Wind Power Policy in India

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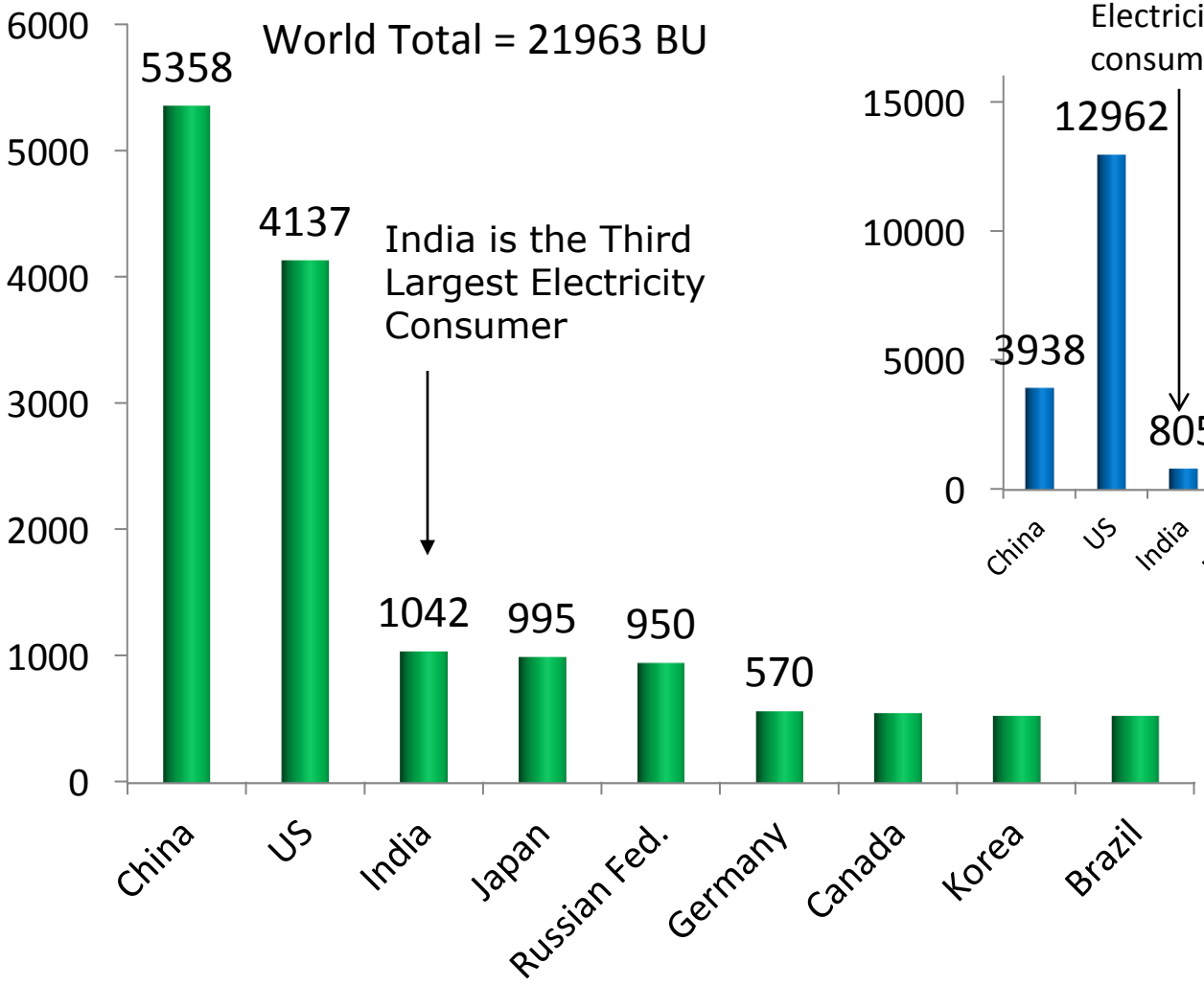
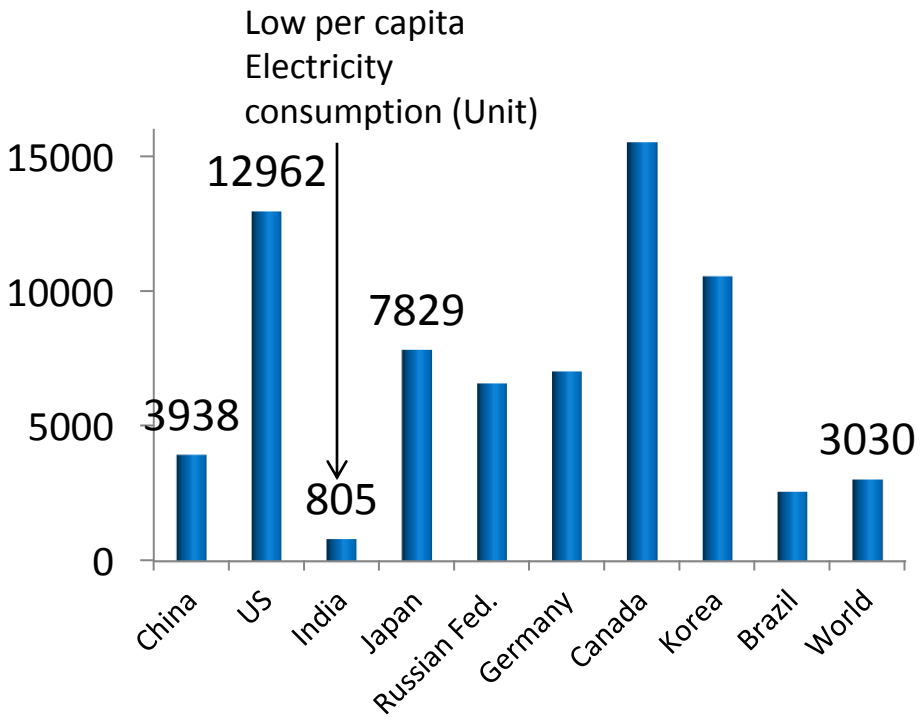
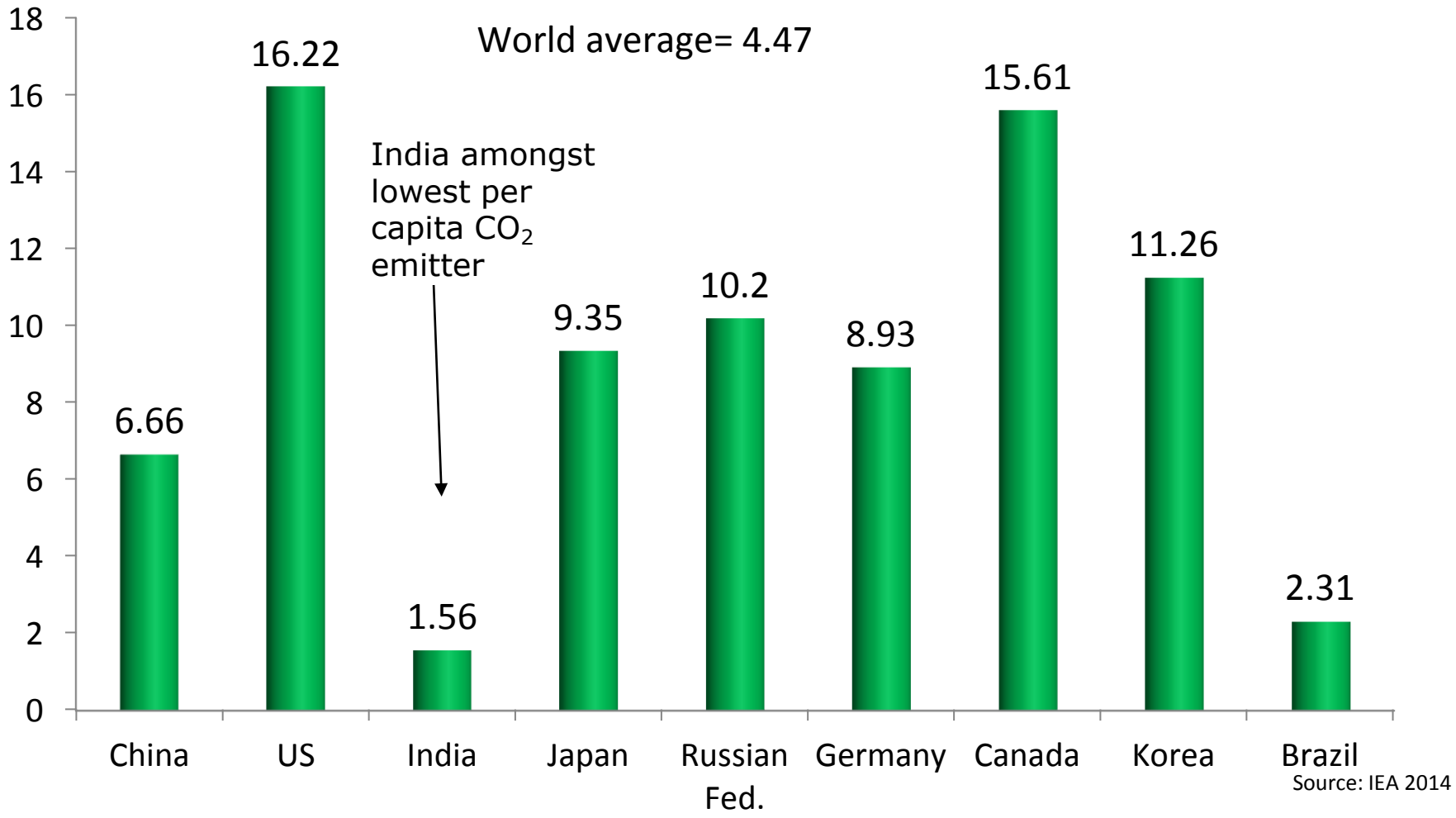
Electricity Consumption (BU) – Where India Stands





Source: IEA 2014

Per Capita Carbon Emmission (in t CO_2)



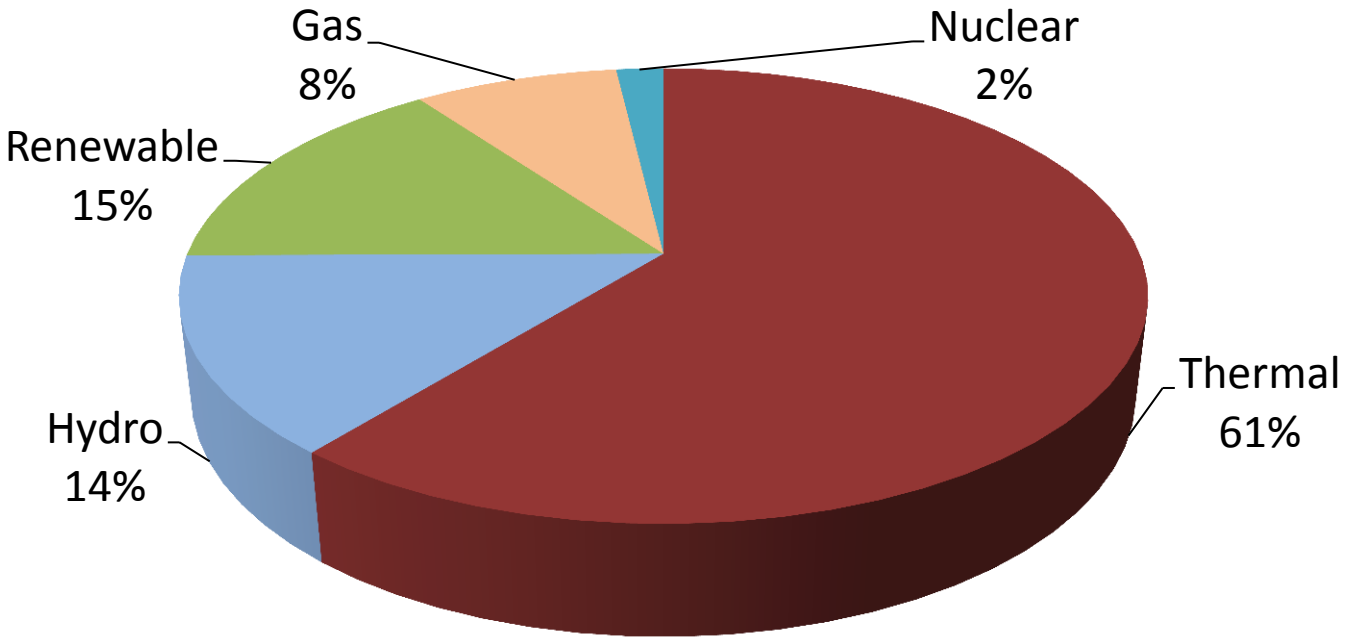
Source: IEA 2014

INDC Targets - India

- Adopt a climate friendly and a cleaner path.
- Reduce the emissions intensity of GDP by 33 to 35 percent by 2030 from 2005 level.
- Achieve about 40 percent cumulative electric power installed capacity from non-fossil fuel based energy resources by 2030.
- Create an additional carbon sink of 2.5 to 3 billion tonnes of CO_2 equivalent through additional forest and tree cover by 2030.

Indian Power Sector

- Total Installed Capacity- 308 GW

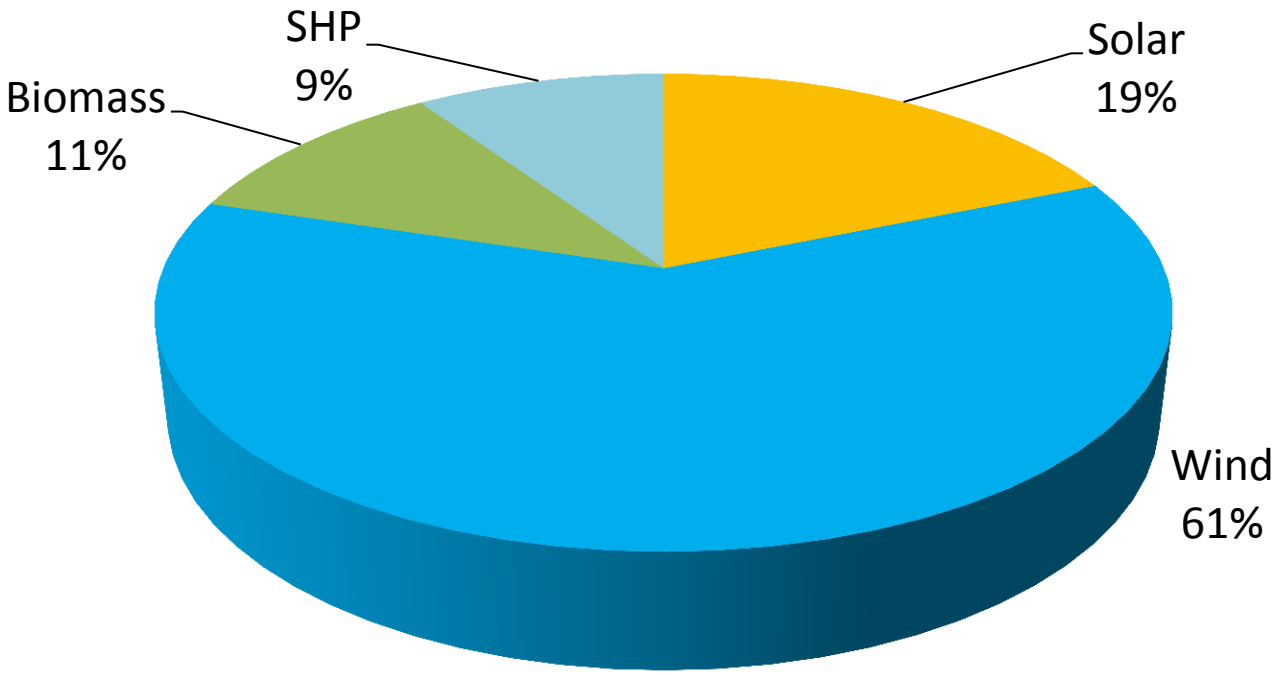


Thermal	Renewable	Hydro	Gas	Nuclear
187.5	46.4	43.1	25.1	5.8

Source: Central Electricity Authority (CEA) as on 31.10.2016

Indian Renewable Power Sector

- Total Installed Capacity- 46.4 GW



Wind	Solar	Biomass	SHP	Total
28.3	8.7	5.0	4.4	46.4

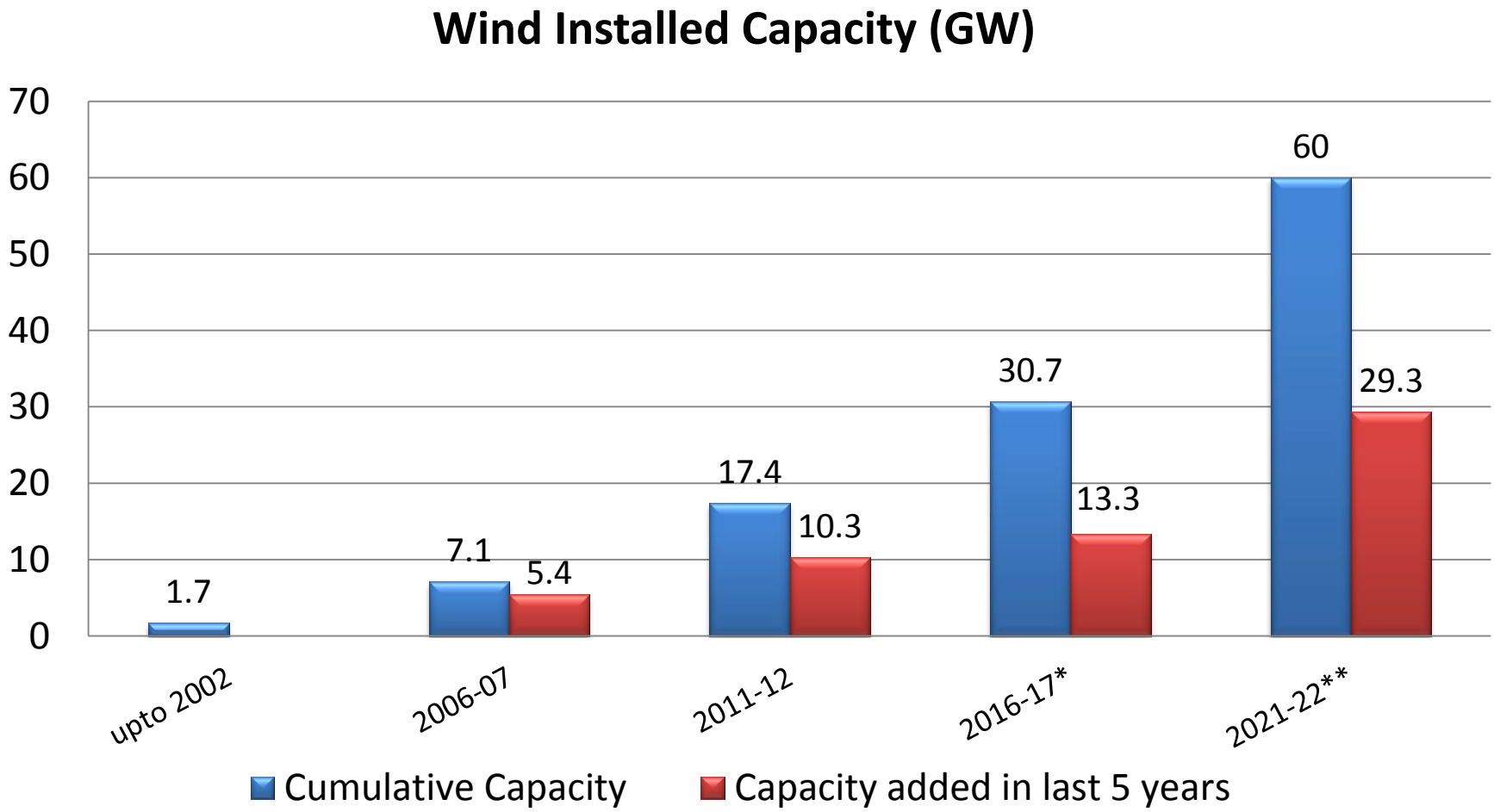
Source: MNRE 31.10.2016

Wind - Global Status

- Wind has highest share amongst RE
  - Out of 785 GW of total RE capacity wind shares 433 GW (over 55%)
- China leads with 145 GW
  - India(25 GW) at 4th position after USA (75 GW) and Germany 45 GW)
- Highest annual capacity addition achieved in 2015 – 63 GW
  - 50 % in China
  - India share 4%

Source: GWEC 2015

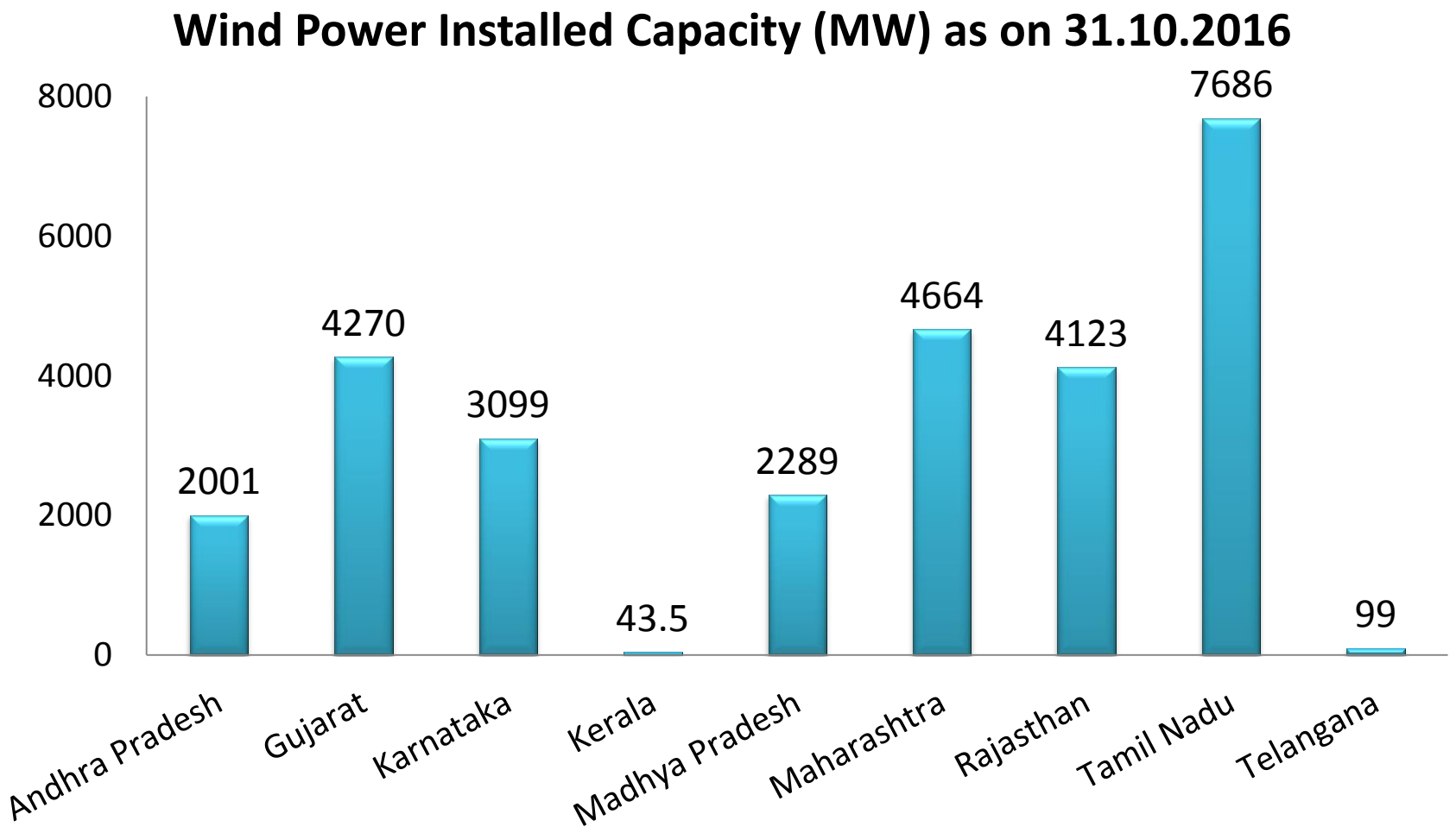
Growth of Indian Wind Power



* Estimated -28.3 GW already achieved

**Targeted

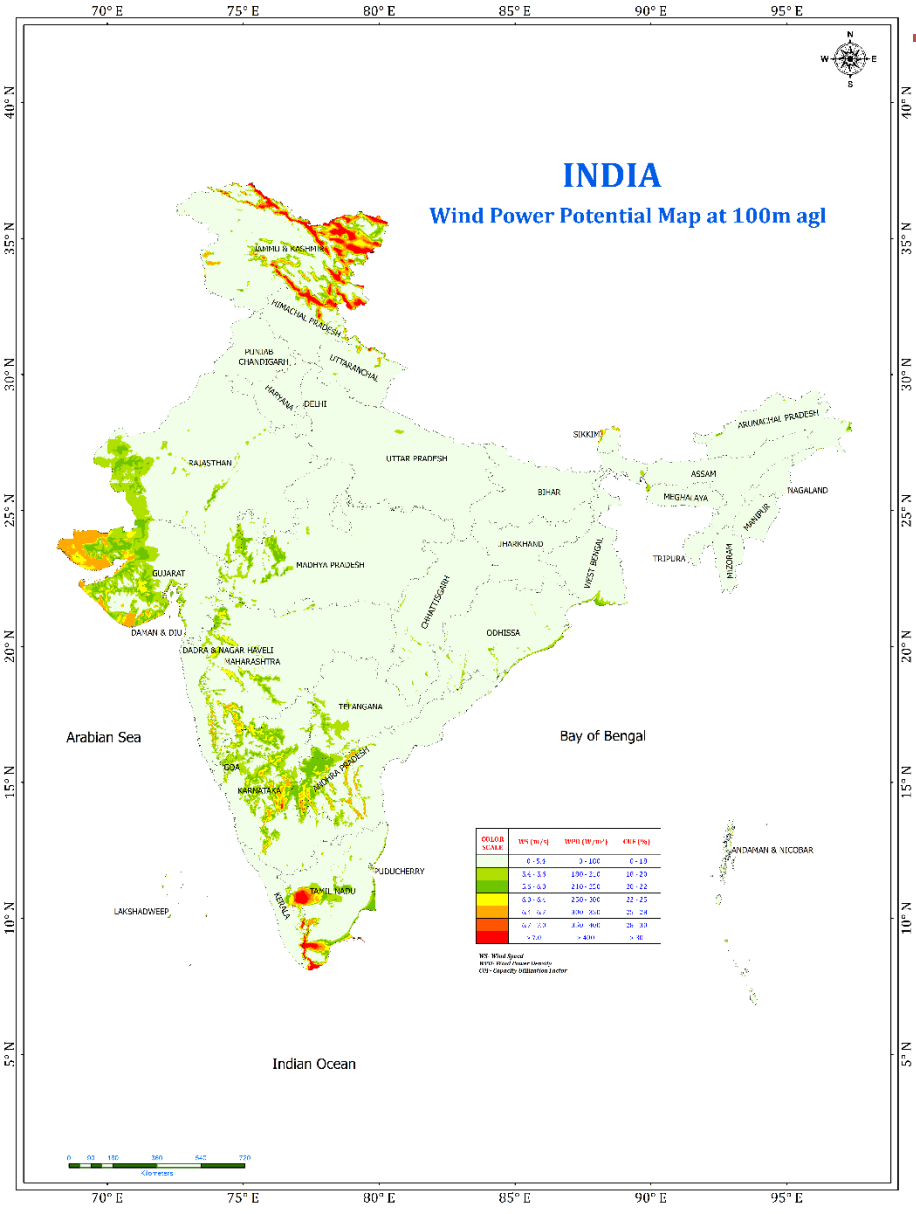
Major Windy States



Onshore Wind Potential

Wind Power Potential in India at 100 meter above ground level (GW)		
S. No.	State	Wind Power Potential at 100 mtr in GW
1	Andhra Pradesh	44.23
2	Gujarat	84.43
3	Karnataka	55.86
4	Madhya Pradesh	10.48
5	Maharashtra	45.39
6	Rajasthan	18.77
7	Tamil Nadu	33.80
8	Telangana	4.24
	Total (8 windy States)	**297.21**
9	Other States	5.04
	All India Total	**302.25**

Most of the wind power potential is concentrated in 8 windy States



Technology & Manufacturing

- Capacity: 225 KW – 3 MW; Gear & Gearless
- Hub heights: Up to 141 m
- Rotor Diameter: Up to 125 m
- 21 manufacturers with 54 models
- Indigenization over 70%
- Cost of Indian wind turbines among lowest in the world
- Manufacturing capacity around 10 GW per annum

Incentives for Wind

- ED exemption, CCD & SAD exemption on specified parts and components
- Feed-In-Tariff (FiT) by State Regulators
- Accelerated Depreciation at 80% or Generation Based Incentive @ Rs. 0.50/unit with cap of Rs. 10 million per MW
- Income Tax Holiday for 10 years

Wind Policies in States

- Wind potential states are providing promotional tariff for wind power projects

State	Tariff per kWh
Andhra Pradesh	4.84
Gujarat	4.19
Karnataka	4.50
Madhya Pradesh	4.78
Maharashtra	3.82-5.56
Rajasthan	5.76 & 6.04
Tamil Nadu	4.16

- States are also providing Concessional Wheeling, Banking, Electricity Duty and Cross Subsidy Surcharges

New Policy Initiatives

Tariff Policy Amendments

- As provided in the Amended Tariff Policy MoP issued RPO trajectory up to 2019 notifying uniform RPO across the country as under:

Year	Solar	Non-Solar	Total
2016-17	2.75%	8.75%	11.50%
2017-18	4.75%	9.50%	14.25%
2018-19	6.75%	10.25%	17.00%

- To facilitate the interstate transmission of wind power Tariff Policy provides for waiving the ISTS charges and losses for interstate sale of wind and solar power. MoP has also issued order in this regard.

Repowering Policy

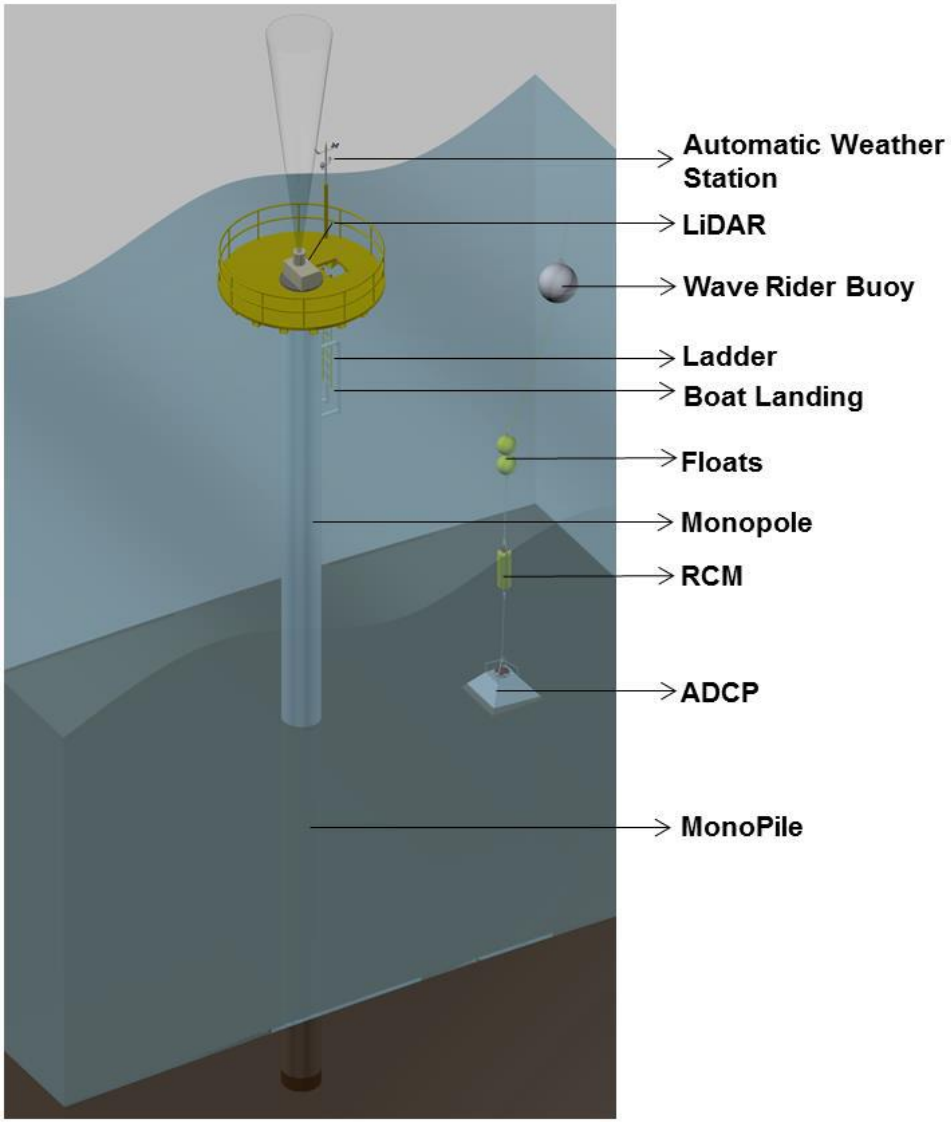
- Around 3 GW wind power capacity comes from wind turbines of 500 kW and below capacity, which are installed at the best windy sites.
- Repowering is necessary for optimum utilization of resources.
- Repowering Policy announced in August 2016
- Enabling provisions on transmission augmentation, treatment of additional power generated, etc. provided in the policy.
- IREDA to provide additional rebate on interest rate.

Wind-Solar Hybrid Policy

- Solar and wind power infirm in nature impose challenges on grid security and stability.
- Solar and winds are almost complementary to each other and hybridization of two technologies would help in:
  - Minimizing the variability; and
  - Optimally utilizing the infrastructure including land and transmission system.
- Draft Wind Solar Hybrid Policy issued in June 2016
- The Goal is to reach wind-solar hybrid capacity of 10 GW by 2022.
- Approaches towards integrating wind and solar depends upon availability of resource and the technology type.

National Offshore Wind Energy Policy

- Country has 7600 km long coastal line. Entire Exclusive Economic Zone (EEZ) available for offshore wind
- Offshore policy notified on 06.10.2015
- NIWE assessing offshore wind potential by installing LiDAR near Pipavav in Gujarat and Tuticorin in Tamil Nadu.



Other Initiatives

Green Energy Corridors Project

- Power evacuation and transmission infrastructure for renewables is being augmented as part of the “Green Energy Corridors” project.
- Projects for creation of InSTS costing over Rs. 10000 crore, for RE projects to be installed during 12th Plan, have already been sanctioned and 40% of the project cost is being provided as grant from NCEF.
- For renewable power projects to be installed up to 2022 Green Energy Corridors project Part-II is under formulation by PGCIL.

Wind Bidding Scheme

- Scheme for Setting up of 1000 MW ISTS -connected Wind Power Projects sanctioned on 14 June 2016.
- Inter State sale of wind power
- SECI to implement scheme through trader (PTC)
- Projects of 50 MW and above, to connect to ISTS point
- Site selection by developer; minimum CUF 20%
- Back to back 25 years PPA and PSA
- Bidding guidelines on the lines of solar bids

New Guidelines for Wind Projects

- MNRE issued guidelines for wind power projects in July 1995, the same were revised in June 1996.
- During last 20 years wind turbine technology has evolved and regulatory authorities have tightened regulation for grid integration of wind turbines.
- In addition issues of micrositing, health and safety, decommissioning, online monitoring to be addressed.
- Provisions in New Guidelines
  - NIWE mast data to be made available online free of cost
  - Wind site allocations to be developed within a maximum of four years

New Guidelines for Wind Projects (Cont..)

- Provisions in New Guidelines
  - Micrositing shall be based on an optimised output rather a strict mandated minimum distance between wind turbines.
  - Safe distance prescribed for Public Roads, railway tracks, highways, buildings, public institutions and EHV lines.
  - Wind Turbine to comply grid regulations. Mandatory to install ABT meter with telecommunication facility.
  - Online registry will be created and mandatory reporting of monthly performance.
  - Noise and shadow flicker to ensure health and safety of people working/residing near the wind farm will be prescribed.

Forecasting and Scheduling of Wind Power

- Wind power being infirm in nature poses certain challenges of grid security and stability.
- These could be addressed through proper forecasting and scheduling
- CERC issued forecasting & scheduling regulations for inter-state transmission of wind and solar power in Aug 2015.
- For intra-state Karnataka ERC issued F&S regulations. Other SERCs are in the process for introducing F&S mechanism.
- Renewable Energy Management Centres to be established in RE rich State. PGCIL issued tenders for SR.

Issues and way forward

- AD to be limited 40%, no GBI and introduction of GST from April 2017
  - GBI evaluation study conducted by CRISIL
  - Bidding introduced – Pass through provision made
- Signing of PPAs
  - Incentivising Discoms for purchase of RE
  - Non-windy states require 9 GW to fulfil non-solar RPO for 16-17
  - ISTS charges and losses waived
  - Wind power to be made available at competitive tariff
- Full Utilisation of Manufacturing Capacity
  - Export incentives, low cost funding
- Innovation, Efficiency improvement and cost reduction
  - Focus on R&D, indigenisation, repowering and hybridisation.


Thank You
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