

## Appendix G

# Renewable Energy Certificate (REC) Mechanism

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### An introduction to Renewable Energy Certificate mechanism

As discussed in Appendix F, the National Action Plan on Climate Change (NAPCC) and Electricity Act 2003 set targets and provide a roadmap for increasing the share of renewable energy generation capacity in India through Renewable Purchase Obligations. To help achieve these targets, India launched the Renewable Energy Certificate (REC) mechanism on November 18, 2010. The regulatory framework for the REC mechanism has been notified by CERC, and the REC mechanism is being supported by the Ministry of New and Renewable Energy and the Ministry of Power.

RECs are market-based instruments to promote renewable energy and facilitate renewable energy purchase obligations amongst various stakeholders.

Renewable energy sources are not evenly spread across different parts of the country, e.g., Tamil Nadu has great wind energy potential but the state of Uttarakhand doesn't have the same potential. States where renewable energy potential is high have such potential beyond the RPO level fixed by the SERCs. Therefore renewable energy deficient states can buy RECs from these states to fulfill their RPOs. Under the REC mechanism, 1 megawatt-hour of electricity generated from renewable energy sources is eligible for one REC. Solar-RECs would also be issued for solar energy; these can be used to fulfill solar-RPOs.

The REC mechanism allows the eligible entities (renewable energy generators) to sell their electricity at regular local tariffs established by the distribution companies (Discoms), and sell their RECs (environmental attributes associated with the megawatt-hours of power produced) to the obligated entities. The REC mechanism, and any preferential tariff availed of, are mutually exclusive, i.e., renewable power is either sold at a preferential tariff, or sold at regular (non-preferential) local tariffs and the associated REC traded.

More details are provided further below but in summary, the REC mechanism<sup>1</sup> works in the following way:

- Renewable energy generators participating in the scheme will be registered with a Central agency.
- The renewable energy generators have two options: either to sell the renewable energy at a preferential tariff fixed; or to sell the electricity generation at regular local tariffs and to sell the associated environmental attributes, namely the REC, separately.
- Under the latter option, the regular local tariff would be typically equivalent to the weighted average power purchase cost of the distribution company set by the appropriate SERCs, including short-term power purchase but excluding renewable power purchase cost.
- The Central agency will issue the REC to the renewable energy generators. One REC is issued for one megawatt-hour (MWh) injected into the grid from renewable energy sources.
- The REC will be exchanged only in the power exchanges approved by CERC within the band of a floor price and a forbearance (ceiling) price to be determined by CERC from time to time. The two power exchanges in India registered with CERC are Power Exchange of India and Indian Energy Exchange.
- The distribution companies, open-access consumers, and captive power plants (CPPs) will have the option of purchasing the REC to meet their Renewable Purchase Obligations (RPO) mandated by the SERCs.
- Compliance auditors will ensure compliance with REC requirement by the market participants.

## Eligibility for participation under REC<sup>2</sup>

A generating company engaged in generation of electricity from renewable energy sources shall be eligible for participation under the REC scheme if it does not have any power purchase agreement to sell electricity at a preferential tariff (determined by the appropriate Commission), and it sells the electricity generated either: to the distribution licensee of the area in which the eligible entity is located, at a price not exceeding the pooled cost of power purchase, or to any other licensee or to an open access consumer at a mutually agreed price, or through the power exchange at market determined price.

The first solar photovoltaic project under the REC scheme was accredited to Jain Irrigation Systems. The project with an installed capacity of 8.5 MW is located in Jalgaon, Maharashtra. The company has also won accreditation for the first biogas project under the REC scheme. More information is available at REConnect Energy Solutions.<sup>3</sup>

## Pricing Mechanism of REC

The REC price would be determined at the power exchange.<sup>4,5</sup> RECs would be traded at the power exchange between the floor price and the forbearance (ceiling) price, as determined by CERC from time to time.

These prices are calculated as under:

- *Forbearance Price (Maximum Price)* = Preferential Tariff- Average Power Pool Cost
- *Floor Price (Market Equilibrium Price)* = Minimum requirement for project viability of renewable energy technologies - Average Power Pool Cost

In August 2011, CERC announced the floor and forbearance prices to be used for solar and non-solar projects from FY 2012-13 up to 2016-17. The prices set are shown in Table G1 below.

**Table G1: Prices for Non-Solar and Solar RECs**

	Non-Solar			Solar		
	2012-2017 Price (Rs.)	Current Price (Rs.)	% Reduction	2012-2017 Price (Rs.)	Current Price (Rs.)	% Reduction
<b>Forbearance Price</b>	3,300	3,900	15.38	13,400	17,000	21.18
<b>Floor Price</b>	1,500	1,500	0.00	9,300	12,000	22.50

## Challenges for solar-RECs<sup>6</sup>

**Market Risks:** Given the early stages of the REC mechanism, many investors are concerned by the possibility of delayed ability or inability to sell solar RECs. In such a scenario, there is a risk of delayed cash flows, and also of significant loss of revenue if solar-RECs remain unsold.

**Future price uncertainty:** While CERC has set the floor and forbearance price for the next five years, these prices could change dramatically for the next and subsequent five-year periods. As solar generating assets are long-lived, future uncertainty is a factor for concern.

Solar power project developers fulfill obligations imposed by solar-RPOs. The developers can choose to sell power under the JNNSM feed-in-tariffs, various State feed-in-tariffs, or avail of the REC market. Each approach has its own unique features, pros and cons. While JNNSM and State tariff approaches are generally accepted to be lower-risk as they are executed by power purchase agreement (PPAs), RECs carry with them uncertainties arising from their nascent nature coupled with future policy uncertainties.

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<sup>1</sup> "About Renewable Energy Certificates (REC)", *Indian Energy Exchange*, [www.iexindia.com/rec.htm](http://www.iexindia.com/rec.htm) (accessed April 27, 2012).

<sup>2</sup> "About Renewable Energy Certificates (REC)", *Indian Energy Exchange*, [www.iexindia.com/rec.htm](http://www.iexindia.com/rec.htm) (accessed April 27, 2012).

<sup>3</sup> *REConnect Energy Solutions*, [www.reconnectenergy.com/rec/](http://www.reconnectenergy.com/rec/) (accessed April 27, 2012).

<sup>4</sup> Madhavan Nampoothiri, "REC Price Band Revised", *Energy Alternatives India*, Aug 25, 2011, [eai.in/blog/2011/08/rec-2012-and-beyond.html](http://eai.in/blog/2011/08/rec-2012-and-beyond.html) (accessed April 27, 2012).

<sup>5</sup> "Average Purchase Power Cost", *REConnect Energy Solutions*, February 7, 2012, [reconnectenergy.com/blog/category/rec-mechanism-india/average-power-purchase-cost/](http://reconnectenergy.com/blog/category/rec-mechanism-india/average-power-purchase-cost/) (accessed April 27, 2012).

<sup>6</sup> "Solar RECs: Investor's perspective and feasibility study", *REConnect Energy Solutions*, April 30, 2011, [reconnectenergy.com/blog/2011/04/solar-recs-investor%E2%80%99s-perspective-and-feasibility-study/](http://reconnectenergy.com/blog/2011/04/solar-recs-investor%E2%80%99s-perspective-and-feasibility-study/) (accessed April 27, 2012).