



Potential of Wind Energy in India: A review

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Abstract: The Tremendous progress of wind technologies over the past decades has brought us to the point where the vision of a clean sustainable energy future is well within reach. Broader range of governments will have to begin to respond to the increasing imperative for the energy securing and price stability offered by wind energy. Under the advanced scenario, wind power could reach nearly 2000 GW by 2030 supply between 16.7- 18.8% of global electricity and help save own 3 billion tons of Carbon Di-oxide emission annually. As the energy revolution proceeds and the use of energy from the renewable sources increases, the number of decentralized energy generators connected to the electricity grid is rising. In this paper, efforts have made to summarize the availability, current status, promotion policies and future potential of different form of wind energy in India.

Keywords : Wind Energy, Wind policy and Renewable policy in India.

•Introduction

Today energy demand and supply has become the main parameter for the socio-economic and technological development of any country. As the conventional energy sources like fossil fuels have adverse effect on the surrounding environment and are limited in the nature, so to meet the demand of energy of the future, we have to move towards Renewable energy sources [1]. According to a report of Central electricity authority (CEA) of India of May 2014, the total installed capacity in India is 251628.21 MW and the renewable energy share from that is 31833.01 MW [2]. The share of various renewable energy sources is listed in table 1 below.

Table 1: Total Renewable Energy Installed Capacity (May 2014)

Source	Total Installed Capacity (MW)
Wind Power	21,262.23
Solar Power (SPV)	2,647.00
Small Hydro Power	3,803.65
Biomass Power	1,365.20
Bagasse Cogeneration	2,512.88
Waste to Power	106.58
Total	31,833.01

Wind Energy has been the fastest growing renewable energy sector in the country. With a cumulative installed capacity of over 18,000 MW, wind power currently accounts for almost 70 percent of the total installed capacity in the renewable energy. About 3,200 MW of new wind power capacity has been added during the last financial year alone which is the highest in a year, so far. The 12th Five Year Plan proposals envisage around 15,000 MW of grid-interactive renewable power capacity addition from wind energy alone. Our Ministry has been at the forefront of providing the necessary policy support and a facilitative regulatory ecosystem for the fast and orderly growth of the sector. We are equally conscious of the challenges and difficulties being faced by the sector. We are, however, confident that the potential of the sector is enormous. The target of 15 percent of total power capacity through renewable for India by 2020 envisaged under the National Action Plan on Climate Change cannot be achieved without a substantial contribution of wind energy. India is the 3rd largest annual wind



power market in the world, and provides great business opportunities for both domestic and foreign investors. The Indian wind power sector experienced growth in 2011 with the addition of more than 3 GW of new installations. Diverse incentives supported by a long term policy and regulatory framework at the central and state levels have played a crucial role in achieving this goal.

Wind potential in India:

India's rapidly growing economy and expanding population make it hungry for electric power. In spite of significant capacity additions over the

last 20 years, power supply struggles to keep up with demand. Electricity shortages are common, and a significant part of the population has no access to electricity at all. The EIA projects that India and China will account for about half of global energy demand growth through 2040, with India's demand growing at approximately 2.8% per year. India's renewable energy installation by July 2014 were 21, 693 MW out of the total renewable capacity of 32,424 MW. (Excluding large hydro). Wind provided almost 67% of the total installed capacity of grid connected

Table 2: State wise Wind Power Installations as on 2013

STATES	INSTALLED CAPACITY(MW)	% OF TOTAL
Andhra Pradesh	435	2.34%
Gujarat	3093	16.67%
Karnataka	2113	11.39%
Kerala	35	0.19%
Madhya Pradesh	386	2.08%
Maharashtra	2976	16.04%
Rajasthan	2.36	12.69%
Tamil Nadu	7154	38.56%
Others	4	0.02%
TOTAL	18551	

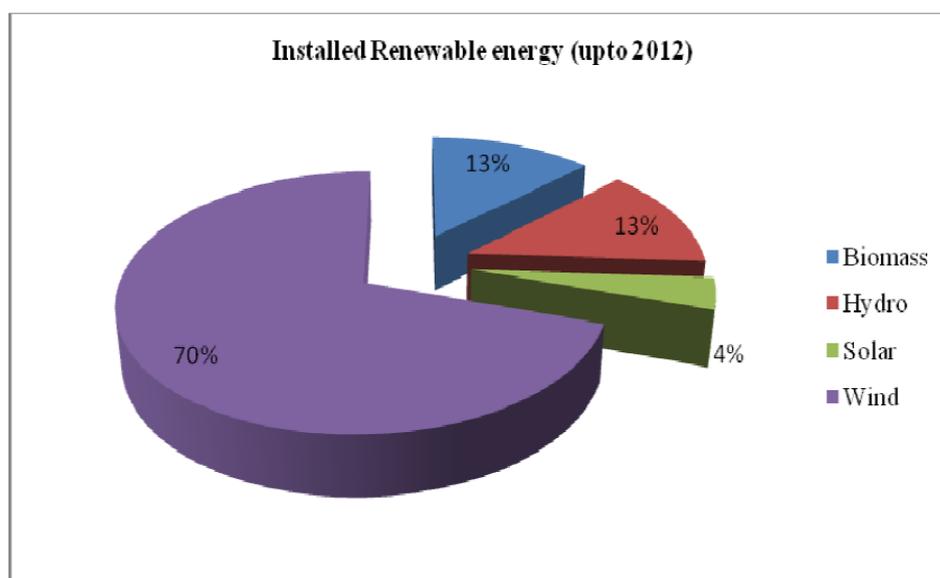
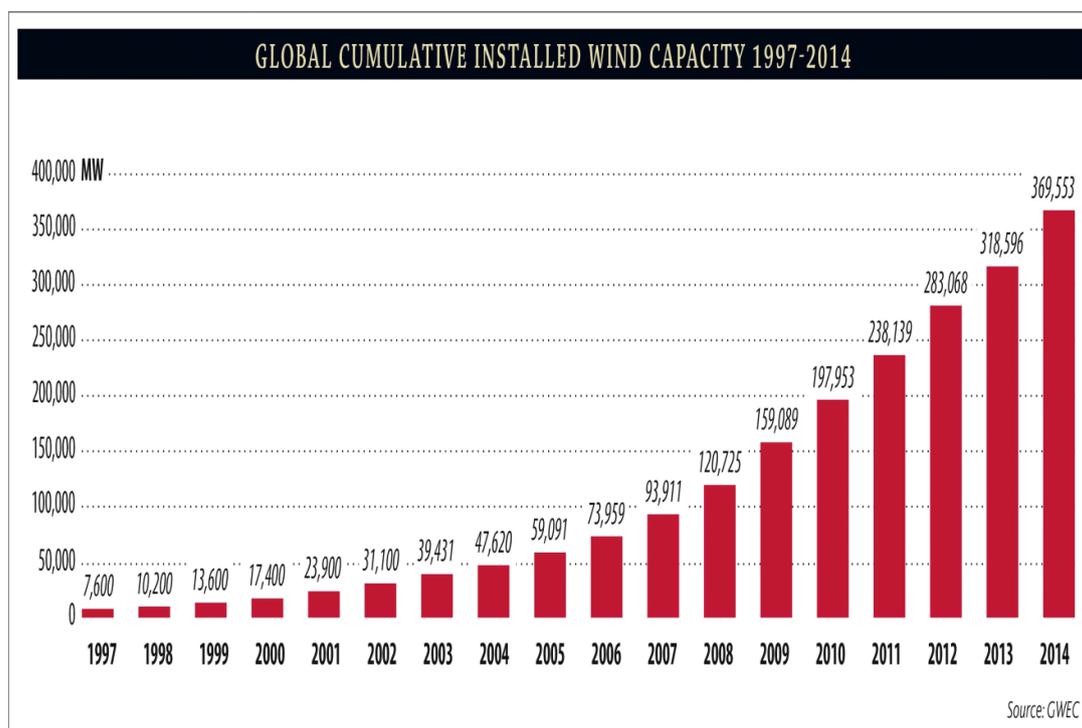


Figure-1
Renewable Power Sector in India (Source: MNRE)



Table 3 : Total Global Installed Capacity (Up to 2013)

Country	Installed Capacity (MW)
China	80,824
USA	60,009
Germany	32,422
Spain	22,907
India	19,565
UK	9,610
Italy	8,415
France	7,821
Canada	6,578
Australia	3,059
Japan	2,655
Denmark	4,578
Portugal	4,564
Sweden	4,066
Brazil	2,788
Rest of the World	26,204
Total	296,065



Wind Energy Policy and Recent Scenario:

The 12th Five Year Plan proposals envisage around 15,000 MW of grid-interactive renewable power capacity addition from wind energy alone. Our Ministry has been at the

forefront of providing the necessary policy support and a facilitative regulatory ecosystem for the fast and orderly growth of the sector. We are equally conscious of the challenges and difficulties being faced by the sector. We are, however, confident that the potential of the



sector is enormous. The target of 15 percent of total power capacity through renewable for India by 2020 envisaged under the National Action Plan on Climate Change cannot be achieved without a substantial contribution of wind energy. In the recently released National Electricity Plan (2012) the Central Electricity Authority projected the need for 350-360 GW of total generation capacity by 2022. The state-wise Renewable Purchase Specification (RPS) targets and the tradable Renewable Energy Certificates (REC) provide further support for the sector. However there are no incentives in the existing framework, especially for state utilities in wind-energy rich states, to adopt RPSs higher than the levels suggested by the National Action Plan on Climate Change. Also the REC Mechanism, due to its limited timeframe (five years) faces the challenge of acceptance as a revenue stream by the financial institutions. Pite major capacity additions over recent decades, power supply struggles to keep up with demand.

Under the IEA New Policies scenario, India's wind power market would shrink considerably out to 2020. The result would be a total installed capacity of 47 GW by 2020 and 83 GW by 2030. Wind power would then produce close to 117 TWh every year by 2020 and 219 TWh by 2030, and help save 70 million tons of CO₂ in 2020 and 131 million tons in 2030. Under the Moderate scenario, the total installed capacity would reach 29 GW by 2015, and this would grow to 49 GW by 2020 and 125 GW by 2030. The wind industry will see investments of €6.6 billion per year by 2020 and €10.3 billion per year by 2030. Employment in the sector would grow to over 86,000 by 2020 and over 145,000 jobs ten years later. Nevertheless the GWEO Advanced scenario shows that the wind development in India could go much further: by 2020 India could have almost 56 GW of wind power in operation, supplying 137 TWh of electricity each year, while employing over 123,000 people in the sector and saving 82 million tonnes of CO₂ Emissions each year. Investment would reach a level of €8.6 billion per year. By 2030 wind power would generate over 400 TWh per year and avoid the emission

of 243 million tons of CO₂ each year. Investment would by then have reached a level of €10.5 billion per year.

CONCLUSION

Country like India has very much unbalanced in electricity production. Production is less and consumption is very much. Wind power is very good option in India to increase power production. This is also very good for our environment protection and economic development. Wind is unlimited source of energy and our country also provide suitable climate for this energy but we need some better idea to increase efficiency and decrease production cost. Global installed capacity could reach nearly 200 GW by 2030, if a robust climate regime was in place along with political will to tackle the climate challenge across most of the globe which has been missing to date. The trend to install smallest rated machines on taller towers with longer blades in lower wind speed areas closer to demand centers opens up new areas for commercial wind development. Wind power scalability and its speed of deployment makes it an ideal technology to bring about the early emissions reductions which are required if we are to keep the window open for keeping global mean temperature rise to 2 degree Celsius or less above pre- industrial levels.

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