

## Chapter-V

# Trading of Renewable Energy Certificates

### 1. Renewable Energy Certificate Mechanism

The Renewable Energy Certificate (REC) mechanism is a market-based instrument, to promote renewable sources of energy and development of market in electricity. The REC mechanism provides an alternative voluntary route to a generator to sell his electricity from renewable sources just like conventional electricity and sell the green attribute separately to obligated entities to fulfill their Renewable Purchase Obligation (RPO). Such a generator can either opt to enter into a Power Purchase Agreement for sale at preferential full cost tariff to a distribution licensee or can opt to take the REC route for such untied capacity. If he opts for the REC route, he can sell his electricity to a distribution licensee such as a conventional source-based generation at an average power purchase cost. Or, he can sell to a third party, that is, to an open access consumer at mutually settled prices, or even on power exchanges. On every one-megawatt hour of such electricity generated, he is entitled to get one REC from the central registry (which is regulated by the CERC) after getting registered once with this registry. Such registration requires prior accreditation with the state nodal agency for verifying the source of generation, capacity, and grid metering.

There have been two categories of RECs, namely solar and non-solar, to meet the RPO of the corresponding category. This is because the cost of solar-based generation is very high compared to all other sources. The RE generator as an eligible entity shall apply for issuance of REC within 6 months from the month in which RE power was generated and injected into the grid. The central agency shall issue the RECs to the eligible entity within 15 working days from the date of physical receipt of the application by the eligible entity. The validity of issued REC has been 1095 days. It is to be sold on power exchanges regulated by CERC, which also fixes a price band for exchange of REC (the band of forbearance price and floor price) to protect the interests of obligated entities and generators, respectively. Obligated entities can fulfill RPO by purchasing renewable electricity at full cost preferential tariff or by purchasing REC

equivalent to their RPO. Voluntary buyers can also purchase REC. Regulatory charge for shortfall of RPO compliance is at the rate of forbearance price.

The Central Electricity Regulatory Commission (Terms and Conditions for recognition and issuance of Renewable Energy Certificate for Renewable Energy Generation) Regulations, 2010 were issued on 14<sup>th</sup> January, 2010 for the development of market in power from non-conventional energy sources by issuance of transferable and saleable credit certificates. The CERC has nominated NLDC as the Implementing Agency (for the Central Registry), which prepares procedures and a web-based platform for the REC mechanism. The REC mechanism was formally launched on 18<sup>th</sup> November 2010.

CERC notified the Central Electricity Regulatory Commission (Terms and Conditions for Renewable Energy Certificates in Renewable Energy Generation) Regulations, 2022 on 9th May 2022. Some of the key features of REC Regulations 2022 are as under:

- I. **Validity of RECs:** As per the new regulations, the certificates issued shall remain valid until they are redeemed.
- II. **Eliminated Floor and Forbearance Price:** Floor and Forbearance price are not required for trading of RECs. Prices would be discovered in the power exchanges and as mutually agreed between eligible entities and electricity traders. The Commission will involve in the following circumstances-
  - i. There is high volatility in the prices of RECs
  - ii. Sudden fluctuations occurred in transaction volumes
- III. **REC Fungibility:** There is a new concept of fungibility for Renewable Energy Certificates, where the categorization of RECs, i.e., solar and non-solar has been eliminated in the REC Regulations, 2022. The regulations have provision for all types of renewable energy technologies, like solar, wind, hydro, biomass and biofuel, conversion of waste into energy and any other RE technology into a new REC contract through which RECs of all RE technologies are traded.

- IV. **Certificate Multiplier:** A new concept of Certificate Multiplier has been introduced for promoting less mature and high-price RE technologies. The multiplier will increase the market value of different RE technologies. The certificate multiplier assigned to RE technologies depends upon the date of commissioning of the project. Multipliers are assigned as per the tariff range (in Rs/kWh) for different RE technologies as given below:

RE Technologies	Tariff Range (Rs/kWh)	Certificate Multiplier
On Shore Wind and Solar	<=4	1
Hydro	4-6	1.5
Municipal Solid Waste and Non-Fossil Fuel based Cogeneration	6-8	2
Biomass and Biofuel	8-10	2.5

Multipliers will be assigned for the next three years from the date of effect of new regulations. The tariff range and Certificate Multiplier will be revised by CERC as per the maturity level of RE technology. The Certificate Multiplier, once assigned to RE generating stations and Captive generating stations, shall be valid for fifteen years from the date of commissioning of these RE and captive generating stations. The RE projects which have already been commissioned before the new REC regulations came into action shall not be subjected to these conditions.

- V. **Transactions of RECs through Trading Licensees:** With a view to increase competition in the Renewable Energy Market and reducing the Transaction costs of RECs, the Commission approved the transactions of RECs through the trading licensees. It will give long-term visibility to all the buyers of RECs, as they can fulfil their RPOs easily. This will facilitate even the small buyers who face difficulty in trading REC to fulfil their RPO.

## 2. Trading of Renewable Energy Certificates

Trading of RECs is being undertaken on Power Exchanges on the last Wednesday of every month. In the event of a bank holiday on the last Wednesday of any month, trading shall take place on the next bank working day. If there are other exigencies warranting a change in the day for trading, the Central Agency can make such change as considered necessary under intimation to all concerned. The bidding window is kept open on the Power Exchanges designated for dealing in the RECs from 13:00 Hrs to 15:00 Hrs on the day of trading.

One REC is equivalent to 1 MWh of electricity injected into the grid from renewable energy sources. The CERC has notified the band of floor price and forbearance (ceiling) price for trading of RECs, from time to time (Table-40).

**Table-40: Floor and Forbearance Price applicable for REC Transactions**

Applicable Period	Floor Price (₹/MWh)		Forbearance Price (₹/MWh)	
	Solar	Non-Solar	Solar	Non-Solar
w.e.f 1st June 2010	12000	1500	17000	3900
w.e.f 1st April 2012	9300	1500	13400	3300
w.e.f 1st March 2015	3500	1500	5800	3300
w.e.f 1st April 2017	1000	1000	2400	3000
w.e.f 5th December 2022	The Commission decided to do away with the requirement of determining floor and forbearance price for REC			

The first REC trading session was held on power exchanges in March 2011. The growth of RECs transacted on power exchanges since 2011-12 is given in Table-41. As may be seen in the table, the number of RECs transacted increased significantly from 10.15 lakh in 2011-12 to 162.00 lakh in 2017-18 and then declined to 89.28 lakh in 2019-20. As per the Hon'ble APTEL Order, trading sessions of RECs at both the Power Exchanges remained suspended from July 2020 to October 2021 and resumed from November 2021 as per Hon'ble APTEL Order dated 09.11.2021.

The categorization of RECs between solar and non-solar has been dispensed with the introduction of the concept of multiplier under the REC Regulations, 2022 w.e.f. 05.12.2022. Accordingly, the power exchanges deactivated the Solar and Non-

Solar REC contract for trading w.e.f. December 2022. A new contract, namely “REC”, has been made available for trading. During 2022-23, a total of 82.50 lakh RECs were transacted on the power exchanges and bilaterally through trading licensees.

**Table-41: Growth of Renewable Energy Certificates transacted on Power Exchanges, 2011-12 to 2022-23**

Year	Number of buyers	Number of sellers	Number of RECs transacted (Lakhs)	% increase in Number of RECs Transacted
2011-12	397	197	10.15	-
2012-13	802	683	25.90	155%
2013-14	1083	1044	27.49	6%
2014-15	821	1378	30.62	11%
2015-16	1332	1512	49.55	62%
2016-17	1760	1588	64.88	31%
2017-18	1140	1088	162.00	150%
2018-19	988	830	126.00	-22%
2019-20	830	820	89.28	-29%
2020-21*	277	523	9.21	-90%
2021-22 *	541	749	84.60	819%
2022-23**	511	811	82.50	-2%

\* As per Hon'ble APTEL Order trading sessions of RECs at both the Power Exchanges was suspended from July 2020 to October 2021 and resumed from November 2021 as per Hon'ble APTEL Order dated 09.11.2021

\*\* Includes RECs traded bilaterally through Trading Licensees

Source: NLDC

Table-42 shows the demand and supply of RECs, i.e., the gap between the volume of buy and sell bids of RECs on power exchanges from 2012-13 to 2022-23. As may be observed from the table, the volume of buy bids as a percentage of the volume of sell bids initially showed a declining trend from 2012-13 to 2016-17, followed by an increasing trend from 2017-18 to 2019-20 in both the power exchanges because of change in demand for both Solar and Non-Solar RECs.

Table-42: Demand and Supply of RECs on Power Exchanges, 2012-13 to 2022-23									
Year	IEX			PXIL			HPX		
	Volume of Buy Bid of RECs (Lakhs)	Volume of Sell Bid of RECs (Lakhs)	Volume of Buy Bid as % of volume of Sell Bid	Volume of Buy Bid of RECs (Lakhs)	Volume of Sell Bid of RECs (Lakhs)	Volume of Buy Bid as % of volume of Sell Bid	Volume of Buy Bid of RECs (Lakhs)	Volume of Sell Bid of RECs (Lakhs)	Volume of Buy Bid as % of volume of Sell Bid
<b>Solar</b>									
2012-13	0.77	0.14	549%	0.12	0.05	265%	-	-	-
2013-14	0.54	5.86	9%	0.14	1.35	10%	-	-	-
2014-15	1.01	37.00	3%	0.63	33.46	2%	-	-	-
2015-16	4.65	227.67	2%	1.83	93.80	2%	-	-	-
2016-17	4.04	323.70	1%	1.53	147.66	1%	-	-	-
2017-18	0.89	34.99	3%	1.20	13.68	9%	-	-	-
2018-19	86.45	152.51	57%	44.46	99.85	45%	-	-	-
2019-20	71.49	19.45	367%	26.80	8.12	330%	-	-	-
2020-21*	1.46	2.44	60%	0.37	0.71	51%	-	-	-
2021-22*	38.73	30.01	129%	6.21	5.58	111%	-	-	-
2022-23 (upto Nov-22)	23.28	215.24	11%	9.33	92.67	10%	0.02	0.09	23%
<b>Non Solar</b>									
2012-13	24.35	91.85	27%	6.55	24.90	26%	-	-	-
2013-14	12.71	251.65	5%	14.11	172.33	8%	-	-	-
2014-15	14.47	553.25	3%	14.51	550.88	3%	-	-	-
2015-16	26.73	889.92	3%	16.34	644.01	3%	-	-	-
2016-17	42.15	981.50	4%	17.16	596.37	3%	-	-	-
2017-18	94.17	635.09	15%	67.89	324.13	21%	-	-	-
2018-19	88.05	60.43	146%	37.82	16.53	229%	-	-	-
2019-20	91.87	94.72	97%	46.71	48.15	97%	-	-	-
2020-21*	5.78	41.70	14%	1.91	21.05	9%	-	-	-
2021-22*	50.84	90.58	56%	21.52	40.41	53%	-	-	-
2022-23 (upto Nov-22)	19.70	238.86	8%	9.70	111.02	9%	0.04	0.12	33%
<b>REC**</b>									
2022-23 (Dec-22 to Mar-23)	25.00	114.35	22%	4.52	33.16	14%	1.10	1.48	74%

\* As per Hon'ble APTEL Order trading sessions of RECs at both the Power Exchanges was suspended from Jul'20 to Oct'21 and resumed from Nov'21 as per Hon'ble APTEL Order dated 09.11.2021

\*\* The categorization of RECs has been dispensed with, on introduction of the concept of multiplier under the CERC REC Regulations, 2022 w.e.f. 05.12.2022. Accordingly, the power exchanges deactivated the Solar and Non-Solar REC contract for trading w.e.f. December 2022. A new contract named "REC" has been made available for trading.

Source: CERC MMC Report (Data from Power Exchanges)

The volume and price of RECs transacted on the power exchanges from 2012-13 to 2022-23 is given in Table-43, and the volume and price of RECs transacted through the trading licensees is given in Table-44.

The market clearing volume of Solar RECs transacted on the power exchanges increased from 0.14 lakhs in 2012-13 to 25.86 lakhs in 2022-23 (upto November 2022), whereas the weighted average market clearing price of these RECs declined from ₹12740/MWh in 2012-13 to ₹1189/MWh in 2022-23 (upto November 2022). The



market clearing volume of Non-Solar RECs transacted on the power exchanges increased from 25.76 lakhs in 2012-13 to 29.43 lakhs in 2022-23 (upto November 2022), whereas the weighted average market clearing price of these RECs declined from ₹1692/MWh in 2012-13 to ₹1000/MWh in 2022-23 (upto November 2022).

The market clearing volume of RECs during December 2022- March 2023 was 26.32 lakhs, whereas the weighted average market clearing price of these RECs was ₹1000/MWh during this period.

REC Regulations 2022 also allowed transactions of RECs through the trading licensees. The volume of RECs transacted through the trading licensees was 0.90 lakhs during 2022-23, and the weighted average price of RECs transacted through trading licensees was ₹925/MWh during this period (Table-44).

<b>Table-43: Volume and Price of RECs Transacted on Power Exchanges, 2012-13 to 2022-23</b>								
<b>Month</b>	<b>IEX</b>		<b>PXIL</b>		<b>HPX</b>		<b>Total</b>	
	<b>Volume of RECs (MWh) in Lakhs</b>	<b>Weighted Average Price of RECs (₹/MWh)</b>	<b>Volume of RECs (MWh) in Lakhs</b>	<b>Weighted Average Price of RECs (₹/MWh)</b>	<b>Volume of RECs (MWh) in Lakhs</b>	<b>Weighted Average Price of RECs (₹/MWh)</b>	<b>Volume of RECs (MWh) in Lakhs</b>	<b>Weighted Average Price of RECs (₹/MWh)</b>
<b>Solar</b>								
2012-13	0.10	12782	0.04	12615	-	-	0.14	12740
2013-14	0.53	9383	0.14	9668	-	-	0.67	9441
2014-15	1.01	3725	0.63	4756	-	-	1.64	4121
2015-16	4.65	3500	1.83	3500	-	-	6.48	3500
2016-17	4.04	3500	1.53	3500	-	-	5.57	3500
2017-18	0.89	1000	1.20	1000	-	-	2.08	1000
2018-19	46.59	1113	25.36	1067	-	-	71.95	1097
2019-20	17.11	2293	6.04	2292	-	-	23.15	2293
2020-21*	1.19	1491	0.33	1290	-	-	1.52	1447
2021-22*	11.21	2201	2.42	2166	-	-	13.63	2195
2022-23 (upto Nov-22)	18.71	1182	7.13	1208	0.02	1000	25.86	1189
<b>Non-Solar</b>								
2012-13	19.81	1731	5.95	1564	-	-	25.76	1692
2013-14	12.71	1500	14.11	1500	-	-	26.82	1500
2014-15	14.47	1500	14.51	1500	-	-	28.98	1500
2015-16	26.73	1500	16.34	1500	-	-	43.07	1500
2016-17	42.15	1500	17.16	1500	-	-	59.31	1500
2017-18	92.41	1480	67.35	1487	-	-	159.76	1483
2018-19	41.22	1298	10.77	1274	-	-	51.98	1293
2019-20	43.16	1634	21.71	1659	-	-	64.88	1642
2020-21*	5.78	1000	1.91	1000	-	-	7.69	1000
2021-22*	49.57	1000	21.41	1000	-	-	70.98	1000
2022-23 (upto Nov-22)	19.70	1000	9.70	1000	0.04	1000	29.43	1000
<b>REC **</b>								
2022-23 (Dec-22 to Mar-23)	21.24	1000	4.19	1000	0.89	1000	26.32	1000

\* As per Hon'ble APTEL Order trading sessions of RECs at both the Power Exchanges was suspended from Jul'20 to Oct'21 and resumed from Nov'21 as per Hon'ble APTEL Order dated 09.11.2021

\*\* The categorization of RECs has been dispensed with, on introduction of the concept of multiplier under the CERC REC Regulations, 2022 w.e.f. 05.12.2022. Accordingly, the power exchanges deactivated the Solar and Non-Solar REC contract for trading w.e.f. December 2022. A new contract named "REC" has been made available for trading.

Source: CERC MMC Report (Data from Power Exchanges)



**Table-44: Volume and Price of RECs transacted through Trading Licensees, 2022-23**

Month	Volume of RECs (MWh) in Lakhs	Weighted Average Price of RECs (₹/MWh)
Dec-22	-	-
Jan-23	-	-
Feb-23	-	-
Mar-23	0.90	925.00
<b>Total</b>	<b>0.90</b>	<b>925.00</b>

*Source: NLDC & Trading Licensees*

### 3. Long-term Growth Trajectory of RPOs

In May 2018, the Ministry of New and Renewable Energy (MNRE), vide order dated 22.05.2018, created the RPO Compliance Cell, with a function to coordinate with States, CERC and SERCs on matters relating to RPO compliance and taking up non-compliance issues with appropriate authorities. MNRE has up-scaled the target of renewable energy capacity to 175 GW by 2022, which includes 100 GW from solar, 60 GW from wind, 10 GW from bio-resources and 5 GW from small hydro-power. The generation target is also coupled with Renewable Purchase Obligation (RPO) to be met by distribution licensees and open-access consumers.

In order to accelerate the growth of hydropower sector, the Ministry of Power (MOP), on 08.03.2019, declared Large hydro Power Plants (LHPs) having installed capacity of more than 25 MW as renewable energy source. The Ministry notified Hydro Purchase Obligation (HPO) as a separate category to Non-Solar RPO for procuring power from LHPs. The Ministry also issued a revised trajectory of RPO for the year 2021-22, including long-term trajectory for HPO on 29.01.2021.

In furtherance, the MOP, on 22.07.2022, specified the RPO trajectory beyond 2021-22 (see Table-45) with the following conditions:

- (a) Wind RPO shall be met only by energy produced from Wind Power projects commissioned after 31st March 2022.

(b) HPO shall be met only by energy produced from LHPs (including PSPs), commissioned after 8th March 2019

(c) Other RPO may be met by energy produced from any RE power project not mentioned in (a) and (b) above.

**Table-45: Trajectory of RPOs beyond 2021-22**

<b>Year</b>	<b>Wind RPO</b>	<b>HPO</b>	<b>Other RPO</b>	<b>Total RPO</b>
2022-23	0.81%	0.35%	23.44%	24.61%
2023-24	1.60%	0.66%	24.81%	27.08%
2024-25	2.46%	1.08%	26.37%	29.91%
2025-26	3.36%	1.48%	28.17%	33.01%
2026-27	4.29%	1.80%	29.86%	35.95%
2027-28	5.23%	2.15%	31.43%	38.81%
2028-29	6.16%	2.51%	32.69%	41.36%
2029-30	6.94%	2.82%	33.57%	43.33%

*Source: Ministry of Power*

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