

Power Trading through REC Mechanism in India

Megha Sharma¹, Saurabh Chanana²

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

²Electrical Department, NIT Kurukshetra, Haryana

Abstract: In India, Renewable Energy Certificate (REC) is considered as an important aspect in promoting renewable energy and assist in the compliance of Renewable purchase obligations (RPO). REC is a tariff based mechanism and cannot be categorized as an incentive for generating power from renewable energy. Under Electricity Act 2003, SERCs declare that distribution companies will have to purchase a certain percentage of their total power requirement from renewable energy sources. 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 RPO target lower. Under REC framework, a RE generator will have the option to sell its generated energy at Average Power Purchase Cost (APPC) and Renewable Energy Certificate through the Power Exchange (PX). Usually APPC is lower than the preferential tariff for RE sources in the state. If an obligated entity fails to comply with the RPO, it shall also be liable for penalty as may be decided by the commission under the section 142 of EA, 2003. In this paper, the procedure for trading power through REC mechanism, its salient features, solar and non solar REC, its floor and forbearance prices are discussed.

Keywords: Green attributes, Preferential tariff, Floor price, Forbearance price.

1. INTRODUCTION

A large part of India's renewable energy potential is concentrated in a few states in the country and some of these states have already achieved comparatively high levels of renewable electricity purchase as a share of their total electricity consumption. After having met their Renewable Purchase Obligation (RPO), these states are now more reluctant to buy energy from renewable energy sources after having met their RPO as mandated by the State Electricity Regulatory Commission (SERC). This is hampering the growth of the renewable sector in an upward manner since the electricity from renewable energy is at present is more expensive than conventional electricity. States that have already fulfilled the required RPO mandate are therefore not willing to invest more in renewable based electricity any further. For example, Tamil Nadu has more than 10% of total electricity from renewable sources of energy but still has untapped wind energy potential. On the other hand, states like Bihar and Delhi have a very little RPO but are required, by

the National Electricity Policy, to enhance the share of renewable electricity in their total electricity consumption. To address this mismatch, the Electricity Regulatory Commissions have collectively evolved a REC mechanism under which the green electricity is to be split into two components, i.e. electricity and the green attribute. The electricity component can be sold to local distribution utilities at a price of conventional electricity and the green attribute is converted into REC which the generator can sell to the utilities of states like Delhi. Such a utility can help a state with little RPO to fulfill its renewable purchase obligations by purchasing RECs, and simultaneously will help states with more RPOs to realize it to the maximum potential in an economic manner.

2. RENEWABLE ENERGY CERTIFICATE

In order for distribution utilities or licensees to meet the RPS, renewable energy need to be available. To ensure this, a mechanism to create a tradable Renewable Energy Certificate (REC) was put in place by the CERC in 2010. Renewable Energy Certificates (RECs) represent the green attribute of electricity generated from renewable energy sources. These attributes are unbundled from the physical electricity and the two products—the green attribute embodied in the form of a certificate and the commodity electricity—may be sold or traded separately [4]. One REC represents 1MWh of energy generated from renewable sources. RECs have now become the currency of renewable energy markets because of their flexibility and the fact that they are not subjected to the geographic and physical limitations of the underlying commodity electricity. RECs can be used by the obligated entities to fulfil regulatory compliance, such as Renewable Purchase Obligation (RPO). There are two categories of RECs: Solar and Non-Solar.

3. REC TRADING TIMELINE

At IEX the trading day for RECs is last wednesday of every month through closed double side auction and the trading time is between 1300-1500 Hrs. The REC trading timeline can be well explained by the Fig. 1 below:

Trading Day	Last Wednesday of every Month
Market Clearing	Closed Double sided auction
Trading Time	1300-1500 Hrs
By 1530 Hrs	Verification by Central agency for Valid REC by cleared seller at IEX
By 1600 Hrs	Central agency confirms REC
By 1630 Hrs	IEX finalizes trade
By 1700 Hrs	Buyer & Sellers informed to Central Agency
By 1800 Hrs	Invoice raised (<i>proof of REC trade</i>)

Fig. 1: REC Trading Timeline. [1]

REC Mechanism

The various steps involved under this mechanism is Accreditation, Registration, Issuance, Trading and Redemption. The Fig. 2 gives the brief description of the steps involved in this mechanism.

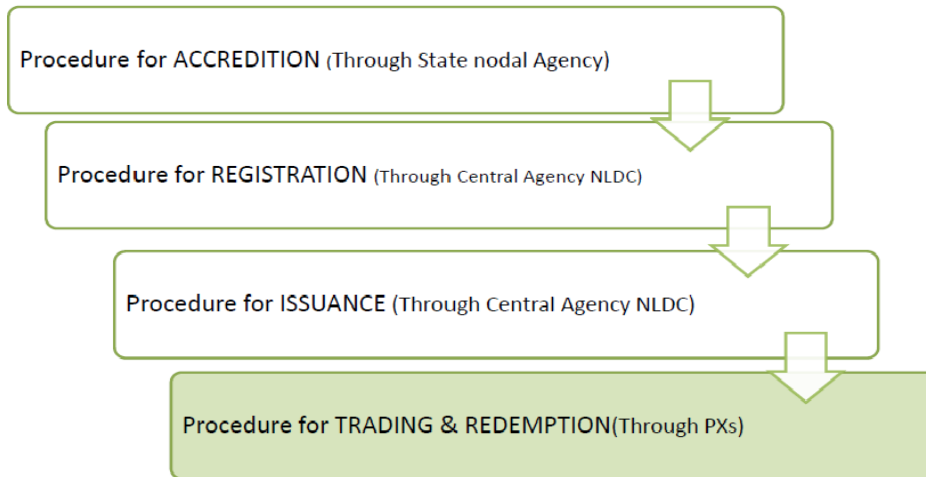


Fig. 2: REC Mechanism [1]

The REC mechanism requires a procedure for accrediting generation plants which are eligible to receive RECs. Accreditation is done to access and establish eligibility of renewable energy plants to receive RECs. This involves processing of application, verification of projects, transfer of information, creation and operation of accounts, etc. Every eligible entity shall apply for registration at central level. Only one central agency at the national level will be authorized to recognize attributes from renewable generation to avoid double counting. Registration will result in the creation of an account for all the entities participating in the mechanism. Central agency would receive information about the injection of RE power by the accredited RE generators through the State Load Dispatch Centre (SLDC) via RLDC and local distribution license.

The eligible entity shall receive a certificate for a specified quantity of electricity generated and injected into the grid. One REC will be issued for each 1 MWh of electricity generated from renewable energy plants. RE generators with RECcertificates can exchange their certificate at a common platform viz. the power exchange approved by CERC. Obligated entities shall buy REC through power exchange. The price discovery of the REC will be based on the demand and supply of the RECs in the market, subject to a forbearance price to be determined by CERC. The validity of RECs is for 730 days [1]. Central registry will furnish details of REC purchase and redemption to respective SERCs to enable them to assess compliance by obligating entities and impose penalties on them, if applicable.

Salient features of the REC mechanism

1. The RE generators will have two options i.e. either to sell the renewable energy at preferential tariff fixed by the concerned Electricity Regulatory Commission or to sell the electricity component and environmental attributes separately.
2. On choosing the second option, the generator can sell the 'electricity component' to either the local distribution company at its average power purchase cost (APPC), the traders, open consumers or to the power exchanges at a manually agreed/market determined price. In addition, the 'environmental attributes' can be exchanged in the form of the REC.
3. The Central Agency (the National Load Dispatch Centre has been designated as Central Agency) will issue the REC to RE generators.
4. One REC is equivalent to 1 MWh of electricity injected into the grid.
5. The REC is exchanged only in the Power Exchanges approved by CERC within the band of a minimum and a maximum price to be determined by CERC.
6. The distribution companies, Open Access consumer, Captive Power Plants (CPPs) have the option of purchasing the REC to meet their RPO.
7. There are also compliance auditors to ensure compliance with the requirements of REC by the participants of the scheme.
8. Voluntary Purchasers like NGOs, the Corporate Sector, Individual Purchasers etc may also purchase REC in order to meet their Corporate Social Responsibility or to support the environment.

4. CATEGORIES OF CERTIFICATES

A Renewable Energy Certificate (REC) is a tradable certificate of proof that one MWh of electricity has been generated by a RE plant in the state. REC mechanism is not an incentive mechanism. There shall be two categories of certificates i.e. solar certificates issued to eligible entities for generation of electricity based on solar as renewable energy sources and non solar certificates issued to eligible entities for generation of electricity based on renewable energy sources other than solar.

Under this framework, RE generators can trade RECs through a power exchange platform that will allow market based price discovery, within the price range determined by the CERC. The respective price limits are called *forbearance price* and *floor price*, their values are calculated separately for solar and all non solar energy sources (wind, biomass, small hydro). While the CERC has stipulated floor and forbearance price for non solar RECs and for solar RECs respectively, while the real price of an REC would be determined at the power exchanges. RECs

will be traded in the power exchange within the boundary set by the forbearance price and floor price, determined by the CERC from time to time. For wind power generation, this range is from Rs. 1,500 to Rs. 3,300 per REC as shown in Table no. 1.

Table 1: Floor and Forbearance Prices.[2]

	Non Solar REC (Rs. /MWh)	Solar REC (Rs. /MWh)
Floor Price	1,500	9,300
Forbearance Price	3,300	13,400

5. CONCLUSION

In this paper the procedure for trading RECs, the categories of certificate and its salient features are discussed. The REC mechanism is a market based instrument, that enable the interstate sale and purchase and of renewable energy. It may be concluded that the future of Renewable Energy Certificate is not dependent on the availability of RECs, but on how effectively State Electricity Regulatory Commissions (SERC's) instill a culture of monitoring, compliance and enforcement among the obligated entities.

REFERENCES

- [1] Information on <http://www.iexindia.com>
- [2] Information on <http://www.nldc.in>
- [3] Information on <http://www.mnre.gov.in>
- [4] S. K. Soonee, Minaxi Garg, and Satya Prakash. *Renewable Energy Certificate Mechanism in India*. 16th National Power Systems Conference, 15th-17th December, 2010.
- [5] D. K. Agrawal, N. P. Patidar, R. K. Nema. *Wind Power Trading Options in Indian Electricity Market: Inclusion of Availability based tariff and Day ahead trading*. 3rd International Conference on Power Systems, 27th-29th December, 2009.
- [6] Information on <http://www.researchandmarkets.com/reports/997788/>
- [7] Information on <http://www.inwea.org>