Outlook of Wind Power Projects and Key Trends

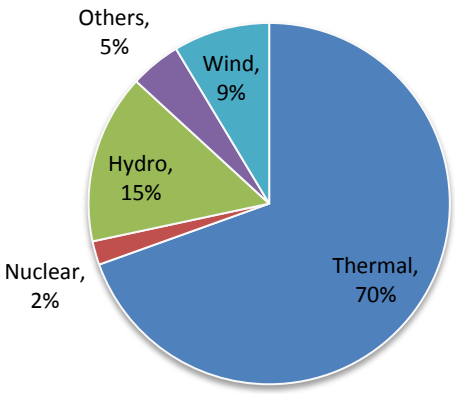
Summary

India has about 80 GW of untapped wind power as on March 31, 2015. The factors favorable for development of wind power plants in India includes incentives from government in the form of Generation based incentives and accelerated depreciation, relatively cost competitive mode of power generation, low gestation period for setting up of the project and introduction of floor/cap pricing mechanism for trading of Renewable Energy Certificates. Furthermore, on account of expected increase in the cost of conventional energy sources such as thermal due to limited fossil fuels would provide fillip to the cost competitive renewable energy sources.

Considering the factors favoring the Independent Power Producers (IPP) in this segment coupled with the projects in pipeline, the wind based capacity additions going forward are expected to grow between 2000 MW to 2500 MW during FY16 - FY17 as against 2312MW of capacity addition during FY15. It is expected that the wind based IPPs would continue to prefer to sell its power to state Discoms by entering into PPA, for this assures stable cash flows to the projects and provides opportunities to avail the benefits of open access and banking facility.

India has a coastline of 7517 km, offering a huge potential for off – shore wind energy as well. India has around wind potential of around 102.77 GW out of which the total installed capacity as on March 31, 2015 was 23.44 GW. India's wind energy installed capacity was majorly spread across 8 states Rajasthan, Gujarat , Madhya Pradesh, Maharashtra, Andhra Pradesh, Karnataka, Tamil Nadu and Kerala.

Installed capacity of power station in India



Source: Central Electricity Authority

Factors favorable and unfavorable for development of wind power plants in India

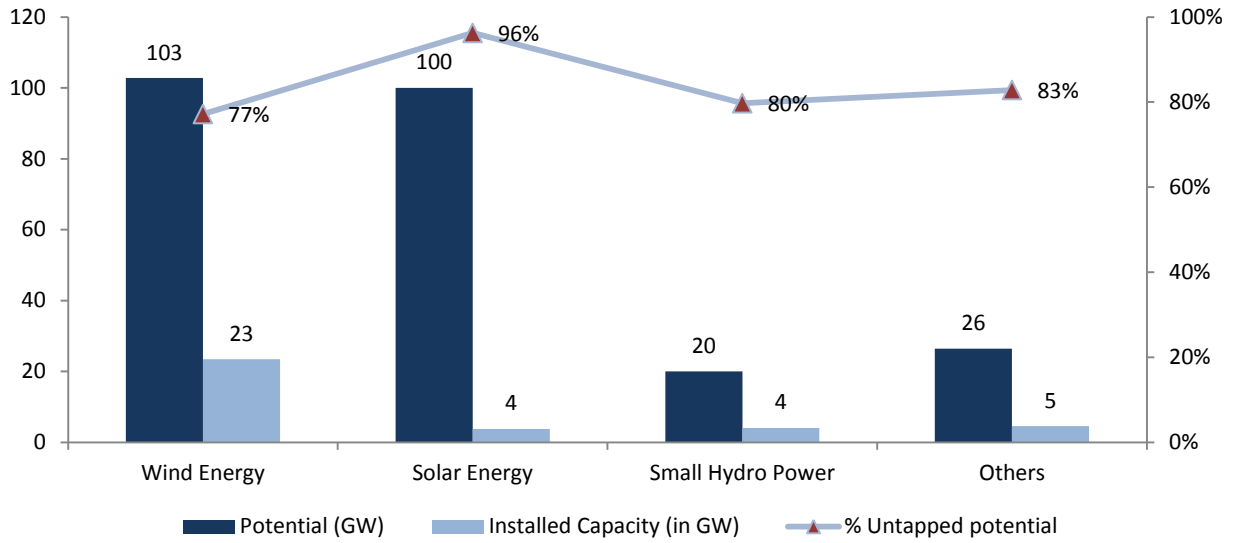
Factors favorable	Factors unfavorable
Government incentives in the form of GBI and Accelerated depreciation	Fluctuating energy generation levels throughout the year
Relatively low gestation period for setting up of the project	Weak financial risk profile of the Discoms leading in delay in realization of receivables
Considerably high untapped wind power potential	Relatively high initial investment
Shift towards development of power from renewable sources and reduce in dependency on fossil fuel	Failure of discoms in meeting renewable purchase obligation
Relatively cost competitive mode of power generation	
About 53% of India's land has 89% of wind energy potential.	

Untapped potential of Wind power plants

The total installed capacity of renewable power projects as on March 31, 2015 aggregates to 35.77 GW (excluding 41.27 GW of large hydro projects) against the total potential capacity of 249.19 GW. India has wind potential of around 102.77 GW out of which the total installed capacity as on March 31, 2015 was 23.44 GW with an untapped potential of about 77%. A major part of capacity addition and exploitation of Wind potential in the future is expected from private sector projects.

Huge untapped potential in wind power is attributed to lower Plant Load Factor (PLF) in comparison to fossil fuel, nuclear and hydropower plants. Furthermore, due to the limitation of grid infrastructure, it has been found that the amount of energy produced from wind farms could not be effectively transmitted to consumers causing wastage of energy. And also the financing structure of wind power projects in India is still bound in uncertainty. Due to aforementioned issues though the untapped potential is huge the extent to which the same can fructify still remains uncertain.

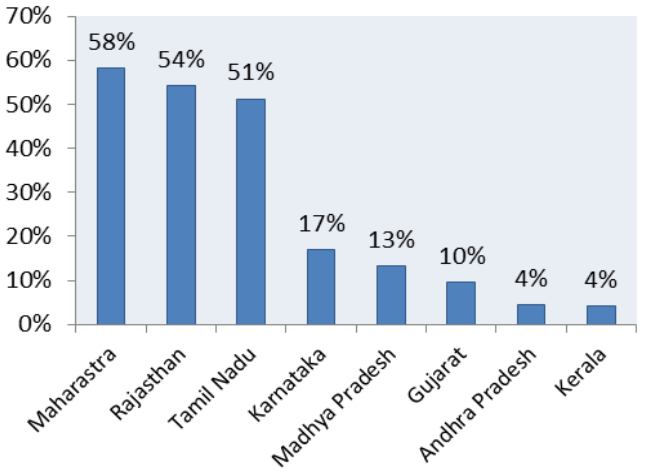
Potential of renewable energy vis-à-vis Installed capacity



Source: Central Electricity Authority

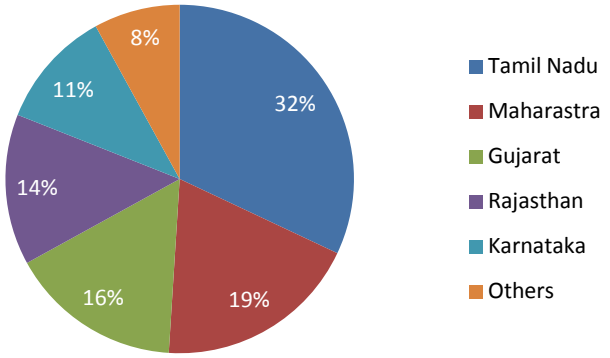
As on January 2014, states like Maharashtra, Rajasthan and Tamil Nadu had utilized their overall wind energy potential by more than 50%. Karnataka, Madhya Pradesh, Gujarat and Andhra Pradesh on the other hand has estimated wind potential of 13.6 GW, 2.9 GW, 35.1 GW and 14.5 GW, spread across 26, 7, 40 and 32 wind farmable sites out of which it has been able to utilize only 17%, 13%, 10% and 4% respectively of capacity.

% of utilized wind power potential by states



Source: Central Electricity Authority

% of contribution of total installed capacity across states in wind power



Source: Central Electricity Authority

Tamil Nadu leads in terms of wind power installed capacity constitutes about 32% of the total installed capacity followed by Maharashtra, Gujarat, Rajasthan and Karnataka contributing 19%, 16%, 14% and 11% of total share respectively. Although the top 5 states contribute about 92% of the installed wind capacity, they still have 49% of the total untapped wind power potential.

Trend in wind energy capacity addition

The fresh wind energy capacity addition during FY15 was better compared to FY13 and FY14 on account of demand from IPP segment and government policies favoring the segment. The satisfactory trend can be corroborated with the fact that the wind energy capacity additions have surpassed the target set by MNRE by 16% during FY15. The wind energy capacity addition during FY15 was 2312 MW (2090 MW in FY14) with Rajasthan, Madhya Pradesh and Maharashtra contributing 23%, 20% and 15%.

Target Vs Achievement across of renewables during FY15(in MW)			
	Target	Achievement	% Surpassed
Wind	2000	2312	16%
Solar	1100	1112	1%
Small Hydro	250	251	0%
Others	420	413	-2%
Total	3770	4088	8%

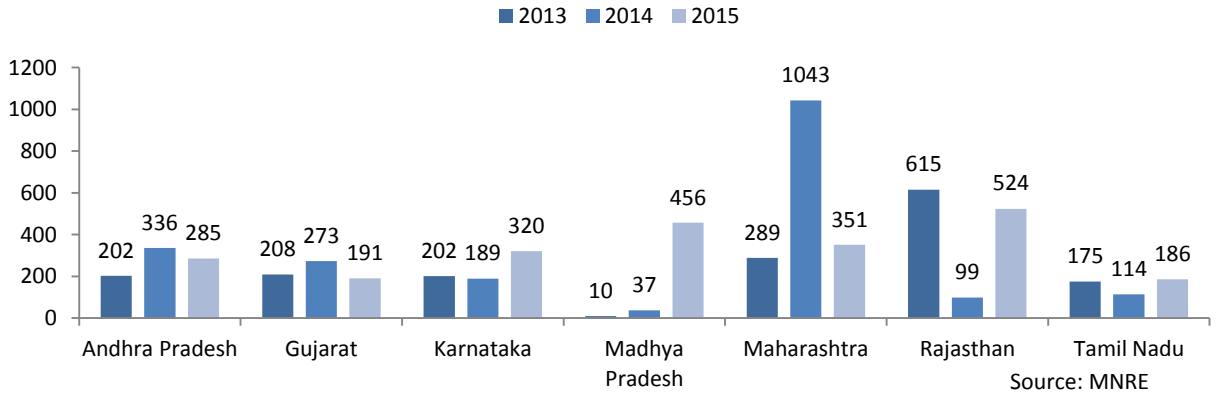
Source: MNRE

The following table illustrates the total wind power potential versus capacity installed till March 31, 2015

	State-wise wind energy Potential in India (MW)	Wind energy installed capacity in India (MW)	% contribution of state	% of untapped potential
Rajasthan	5050	3307.20	14%	35%
Gujarat	35071	3645.40	16%	90%
Madhya Pradesh	2931	879.7	4%	70%
Maharashtra	5961	4450.80	19%	25%
AP & Telangana	14497	1031.40	4%	93%
Karnataka	13593	2638.40	11%	81%
Tamil nadu	14152	7455.20	32%	47%
Kerala	837	35.10	0%	96%
Rest of the States	10768	4.30	0%	100%
Total	102860	23447.50	100%	77%

Source: C-WET & MNRE

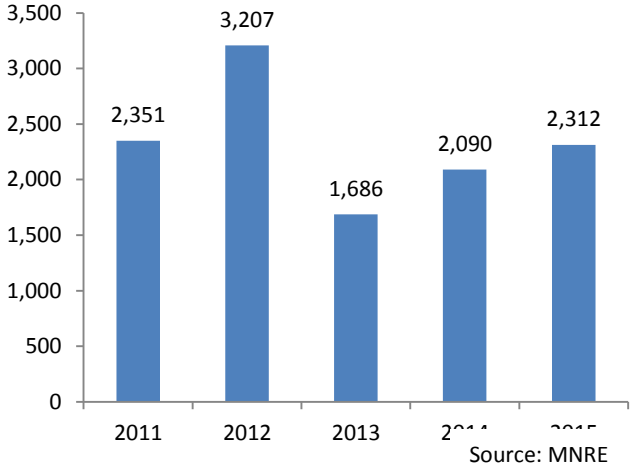
The following graph illustrates the wind capacity additions during FY13~FY15 across 7 states:



Source: MNRE

The following graph illustrates the wind capacity additions during FY11-FY15 in MW

The overall installations of wind power projects are better during FY15. Going forward, considering the wind power projects in pipeline with various IPP's it is expected that the capacity additions would grow between 2000 MW to 2500 MW during FY16 - FY17. During 5MFY16, the total wind capacity additions remained at 645 MW.



Source: MNRE

Wind farms are not only built faster than fossil fuel plants but also are providing attractive solution with competitive rates in country like India where demand always exceeds supply.

Following table illustrates the major Indian players in wind farms who tapped the wind power potential and have grown considerable during the last half a decade along with their proposed capacity additions going forward:

Independent power producers	Current operational wind capacity (MW)	Proposed capacity additions (MW)
CLP power India Ltd	732, July 2014	253 in pipeline
ILFS Renewable Energy Ltd	550, March 2014	454, 2015
Re New Power Ltd	545, December 2014	5000, proposed
Mytrah Group	543, December 2014	3500 in pipeline
Orient Green Power Ltd	422, December 2014	111, FY16
Greenko Group	402, December 2014	5000, FY20

Source: compiled by CARE

In order to build the growth trajectory going forward, companies need to maintain reliable wind data bank, pin down the best locations and designs, maintain a team of expert executors of electrical grid connectivity and proficient tariff negotiating skills considering various trade-offs.

Increase in cost of generation of conventional power can act as competitive advantage for RE source

Although the cost of coal in the international market has shown consistent decline for about last five years, the trend is unlikely to continue for long period considering the limited availability of fossil fuels and increase in demand coupled with heightening operational and logistics costs. Considering the increase in prices of fossil fuels such as coal and R-LNG going forward and rise in fuel shortages, there would be upward pressure in cost of generation of conventional power. This situation would result in providing competitive advantage for renewable IPP especially wind considering the competitiveness in their tariff rates.

Overall cost of generation of thermal fuel versus wind tariff across states	Rs/Kwh*
Cost of generation - imported coal	3.82
Cost of generation - gas (60%) & R LG (40%)	4.60
Cost of generation - domestic coal (50%) & Imported coal (50%)	4.04
Wind : Maharashtra	
Wind power density range 200-250	5.67
Wind power density range 250 – 300	4.93
Wind power density range 300-400	4.20
Wind power density range >400	3.78
Wind Tariff – Tamilnadu	3.51
Wind Tariff - Andhra Pradesh	3.50
Wind Tariff – Karnataka	3.70
Wind Tariff – Gujarat	4.23
Wind Tariff – Rajasthan	4.90

* (Including Accelerated Depreciation benefits)

Source: India Renewable Energy Status Report 2014

Of all the states Maharashtra is the first state to introduce wind-zone specific tariffs as devised by CERC and the other states are yet to adopt implementation of the same. Furthermore, the tariff rates vary across the states and entering into a long term PPA with Discoms would reduce the uncertainty of cash flows.

Government policies favoring growth of wind power projects:

- *Accelerated Depreciation:*

Acceleration depreciation was withdrawn with effect from April 01, 2012. However, the Ministry of Renewable Energy has reinstated the policy in July 2014. This tax benefit allows projects to deduct upto 80% of value of wind power equipment during the first year of project operation. Investors are given tax benefits upto 10 years.

- *Generation Based Incentive (GBI) Scheme:*

Under this scheme, GBI will be provided to wind electricity producers who come under these categories:

- Wind electricity producer would be provided with an incentive of Rs.0.50/kWh per unit of electricity fed into gird with a maximum capacity of Rs. 1.00 crore per MW.
- Incentives are provided for the projects with duration more than 4 years and less than 10 years

- Total disbursement in a year not to exceed Rs.25 lakhs per MW during the first four years.
- GBI scheme is applicable for the 12th Financial Year Plan period having a target of 15,000 MW
- Captive producers are allowed for GBI but open access (merchant power) not allowed.

Renewable Purchase Obligation (RPO)

Several states have implemented RPOs to meet the power requirements from 1% to 15% of total power generated. The impact of the RPOs on wind development would depend on the penalties and enforcement of the targets as well as an effective REC market to promote development of areas of the country with the most abundant wind resources. Although National Action Plan on Climate Change has set an ambitious RPO target 15% of total power generated by 2020, most of the states have performed abysmally low in achieving the same.

Current Issues and Challenges

Counter party credit risk relating to state DISCOMs

The power generating companies usually have Power Purchase Agreement (PPA) with either the distribution companies or captive power consumers. However, while the PPA tends to reduce the demand risks for operational wind power projects, the projects continue to face counter party payment risk. Even if the SPV generates and supplies the adequate power and supplies the same to the buyer, any delay in payments by the buyer can significantly impact the SPV's credit quality, these risks may vary from buyer to buyer.

Technological risk

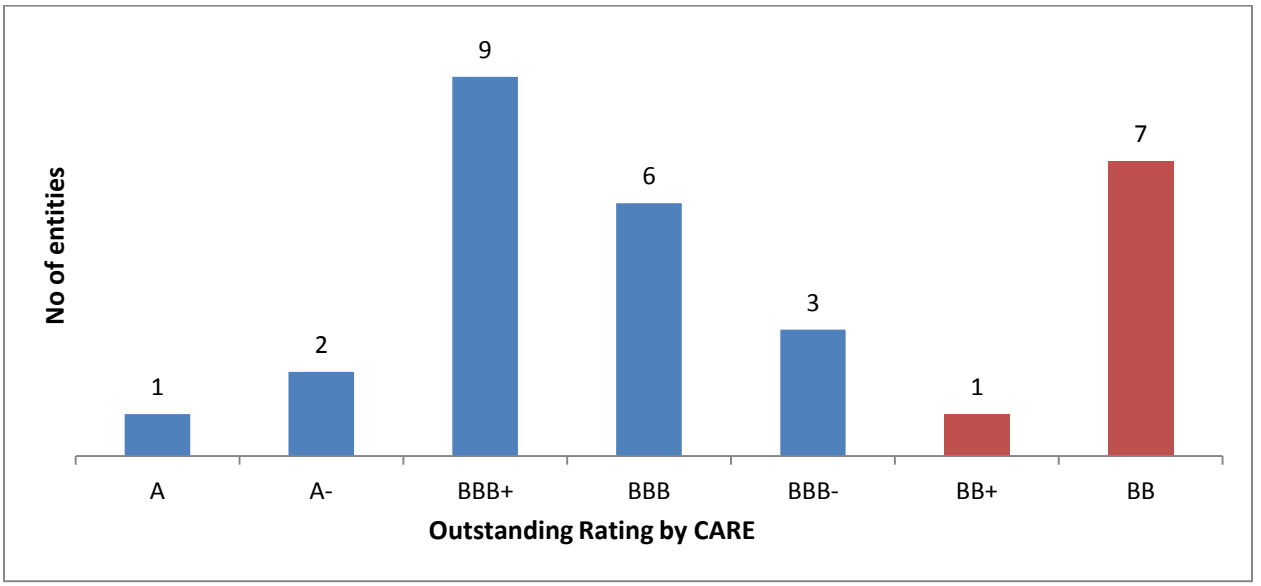
Lack of Transmission infrastructure leads to difficulties pertaining to evacuation of power generated; apart from that due to variable wind levels throughout the day and across the seasons there would be fluctuation in voltage and power factor, which can cause difficulties in linking with Central Transmission Utility. Most of the favorable wind sites having PLF in the range of 28% have already been developed thus leaving the sites with low PLF to develop.

Regulatory risk

Involvement of multiple regulators bodies such as MNRE, IREDA, SERCS etc makes the entire subsidy structure complex. Furthermore, delays in acquiring land and obtaining statutory clearances during the project stage and lack of an appropriate regulatory framework to facilitate RPO would adversely affect the project in terms of cost and time overruns and mismatch of cash flows.

Rating Dispersion:

CARE has outstanding credit ratings (as on October 16, 2015) of about 29 wind power projects of which about 72% are in investment grade. The rating dispersion of these entities is given below:



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