich sites
- Market-based tariff discovery
 - Investment grade resource assessment → informs FiT determination methodology → transparent process
 - Tariff adjusted based on actual performance

4. Market Environment

Mission' s focus on alternative approaches to achieving compliance of procurement targets by states:

- Wind to be dealt as a resource of national importance – strategic, technical, economic, and operational reasons
- State RPOs to be aligned with national trajectory, 15% RE by 2020
 - Graded incentive to utilities - linked to achievement beyond current levels of RE – effective 2014-15 and valid up to the end of 13th Plan
 - Possible: 3% additional wind
- Inter-state/Inter-regional power procurement:
 - REC mechanism to be strengthened
 - Wind-poor states to support projects in wind-rich states
 - Central Government, to work with regulators, to ease open access
 - Transmission charges on MWh basis, with remaining transmission costs to be socialized
 - Encourage environment for open access and captive generation

5. Planning

Mission recognizes the criticality of changes in the current resource and transmission planning processes to implement the macro-level wind penetration targets, while also optimizing requirements for grid infrastructure, integration, and system operation

- Central integrated resource planning – collaborative efforts for states to provide data
- Generation, transmission and balancing power requirements
- Collaboration between CEA/POSOCO/PGCIL (for Transmission)
- Collaboration between CEA/NLDC/RLDCs for balancing capacity requirements
- CEA-POSOCO-PGCIL-NLDC ↔ State transmission companies, SLDCs, SERCs
- Collaboration between CEA and CERC to enable adoption of analysis by Regulator

Implementation:

GOI shall, (in collaboration with CEA and PGCIL), formulate an integrated generation and transmission planning framework

GOI and its agencies to maintain statistics on RE generation and continuously update through a portal in public domain

GOI to undertake integrated resource planning (IRP) for the 13th five year plan attributing capacity value to wind generation

6. Transmission & Infrastructure Development

- **New transmission build:**

- Investments from domestic and international sources
- Suitable **transmission pricing principles** to boost investments
- Transmission line rating principles – best suited for VRE
- Zoning concept – transmission leading generation

- **Access roads and transmission lines**

- Coordination with states – on ROW issues
- MNRE, in coordination with MoRTH, to develop guidelines for streamlining rules and regulations for inter-state transportation of cargos

7. Grid Integration

- Maximizing the geographical footprint minimizes the cost of generation, integration and system management.
- The Mission seeks to integrate wind power with the grid while maintaining grid stability, even for high levels of penetration
- Alternatives for forecasting and scheduling
 - Centralized (done at regional/state level and shared of developer) – adhere to SO schedules, costs of net deviation to be socialized over the entire system – Coordinated by SLDC/RLDC/NLDC with 3rd party agencies
 - Forecasting by individual developer (particularly for market sales) – pays for deviation beyond specified limits
- Balancing resources – Network management and markets
 - GoI to work with FoR/CERC/SERCs to enable:
 - Expansion of balancing/control areas
 - Coordination between SLDCs/RLDCs
 - RE Management Centres
 - Procurement and settlement mechanisms

International Cooperation

Technology	Specific Area
Across RE sector including wind	Forecasting & Scheduling
	Storage Technologies
	Smart Grid Technologies
	Grid Infrastructure planning / deployment
	Easing the cost and terms of Financing for projects
Onshore / Offshore Wind Energy	Resource Assessment
	Turbine Design / Technology
	R&D on blade design and manufacturing technology
	Environment and Social Impact Assessment
	Standards & Testing
Specific to Offshore Wind Energy	Marine Spatial Planning
	Demonstration Projects
Small Aero-generators & Hybrid Systems	Smart minigrids for remote applications
	Use in urban built up environment

Thank you