# Renewable Energy Potential in India and Slackness in RPO Compliance is Affecting the REC Market

**Megha Sharma[1], Saurabh Chanana[2]**

[1]*M. Tech Student, School of Renewable Energy and Efficiency, NIT Kurukshetra, Haryana*

[2] *Electrical Department, NIT Kurukshetra, Haryana*

**ABSTRACT**

***India is now recognized as a leading country in the world for the development and utilization of renewable energy, particularly in wind power development. In fact, power generation from wind has emerged as one of the most successful programs in the renewable energy sector, and has started making a meaningful contribution to the overall power requirement in some of the States. The renewable energy potential of different states in India is different. The barrier for RE abundant states to sell their surplus power to the states having lower potential is scheduling of energy and too high long term open access charges. Consequently, lower RE potential states keep their Renewable Purchase Obligation (RPO) target lower. In this paper, we will discuss the renewable energy potential of India, state wise wind power installed capacity of India and the future of REC market is dependent on how effectively SERCs enforces RPO compliance by obligated entities.***

***Keywords: Renewable Purchase Obligation, Obligated entities, Feed-in-Tariff, Central fiscal incentives.***

## 1. INTRODUCTION

The wind power programme in India was initiated towards the end of sixth plan, in 1983-84. A market–oriented strategy was adopted from inception, which has lead to the successful commercial development of the technology. The broad based National programme includes wind resource assessment activities, research and development support; implementation of demonstration projects to create awareness and opening up of new sites; involvement of utilities and industry; development of infrastructure capability and capacity for manufacture, installation, operation and maintenance of wind electric generators; and policy support. The programme aims at catalyzing the commercialization of wind power generation in the country. The Wind Resources Assessment Programme is being implemented through the State Nodal Agencies, Field Research Unit of Indian Institute of Tropical Meteorology (IITM-FRU) and Center for Wind Energy Technology (C-WET).

Wind in India is influenced by the strong southwest summer monsoon, which starts in May-June, when cool, humid air moves towards the land and the weaker northeast winter monsoon, which starts in October, when cool, dry sir moves towards the ocean. During the period March to August, the winds are uniformly strong over the whole Indian Peninsula, except the eastern peninsular coast. Wind speeds during the period November to march are relatively weak, though higher winds are available during a part of the period on the Tamil Nadu coastline. A notable feature of the Indian programme has been the interest among private investors/developers in setting up of commercial wind power projects. The wind power generation capacity in India is 49,130 MW as per the official estimates in the Indian Wind Atlas (2010) by the Centre for Wind Energy Technology (C-WET). The potential is calculated with respect to 2 per cent land availability at windy locations and pertains to a 50 meter hub height level of the wind turbines.

As on March 31, 2013 a total of about 19,052 MW of commercial projects has been established until. The break-up of projects implemented in prominent wind potential states (as on March 31, 2013) is given in the Table 2.1:

**Table 1: State-wise Wind Power Installed Capacity in India (till 31.03.2013) [1].**

| State | Estimated Potential* (MW) | Installed Capacity (MW) |
|---|---|---|
| **Tamil Nadu** | 14,152 | 7,162 |
| **Gujarat** | 35,071 | 3,175 |
| **Maharashtra** | 5,961 | 3,022 |
| **Karnataka** | 13,593 | 2,135 |
| **Rajasthan** | 5,050 | 2,685 |
| **Madhya Pradesh** | 2,931 | 386 |
| **Andhra Pradesh** | 14,497 | 448 |
| **Kerala** | 837 | 35 |
| **Others** | 10,696 | 4 |
| **All India** | 1,02,788 | 19,052 |

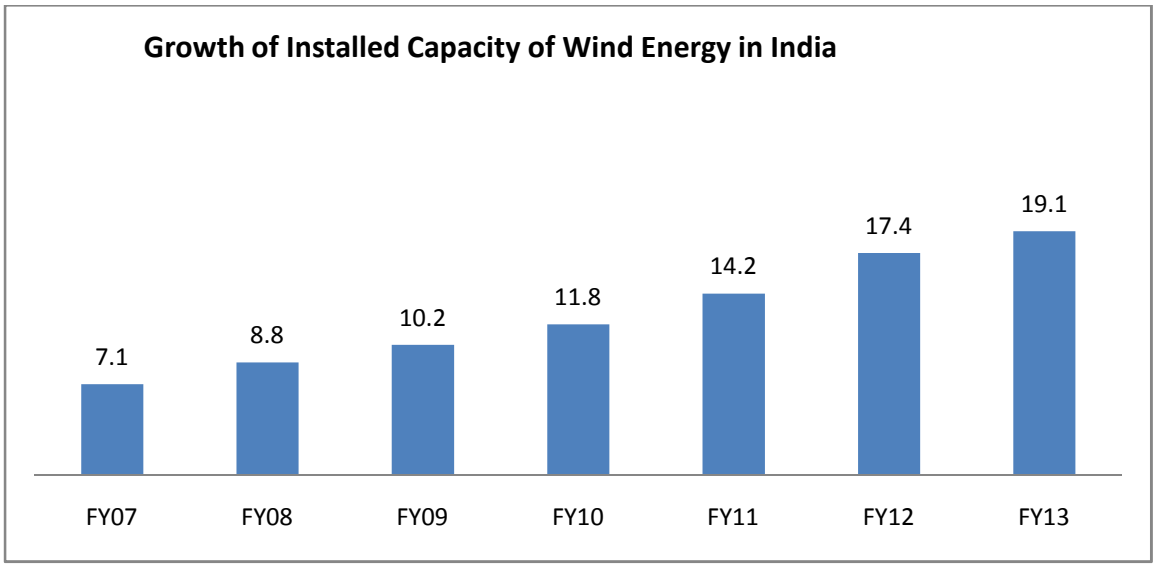


**Fig 1: Growth of installed capacity of wind energy in India (GW) [5].**

## 2. BENEFITS & INCENTIVES TO WIND ENERGY PROJECTS IN INDIA

The Government is promoting wind power projects through private sector investment by providing fiscal and promotional incentives such as concessional import duty on certain components of wind electric generators, excise duty exemption to manufacturers. 10 years tax holiday on income generated from wind power projects is also available. Loans for installing windmills are also available from Indian Renewable Energy Development Agency (IREDA) and other financial institutions [2]. Technical support, including wind resource assessment is provided by the Centre for Wind Energy Technology (C-WET), Chennai. This apart, preferential tariff is being provided in potential states. The Government has also announced a Generation Based Incentives (GBI) under which Rs. 0.50/unit generated from wind power projects is being provided for the projects which do not avail the accelerated depreciation benefit. 80% of accelerated depreciation is provided to the investors of wind power projects and it is considered to be the main driver but was stopped as from 1st April 2013.

The central fiscal incentives from Ministry of Finance which the wind energy sector enjoys are:

### *a) Direct Taxes*

- Wind power projects shall have normal depreciation of 15%. In addition, there is a provision of availing 20 % depreciation in the first year.
- Exemption of Income Tax on earnings from the Project u/Sec 80IA for 10 years.

***b) Indirect Taxes***

- Exemption of Excise Duty on Wind Energy Generator (WEG).
- Concessional Custom Duty on specified WEG components.

Fig 2 shows various incentive based schemes started by Government of India in order to promote renewable energy in India.

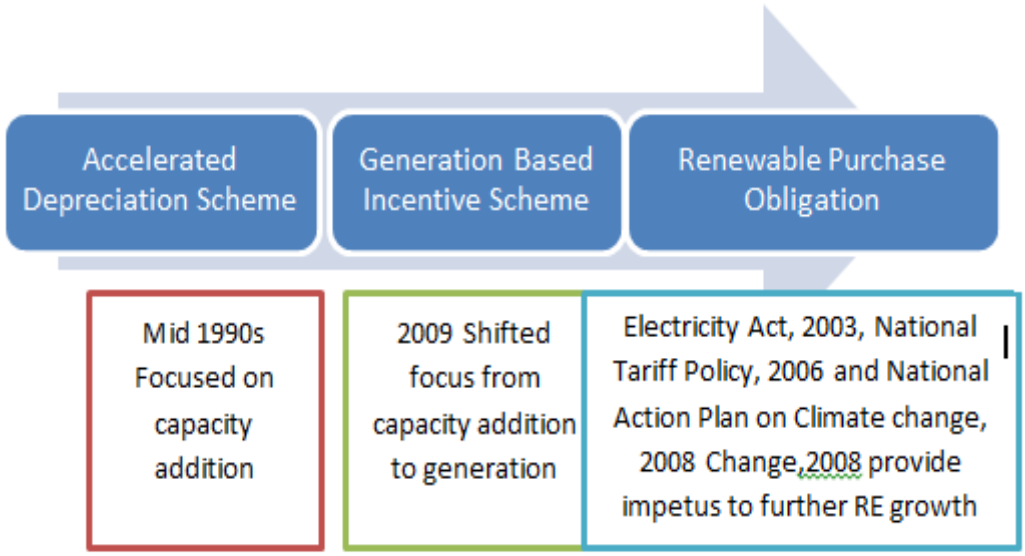


**Fig 2: Schemes to promote RE in India [3].**

## 3. RENEWABLE PURCHASE SPECIFICATION

The Electricity Act 2003 proposed mandatory Renewable Purchase Specification (RPS) for all states. To date, 26 states have specified targets for the uptakes of renewable electricity. With the introduction of the new Renewable Energy Certificate scheme, states are looking at fulfilling the RPS set by the Electricity Act through this provision.

## 4. STATE FEED-IN TARIFF

At present thirteen SERCs have declared preferential feed-in tariffs for the purchase of electricity generated from the wind power project established in respective states. All the SERCs have adopted a 'cost plus' methodology to fix the feed-in tariff, which varies across the states depending upon the state resources, project cost and other tariff computing parameters as considered by the respective SERCs.

## 5. RENEWABLE ENERGY CERTIFICATES

In order for distribution utilities or licensees to meet the RPS, renewable energy needs to be available. To ensure this, a mechanism to create tradable Renewable Energy Certificates (RECs) is put into place by the CERC in 2010. All the renewable energy projects commissioned after 01.04.2010 are eligible to register under the REC framework. Status of Renewable Purchase Specification (RPS) and Renewable Energy Certificate (REC) regulations of State Electricity Regulatory Commissions (SERCs) is shown in the Table 2:

**Table 2: State wise comparisons of Feed-in-Tariff policy for wind power [4].**

| States | Current Tariff rates per kWh | Details of available tariff rates | RPS Targets (% for wind) |
|---|---|---|---|
| **Andhra Pradesh** | INR 4.70 | Constant for 25 years for the PPAs to be signed by 31-03-2015 | 5% for all RE (2012-2013) |
| **Gujarat** | INR 4.23 | No escalation for 25 years of project life | 5.5% for wind (2012-2013) |
| **Haryana** | Wind Zone I– INR 6.14 | Tariff is for FY 2012-13 | 3% for all RE (2012-2013) |
| | Wind Zone II– INR 4.91 | | |
| | Wind Zone III– INR 4.09 | | |
| | Wind Zone IV–INR 3.84 | | |
| **Karnataka** | INR 3.70 | No escalation for 10 years | 7-10% (2011/12) for all Non-Solar |
| **Kerala** | INR 3.64 | No escalation for 20 years of project life | 3.3% (2011-2012) & 3.63% (2012-2013) for all RE |
| **Madhya Pradesh** | INR 4.35 | No escalation for 25 years of project life | 4% for wind (2012-2013) |
| **Maharashtra** | Wind Zone I– INR 5.67 | No escalation for 13 | 8% for all RE (2012- |

| | | | |
|---|---|---|---|
| | Wind Zone II- INR 4.93 | years | 2013) |
| | Wind Zone III– INR 4.20 | | |
| | Wind Zone IV– INR 3.78 | | |
| **Orissa** | INR 5.31 | No escalation for 13 years | 5.5% for all RE (2012-2013) |
| **Punjab** | INR 5.07 (for zone I) | No escalation for 10 years | 2.9% for all RE (2012-2013) |
| **Rajasthan** | INR 4.46 & 4.69 (for FY 2011-12) | No escalation over project life of 25 years | 7.5% for wind (2011-2012) |
| | | INR 4.46/kWh for Jaisalmer, Jodhpur & Barmer districts while INR 4.69/kWh for other districts | |
| **Tamil Nadu** | INR 3.51 | No escalation for 20 years of project life | 9% for all RE (2011/12) |
| **Uttarakhand** | Wind Zone I– INR 5.15 | INR 5.65 for the first 10 years & INR 3.45 11th year onwards | 5.05% for all RE (2012/13) |
| | Wind Zone II– INR 4.35 | INR 4.75 for 1st 10 year & INR 3.00 for 11th year onward | |
| | Wind Zone III– INR 3.65 | INR 3.95 for 1st 10 year & INR 2.55 for 11th year onward | |
| | Wind Zone IV– INR 3.20 | INR 3.45 for 1st 10 year & Rs.2.30 for 11th year onward | |
| **West Bengal** | INR 4.87 | No escalation for 10 years | 4% for all RE (2012/13) |

## 6. RPO REGULATIONS

Renewable Purchase Obligation (RPOs) requires distribution licensees, captive power consumers and open access consumers to purchase or generate a certain percentage of their total electricity requirement from appropriate renewable source. States with low renewable energy potential can meet their target by buying Renewable Energy Certificate (RECs). SERCs have specified progressive, and in many cases, renewable specific RPO targets. Non-compliance with RPOs would result in penalties on obligated entities [5].

While RPO regulations are in place, the absence of strict enforcement has lead to obligated entities not complying with targets. Most of the states are not in a position to enforce these regulations on distribution licensees and captive generators. The sale ability of REC is also an issue. RPO guidelines specifies that if an obligated entities fails to comply with targets, it has to purchase RECs as penalty at a forbearance price decided by CERC.

Although the RPO regulation clearly specifies that state agencies will need to submit a quarterly status report of their RPO compliance, none of the state agencies are adhering to this requirement. States that outperformed their 2012 target are Meghalaya, Nagaland, Uttarakhand, Himachal Pradesh and the southern coastal states of Tamil Nadu and Karnataka. While Meghalaya set an RPO target of 0.75% and achieved 4.10%, Tamil Nadu achieves 19.14% against 9%.

On the other hand Delhi, Maharashtra, Panjab, Andhra Pradesh and Madhya Pradesh are among the states that missed their targets. In a recent order in August, the Maharashtra Electricity Regulatory Commission (MERC), the power regulator in Maharashtra, have directed all distribution companies to fulfill their RPO targets for both solar and non-solar for four years, i.e., financial year 2010-11, 2011-12, 2012-13, 2013-14, cumulatively, before 31st March 2014. Non-compliance will result in strict penalties. The decision is expected to give some push to the struggling REC market in the country.

## 7. CONCLUSION

Hence we can conclude that 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 record annual 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 power is now increasingly accepted as a major complementary energy source for securing a sustainable and clean energy future for India.

## REFERENCES

[1] Information at www.cwet.tn.nic.in

[2] GWEC, WISE and IWTMA,"Indian Wind Energy Outlook 2012", Available: http://www.gwec.net/fileadmin/image/India/IWEO_2012_lowres.pdf

[3] Information at www.iexindia.com

[4] Information at www.mnre.gov.in

[5] Ernst & Young, "Mapping India's Renewable Energy growth potential: Status and outlook 2013", Available: http://www.ey.com/Publication/vwLUAssets/Mapping_Indias_Renewable_Energy_growth_potential/$FILE/EY-Mapping-Indias-Renewable-Energy-growth-potential