

STATUS OF RENEWABLE PURCHASE OBLIGATIONS (RPOS) IN INDIA: AN EFFECTIVE TOOL TO INDORSE SOLAR ENERGY

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Abstract

Getting uninterrupted electricity is likely to a Fundamental Right under the Umbrella legislation of the Indian Constitution Under Article 21, and to fulfill that Maximum Electricity Generation from Renewable Energy is the dire necessity. Research shows that the generation of electricity from Renewables was started in the late 1990s. In India, Household Electricity demand was increased during last year, Due to lockdown in all states because of Covid-19 which mandated everyone to stay at home. Everything became online which requires electricity to run and to operate those appliances, even the demand for electricity consumption in the hospital also required a nonstop electricity supply to run medical equipment. This demand we had fulfilled because big consumers are not using electricity at that time, what if there is partial lockdown where companies and big consumers are allowed to do production and all, then the story must be different, and, if any power grid failed just like in July 2012 at that time for any reason or any energy crisis occurs, then the number of dead persons would be more from that grid failure, crisis rather than Covid-19. India is a country that is blessed with sun throughout the year, and that's why we have to generate electricity through Solar more. This research emphasis on Renewable purchase obligation i.e., an initiative from which we can achieve our targets and the current status of RPO's and their effectiveness in India, and how to maximize electricity generation from renewable energy can be made possible.

Keywords: Renewables, Renewable Purchase Obligation, Renewable Energy, Solar Energy, Renewable Energy Certificate.

I. INTRODUCTION

The power sector is one of the important sectors for Economic aspects and every nation's welfare. India also fulfills its electricity demands, but for an uninterrupted power supply, it has to increase its yearly growth of 8 to 9 % in Electricity Generation (Prateek Mundra, ET. AL., 2020). This growth is necessary because the Conventional energy resources Reserves in India are falling at an alarming rate with Extreme environmental damages, and greenhouse emission gases. the electricity sector alone contribution is 45% to

the total greenhouse emissions in India (Emissions including Land-Use Change and Forestry, 2017). It should be highlighted that switching to Renewable Energy more specific Solar as a Substitute of Conventional Energy is the best way to make India a power-secured and Self-Reliant country.

Power Sector of India's is one of the utmost simplified and diverse globally. Electricity production from conventional sources includes primarily coal, hydro, oil, natural gas, and nuclear power, most feasible non-Conventional options including solar, wind, and Biogas (includes agricultural and domestic waste). The

electricity requirement risen significantly, and is likely to continue to escalate in the coming future. To meet the country's increasing need for electricity, which requires a substantial increase in the generation of electricity.

India was ranked fourth in May 2018, out of 25 countries in the Asia Pacific area on an indicator that examined their total power. As of 2018, India ranked fourth in wind energy, fifth in solar energy and fifth in renewable energy installed capacity. India came in sixth place on the list of countries that have made major investments in renewable energy, with a total investment of US\$ 90 billion. India is the only G-20 country on track to meet the Paris Agreement's objectives (Power Sector in India, n.d.).

The power sector in India is undertaking a tremendous conversion that has transformed the industry's outlook. The Government of India intent of accomplishing 'Power for All' has rushed the expansion in the country. Both the market and the supply sides are getting more competitive at the same time (fuel, logistics, finances, and manpower).

By 2022, Solar Energy is anticipated to produce 114 GW, with wind power producing 67 GW and biomass and hydropower producing 15 GW.

The renewable energy target has been increased to 227 GW by 2022. The country's total thermal installed capacity was 234.72 GW in FY22 (till May 2021). Total Installed capacity for Renewable, hydro, and nuclear energy are as 95.65 GW, 46.21 GW, and 6.78 GW, respectively.

The said industry attracted US\$ 15.33 billion in Foreign Direct Investment (FDI) between Apr, 2000 and Mar 2021, representing 3% of the total FDI intake into India.

Some of the investments in the year 2021 and developments are mentioned below:

National Thermal Power Corporation Limited (NTPC) in July 2021, announced that it would capitalize Rs. 2-2.5 crore (US\$ 0.27-0.34 million) to expand renewable capacity over the next 10 years (Renewable Energy Industry in India, n.d.).

In July 2021, the company invited bids for an engineering, procurement, and construction (EPC) package, with land development for 500 MW of grid-connected solar projects in India (Renewable Energy Industry in India, n.d.).

In June 2021, NHPC signed a memorandum of understanding (MoU) with Bihar State Hydro-Electric Power Corporation Limited (BSHPCL) to execute Dagmara HE Project (130.1 MW) in the state (Renewable Energy Industry in India, n.d.).

In June 2021, the NTPC has issued a global tender for the installation of a grid-scale battery storage system with a capacity of 1,000-megawatt hours (MWh). The plan entails the design, construction, and operation of such a system, as well as a co-investment partnership (Renewable Energy Industry in India, n.d.). GE Renewable Energy announced in April 2021 that it would supply CleanMax with 42 units of 2.7-132 onshore wind turbines, totalling 110 MW, for onshore wind hybrid projects (Renewable Energy Industry in India, n.d.).

Actis LLP, a private equity firm, announced plans to invest US\$ 850 million in two green energy platforms in India in March 2021. The first platform, according to the company, would focus on establishing grid-connected solar and wind power parks, while the second will cater to the commercial and industrial sectors (Renewable Energy Industry in India, n.d.).

TOTAL Energies purchased a 20% interest in Adani Green Energy in January 2021. TOTAL also bought a 50% stake in Adani Energy Limited's 2.35 GW portfolio of operating solar facilities as part of the acquisition. The total value of the transactions was US\$ 2.5 billion (Renewable Energy Industry in India, n.d.). The Government of India and the Asian Development Bank (ADB) agreed a US\$ 100 million lend in December 2020 to modernise and enhance the power distribution infrastructure in Bengaluru, Karnataka, in order to improve the quality and reliability of electricity delivery (Renewable Energy Industry in India, n.d.). Kerala State Electricity Board Limited (KSEBL) Sent a Letter of Award (LOA) in January 2021 to Tata Power to develop a 110 MW solar project. Tata Power's renewable capacity will rise to 4,032 MW as a result of this agreement, with 2,667 MW operational and 1365 MW under construction, together with 110 MW under this (Renewable Energy Industry in India, n.d.).

2. RESEARCH METHODOLOGY

In this research paper, positive research philosophy to collect the existing and interpretation of the same

data to explain the importance of Renewable Purchase obligation in India and in what ways Renewable Energy Certificate will enhance the purchase of electricity generated from renewables. The objective of this research is to check the efficiency of RPO in the existing renewable energy systems, and for that RPO mandates data is being studied to project the efficacy of RPO. This study adopted a deductive approach to the analysis of existing data on RPO. Furthermore, the obligations and their noncompliance are also discussed being discussed to make a comprehensive study of legal cases. Also, the quantitative data from secondary sources have been analyzed such as books, articles pertaining to RPO and REC, apart from that newspapers articles, policy papers, and available statistics to understand it better.

3. LITERATURE

The population of India and their energy demand at present is increasing day by day and the international commitments towards sustainable development to mitigate climate change may only be achieved through generating more and more electricity through renewables and may achieve the target of 175 GW by 2022(Now 227GW). Further, the international alliance may also help in the shifting from Non-Renewable to Renewable Energy because the developing countries don't have the proper resources and technology to generate electricity from solar (Usha Tandon, 2018).

To Understand the current status of Renewable Energy in the Indian energy market reveals that it is transforming in to cleaner forms of power generation. Countries like India, which are located in the global sunbelt, have enormous potential to use renewable energy sources, particularly solar energy (Poudineh et al.) have collectively addressed the issues that are hurdles in the deployment of RE in these countries.

The Prime minister of India is having an approach of one sun one world and one grid (OSOWOG) during the COP-26, which requires more and more development in the solar energy sector, and also accelerating clean energy technology and deployment (One Sun, One World One Grid, 2021). The main issue in this is that it is available in the daytime only and depends on atmospherically. The main motive behind this is to invest more in the solar and wind energy sector to support the global grid. This main issue of this renewable energy may

be overcome by the global grid or maybe sharing of energy through collaboration in the countries where one country has a day and the other has a night (One Sun, One World One Grid, 2021).

4. STRATEGIC INITIATIVES TAKEN BY GOVERNMENT OF INDIA

Strategic initiatives by the Government of India's have led to incredible growth and expansion of the Renewable Energy (RE) sector in the country. The Government of India's Ministry of New and Renewable Energy (MNRE) and State Nodal Agencies (SNAs) of the states have already implemented adequate policy initiative to meet the aim of 175 GW from renewable energy till 2022, with alone capacity of 100 GW from solar.

India acquiesced its 'Intended Nationally Determined Contributions' (INDCs) to the United Nations Framework Convention on Climate Change (UNFCCC), pledging to curb the secretions of toxics Substance's intensity of its GDP by 33 to 35 percent by 2030, compared to 2005 levels, and to attain approx. 40% collective electric power installed capacity from non-fossil fuel-based energy resources by 2030.

The International and National initiatives have proven to be a major promoter for energy security and a reduction in reliance on conventional fuel sources. It might be a step toward fulfilling the INDCs, and so contribute to the global effort to address climate change concerns. In accordance with the Electricity Act of 2003.

The requirement of the License to generate power is removed by the Act and leads to the opening of generation, distribution, and transmission of electricity in the states. This act also acquaints with the idea of Open Access and an option for buyers. The usage of Renewable Energy (RE) was first endorsed in the act as a part of the National Electricity Policy (NEP) (Ajit Ranade, 2018).

4.1 Solar Energy Under NAPCC

Following the NEP in 2005, the Government of India established the National Action Plan on Climate Change (NAPCC) in 2008 to mitigate change in climate and temperature rise worldwide. This strategy was to be carried out in eight missions. The National Solar Mission is the first of the eight missions, and its goal is to escalate the development and usage of more solar Radiation for electricity generation.

Certain goals were specified to achieve. RPO was explained in the E- Act, 2003 and the National Tariff Policy of 2006, and it was executed by the state governments. The RPOs Mandates on Big power consumers to source a set percentage of their electricity demands from renewable sources like solar and wind.

This obligation is likely a catalyst to enhancement to the Renewable Energy Sector, which generates demand and leads to production and development of energy through renewables.

As of 2021, solar energy and wind energy capacity of nation are 42GW and 39.25GW, respectively.

5. A FATHOMLESS DISCUSSION ON RENEWABLE PURCHASE OBLIGATION

According to Section 86(1) (e) of the E-Act, 2003 ("EA 2003") and the NTP 2006, RPO is explained as, 'A mechanism by which obligated entities are compulsory to buy a firm ratio from the total consumption of power from Nonconventional energy sources like solar, wind, etc., This purchase is characterized in to two as Solar RPO and Non-Solar RPO likely.

In other words, the RPO is, to purchase of minimum proportion of electricity from total consumption in the distribution area where licensee have to buy electricity from the renewable energy sources which is fixed by state electricity regulatory commission. The SERCs specified three groups, who is covering the whole customer base of the country in order to meet each state's RPO targets:

- Power distribution companies (DISCOMs);
- Open Access traditional power buyers: those who get power from outside sources such as power exchanges (IEX/PXIL), traders, or bilateral agreements;
- Consumers who generate conventional power for self-use (captive generation).

Source: Fig: 1(Central Electricity Authority, Annual Report 2019-2020.)

These obligations are known as **Renewable Purchase Obligations (RPOs)**.

5.1 A brief schema after Paris Agreement way forward for Renewable

The essential foundation of the RPO system is India's signing of the Paris Agreement, in which it committed to reducing carbon emissions by using clean fuels and increasing the use of renewable energy for power generation on a worldwide scale. The Ministry of Power (MoP) has announced the RPO trajectory objective for the year 2022. With these specific targets, the UPA government in 2015 quite dramatically revised upward set of 175 GW from Renewable Energy by 2022 set by the MOP and including solar energy capacity of 100 GW. The Obligated Entities must adhere to the solar and non-solar electricity targets in the same way of all States and Union Territories.

With the amendment of the Tariff Policy in January 2016, State Electricity Regulatory Commissions (SERCs) are essential to preserve a minimum percentage of total energy consumption, excluding hydropower, for solar energy purchase by March 2022 or as notified by the Central Government from time to time. The GOI unveiled the Long-Term Growth Trail for RPOs for solar and non-solar energy in all states and union territories in July 2018.

5.2 Year Wise Data Relating to Electricity Generation from Conventional and Non-Conventional Sources

Year-wise Electricity Generation from Renewable Energy Sources and Non-renewable Energy sources for the following years from 2014-2015, 2015-2016, 2016- 2017, 2017-2018, 2018-2019 & 2019-2020 and the total percentage of generation from RE for the abovementioned period are given below:

Percentage of Generation from RE.

Years	Non-RES Generation (MU)	RES Generation (MU)	Total Generation (MU)	% Of R.E w.r.t total Generation
2014-15	1048672.90	61719.25	1110392.15	5.56
2015-16	1107822.28	65780.86	1173603.14	5.61
2016-17	1160140.90	81548.21	1241689.11	6.57
2017-18	1206306.20	101839.48	1308145.68	7.79
2018-19	1249336.70	126759.09	1376095.79	9.21

2019-20	1250783.91	138337.02	1389120.93	9.96
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Every year we can see the growth in a generation but still, we cannot depend solely on Non-Renewable Energy Sources.

5.3 State Wise Data on Rpo in Renewable Energy

“The Indian landmass receives one of the highest levels of solar energy in the world, which still remains untapped and underutilized,” said Bimal K Bhattacharya. Every state has their own capacity of generation as per their available resources, and generation of electricity is depending on the environmental conditions and the availability of Solar radiation. The assessments of solar radiation help in the selection of sites for the construction of new large-scale solar-based power generation systems, as well as the computation of solar energy rooftop potential in urban and rural areas. Following Kutch in Guj, Hayathnagar (TG) was discovered as getting the second greatest solar energy radiations,

followed by Srihari Kota (A.P), Jaisalmer (Raj.), and Mahendragiri (Ori.).

Some parts of the nation have very high potential on account of solar radiation like Solar energy radiation to high energy available in some parts of central and western India like Chhattisgarh with efficient parts in Guj., Raj, M.P., Kar., and T.N.

High Radiation Solar energy can be seen in the North-eastern Hills areas, like Mizoram, and some parts of Tripura, but some Lesser solar energy also can be seen Over the North Indian River plain also known as Indo-Gangetic plain due to Season change in which cloud covers, dense fog, and sometimes haze during the winter season, and in July due to rainy season. And low energy in the Western Himalayan ranges of the nation.

The reason of State-wise data on RPO is different in every state is due to the geographical conditions mentioned above. A list of state-wise data for the following years on RPO is mentioned below.

Table: Source

State Wise Data of RPO in India.

Sl. No	State	RE Technology	2017-18	2018-19	2019-20	2020-21	2021-22
1	Andhra Pradesh	Non-Solar	6%	7%	8%	9%	10%
		Solar	3%	4%	5%	6%	7%
		Total	9.00%	11.00%	13.00%	15.00%	17.00%
2	Arunachal Pradesh (align with MoP trajectory)	Non-Solar	9.50%	10.25%			
		Solar	4.75%	6.75%			
		Total	14.3%	17%	0.00%	0.00%	0.00%
3	Assam	Non-Solar	5.00%	6.00%	7.00%	8.00%	9.00%
		Solar	4.00%	5.00%	6.00%	7.00%	8.00%
		Total	9.00%	11.00%	13.00%	15.00%	17.00%
4	Bihar	Non-Solar	5.50%	6.00%	6.75%	7.50%	9.00%
		Solar	2.25%	3.25%	4.75%	6.75	8.00%

		Total	7.75%	9.25%	11.50%	14.25%	17.00%
5	Chhattisgarh	Non-Solar	7.00%	7.50%	8.00%	8.50%	
		Solar	2.00%	3.50%	5.00%	6.50%	
		Total	9.00%	11.00%	13.00%	15.00%	
6	Delhi	Non-Solar	9.50%	10.25%	11.00%		
		Solar	4.75%	6.75%	8.75%		
		Total	14.25%	17.00%	19.75%		
7	JERC (Goa & UT)	Non-Solar	4.20%	5.40%	6.80%	8.00%	9.00%
		Solar	2.50%	3.60%	4.70%	6.10%	8.00%
		Total	6.70%	9.00%	11.50%	14.10%	17.00%
8	Gujarat	Non-Solar	8.25%	8.45%	8.80%	8.90%	9.00%
		Solar	1.75%	4.25%	5.50%	6.75%	8.00%
		Total	10.00%	12.70%	14.30%	15.65%	17.00%
9	Himachal Pradesh	Non-Solar	9.50%	10.25%	10.25%	10.25%	10.50%
		Solar	4.75%	6.75%	7.25%	8.75%	10.50%
		Total	14.25%	17.00%	18.00%	19.00%	21.00%
10	Jammu and Kashmir	Non-Solar	7.25%	8.00%	8.75%	9.50%	9.50%
		Solar	1.25%	1.50%	1.75%	2.00%	3.00%
		Total	8.50%	9.50%	10.50%	11.50%	12.50%
11	Jharkhand	Non-Solar	4.00%	4.50%	5.00%		
		Solar	3.75%	5.50%	6.55%		
		Total	7.75%	10.00%	11.55%		
12	Karnataka	Non-Solar					
		Solar					
		Total					
13	Kerala	Non-Solar	6.00%	7.00%	5.75%	6.05%	6.35%
		Solar	1.50%	2.75%	0.25%	0.25%	0.25%

		Total	7.50%	9.75%	6.00%	6.30%	6.60%
14	Madhya Pradesh	Non-Solar	7.00%	7.50%	8.00%	8.50%	9%
		Solar	1.50%	1.75%	4.00%	6.00%	8.00%
		Total	8.50%	9.25%	12.00%	14.50%	17.00%
15	Maharashtra	Non-Solar	10.50%	11.00%	11.50%		
		Solar	2.00%	2.75%	3.50%		
		Total	12.50%	13.75%	15.00%		
16	Manipur	Non-Solar	2.00%	2.50%	3.00%	3.00%	3.00%
		Solar	5.50%	8.00%	9.00%	10.00%	10.50%
		Total	10.00%	12.70%	14.30%	15.65%	17.00%
17	Mizoram	Non-Solar					
		Solar					
		Total					
18	Meghalaya	Non-Solar	2.07%	3.25%	4.00%	4.75%	
		Solar	0.43%	0.75%	1.00%	1.25%	
		Total	2.50%	4.00%	5.00%	6.00%	
19	Nagaland	Non-Solar					
		Solar					
		Total					
20	Orissa	Non-Solar	4.50%	5.00%	5.50%		
		Solar	3.00%	4.50%	5.50%		
		Total	7.50%	9.50%	11.00%		
21	Punjab	Non-Solar	4.20%	4.30%	5.50%	6.50%	8.00%
		Solar	1.80%	2.20%	4.00%	5.00%	6.50%
		Total	6.00%	6.50%	9.50%	11.50%	14.50%
22	Rajasthan	Wind	8.20%	8.75%	8.75%	8.75%	8.90%
		Biomass	1.30%	1.50%	1.50%	1.50%	1.60%

		Non-Solar	9.50%	10.25%	10.25%	10.25%	10.50%
		Solar	4.75%	6.75%	7.25%	8.75%	10.50%
		Total	14.25%	17.00%	17.50%	19.00%	21.00%
23	Tamil Nadu	Non-Solar	9.00%				
		Solar	5.00%				
		Total	14.00%				
24	Tripura	Non-Solar	11.50%	12.25%	13.00%		
		Solar	1.50%	1.75%	2.00%		
		Total	13.00%	14.00%	15.00%		
25	Uttarakhand	Non-Solar	9.50%	10.25%	11.00%	11.75%	12.50%
		Solar	4.75%	6.75%	7.00%	7.50%	8.00%
		Total	14.25%	17.00%	18.00%	19.25%	20.50%
25	Uttar Pradesh	Non-Solar					
		Solar					
		Total					
26	West Bengal	Non-Solar	7.40%				
		Solar	0.60%				
		Total	8.00%				
27	Sikkim	Non-Solar	9.50%	10.25%			
		Solar	4.75%	6.75%			
		Total	14.25%	17.00%			

It is concluded that out of 27 states of India, only a few states are in compliance with the Renewable purchase obligation otherwise some states who is having the potential didn't purchase electricity from renewables. MNRE in its guidelines recommended the constitution of a monitoring committee in every state to observe the compliance of RPO by entities. The monitoring committee has to maintain data of compliance as well as the data of those entities

which may not be covered under the REC mechanism or have an onsite captive generation of electricity.

The electricity act also empowers SERCs to Impose Penalties on Noncompliance U/S 142. Most of the States had an Authorised state agency for preparing a quarterly report to their respective SERCs, mentioning compliance of RPO and its shortfalls. on the basis of data received from the monitoring committee,

SERCs can impose and collect penalties from entities for the shortfall.

6. INTERPRETATION OF RPO OBLIGATION THROUGH JUDICIAL PRONOUNCEMENT IN INDIA

Based on few Recent judicial pronouncements on RPO, there is a need to examine whether the Distinction of Section 86(1)(e) has been successfully applied or interpreted or requires any clear guidelines. In the case of Hindustan Zinc Ltd. V. Rajasthan Electricity Regulatory Commission [2015] Civil Appeal No. 4417, the Apex Court discussed the applicability of RPO on distribution companies, while disposing the said petition it was stated that the regulations formulated by RERC are to be to achieve the constitution fundamental of DPSP Under Article 48-A read with Article 51A(g) of the constitution of India and is harmony with the Electricity Act, and the NEP 2005 and the NTP 2006 to achieve the preamble as to promotion of Electricity from Renewable Sources against Conventional Sources. Further, RERC is being empowered to formulate regulations U/S 181(1) of the 2003 Act.

Apex court also upheld the decision of High Court on penalty Imposition under regulation 9 of the 2010 regulations on Hindustan Zinc and stated that it is not in the domain of Tax, but to achieve the objective of RPO noncompliance and, the regulations cannot in any manner be violation of Fundamental Rights protected under Article 14 and 19(1)(g) under the Constitution of India. From this case it was concluded that the Discoms should fulfil the mandates about RPO targets otherwise the penalty may be imposed. Similarly, in the case of JSW Steel Limited V. Maharashtra Electricity Regulatory Commission [2020] APPEAL No. 176 of 2020 & IA No. 1298 on 2 August, 2021, the Appellant is one of the leading manufacturers of Steel in India and owns a steel manufacturing unit at Dolvi in the state of Maharashtra. For the purpose of running this steel manufacturing unit, the Appellant has established Cogeneration Captive Power Plant at its Dolvi unit;

- i. Gas Expansion Turbine (Differential Pressure based): 14 MW; and
- ii. Waste-gas based co-generation plant: 53.5 MW.

The Cogeneration Captive Power Plants harness the heat capacity, which emerges in the blast furnace gases and exhaust gases generated during the process of steelmaking to run the turbines and also generate electricity. Therefore, the Appellant contend that there is no consumption of any fossil fuel in the CPPs to generate electricity as contended by the Respondents. There is no dispute that the Appellants plant is recognised as a Cogeneration CPP in terms of E-Act, 2003. There is no dispute pertaining to the proceedings of the Respondent Commission at the instance of Appellant in September 2013. Reference to these proceedings is relevant for the purpose of understanding the dispute now raised before us.

6.1. Contention Raised by the petitioner before the respondent commission are as:

The Appellant herein approached the Respondent Commission seeking a declaration that its Dolvi unit requires to be exempted from the compliance of RPO targets under MERC (Renewable Purchase Obligation, its Compliance and Implementation of Renewable Energy Certificates Framework) Regulations, 2010 (hereinafter referred to as MERC RPO Regulations, 2010).

6.2. Order passed by respondent commission

By Commission order dated 12.04.2018, Judgment in APPEAL No. 176 of 2020 Regulation 11.3 makes an Obligated Entity which does not fulfil its RPO liable to Regulatory Charges as specified in Regulation 12.1, with the following exception: Provided further that captive user(s) consuming power from grid connected fossil fuel-based co-generation plants, are exempted from applicability of RPO target and other related conditions as specified in these Regulations.

6.3. Contention Raised by the petitioner before the APTEL are as;

the Appellant has preferred this appeal praying for the following reliefs:

- 6.3.1.** “set aside the Impugned Order dated August 29, 2020 passed by the Respondent No. 1 in Case No. 335 of 2019 and the consequences flowing therefrom;

6.3.2. hold and declare that the Appellant is exempt from the RPO targets in relation to its Dolvi Unit for the period FY 2010-11 to FY 2015-16 (i.e., the period covered by the MERC RPO Regulations, 2010) and also for the subsequent years (i.e., the period covered by the MERC RPO Regulations, 2016 and MERC RPO Regulations, 2019) as long as the cogeneration is in excess of presumptive RPO targets, dehors the provisions of the relevant regulations;

6.3.3. hold and declare that the Appellant's Dolvi Unit is entitled to set-off its presumptive RPO targets qua the Open Access consumption against the electricity generated and consumed from its cogeneration plants irrespective of the type of fuel utilized in such plants; and

6.3.4. pass such further orders as this Hon'ble Tribunal may deem just and proper in the circumstances of this case."

6.4. APTEL conclusion on the findings

Summary of our conclusions is given below: -

6.4.1. The bare reading of Section 86(1)(e) does not show the exact meaning of co-generation as cogeneration from renewable sources only. The meaning of the term may be understood as mentioned under Section 2 (12) of the Act.

6.4.2. with the interpretation of Section 86(1)(e), generators are categorically divided in to two;

6.4.2.1. Co-generators, or

6.4.2.2. Generators of electricity through renewable sources of energy.

It is clear from this Section that both these categories must be promoted by the State Commission by directing the distribution licensees to purchase electricity from both of these categories.

6.4.2.3. The RPO mandates on the co-generator to obtain electricity from renewable energy would rout the object of Section 86 (1)(e).

6.4.2.4. Section 86(1)(e) is that they are different and they are required to be promoted together and as mandating of RPO on one in

preference to the other is completely conflicting to the legislative interest.

6.4.2.5. Under the Electricity Act, both Renewable Source of Energy and Cogeneration Power Plant, are equally promoted for the purpose of the act, Judgment in APPEAL No. 176 of 2020 by State Commission through the proper methods and viable directions, in view of the fact that Cogeneration Plants, who has many benefits for environment and to the public at large, are to be eligible to be treated like other renewable energy sources.

6.4.2.6. In the view of this fact, the intention of the legislature is clearly to promote cogeneration irrespective of the nature of the fuel used for such cogeneration and not generation from renewable energy sources alone.

In view of the facts and circumstances, as stated above, this APTEL held that, the Appellants herein, being co-generation plants, are not under a legal obligation to purchase power from renewable sources of energy in order to meet their Renewable Purchase obligation in the interest of justice and equity.

These two cases are so much of important while interpreting the RPO mandates on Discoms, Obligated entity, Captive User, and Cogeneration plants, Both the Apex court and Appellate tribunal are on the same opinion while interpreting the Section 86(1)(e) in terms of mandate of RPO on Discoms, Obligated entity, Captive User, and Cogeneration plants and provide relaxation on mandates imposed by SERC to protect the legislative intent to promote Cogeneration.

6.5. A postulation towards Renewable Energy Certificate Mechanism

Some Indian states, such as Guj., Raj., TG, and T.N, have a lot of solar energy potential, and the state commissions have set higher RPOs (Energyhive, n.d.). In fact, even above the RPO level set by the State Commissions, there are ways to tap into the potential in such states. The high cost of generation from renewable energy sources, on the other hand, discourages local distribution licensees from acquiring electricity generated from renewable energy sources over the RPO level set by the State Commission. The concept of a Renewable Energy Certificate

(REC) takes on new meaning in this scenario. (Energy hive, n.d.)

The objective of this perception is to overcome the imbalance between the availability of renewable energy sources and the need for obligated businesses to fulfil their RPO targets. In light of the foregoing circumstances and in order to address regional constraints, CERC notified the Central Electricity Regulatory Commission Regulations, 2010 on January 14, 2010, introducing the REC modalities in the Indian Electricity Sector.

As per the objectives Renewable energy generators might choose between;

1. “Selling the power at a preferential tariff, and”
2. “Selling the power, at a conventional purchase rate (average power purchase cost or APPC), and the environmental attributes separately.”

RECs, which would be issued by the National Load Dispatch Centre (NLDC), might be used to trade environmental qualities. This incentive system would eliminate geographic barriers and make interstate RE transactions easier. The REC framework was supposed to give a boost to the country's RE capacity expansion.

Block Diagram of REC Concept



RE generators will have two options:

- i) either to sell the renewable energy at **preferential tariff or PPA**
- or
- i) sell **electricity generation and environmental attributes** associated with RE generations separately.

The **environmental attributes can be exchanged** in the form of Renewable Energy Certificates (REC).

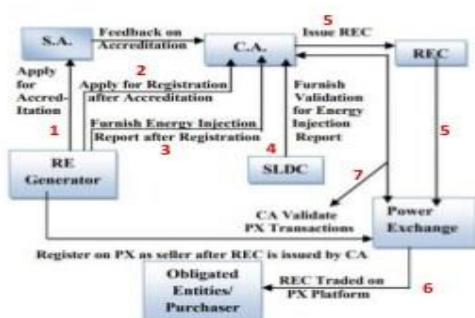
Figure: Block Diagram of REC Concept (S.K. Soonee and etal, n.d.)

One REC is equal to one megawatt-hour of energy pumped into the system. RECs were originally valid for 365 days from the date of

issuance, but CERC extended it to 1095 days. RECs are categorised in two ways:

- Solar certificates are issued to qualified entities for solar-produced power;
- whereas non-solar certificates are issued for electricity generated from renewable energy sources other than solar.

REC Implementation Mechanism



Step-wise Implementation:

1. RE generator (power plant) will apply for **Accreditation** with State Agency (S.A.)
2. After receiving accreditation, it will apply for **registration** with Central Agency (C.A.), i.e. NLDC
3. After registration, RE generator will provide **Energy Injection report** (prepared by SLDC on monthly basis) to C.A.
4. The SLDC will provide its **validation (affirmation)** on the Electricity Injection report
5. Based on both, the C.A. will issue RECs and send it to a **power exchange** for trading
6. During trading the **REC will be bought** by an Obligated Entity
7. The C.A. will **validate all the transactions** made in during trading in the Power Exchange

Figure: REC implementation Mechanism (S.K. Soonee and etal, n.d.)

REC is recognised with other names in different countries like United Kingdom, United States, Australia, Japan, Netherlands, Denmark & Poland, RECs as Green Tags, Renewable Obligation Certificates or Tradable Renewable Certificates Internationally, this notion has been

7. CORDIAL RELATION BETWEEN RPO AND REC.

The REC structure is based on market that promotes R.E Sources, and the progress of the electricity market, resulting in the country's long-term development. The REC mechanism was created to solve the disconnect between the supply of renewable electricity and the obligation of obliged organisations to satisfy their RPO by purchasing RE in the form of REC from faraway locations. India, like many other developed and developing countries, supports the sale of renewable electricity's green features apart from its physical composition in order to achieve affordability or grid parity.

In the energy market, this mechanism helps in the development of remote locations cost-efficient. Setting RPO targets, provisions for a surcharge if RPO targets are not met, and a way to satisfy RPO through certificate trading are all part of the framework. On a National Power Exchange, the RE generator can sell electricity and associated RECs to the distribution firm for an Average Power Purchase Cost (APPC). A distribution business or other obliged organisations might purchase RECs to meet its RPO. REC trading began in India in March 2011 on the Indian Energy Exchange (IEX) and Power Exchange of India (PXI). Both

used to create a stable and legitimate market for selling the green Attributes of power in order to give renewable energy generators with a new source of revenue.

exchanges were established with the goal of executing day-ahead and term-ahead power trading.

Power Market Regulations (2010) organised Exchange operations. Contributors or RE producers' approach their SNAs and SLDCs to obtain registration and accreditation in the exchanges.

7.1. Lacunae In The Execution Of Rpo On Discoms

7.1.1 Failure to tap investment potential of the middle class - Community-based projects and rooftop solar have received less attention in the policy. In spite of initiatives in terms of Feed-In Tariffs, and state Government policies, roof-top solar has seen little progress on the ground level due to implementation issues. Hence, the government should try to spread awareness about technical specifications and the economic viability of such projects and back that with subsidies from MNRE. Public buildings should install rooftop solar and set the example for corporate and household buildings. In terms of community projects, the German model can be followed where funding for wind projects is procured from the community. Community biogas plants are also an economically viable option.

7.1.2. Sustainability of projects: With solar power tariffs rapidly dwindling to the sub-3-rupee regimes, there is a question of profitability and sustainability of such installations in the long run, with advancement in technology providing higher efficiency in the future. Hence, decentralized off-grid projects can be a better solution in short term.

7.1.3. Failure of Discoms to adhere to RPO: Due to the poor health of DISCOMs, they are not willing to purchase renewable power which is still at a high cost. States should be nudged to take up UDAY (Ujjwal DISCOM Awas Yojana) scheme and heal Discoms and addressing fundamental problems like AT&C losses and power theft to help them pursue RPOs.

7.1.4. Funding: Procuring funding for renewable projects remains difficult for corporates due to the absence of a proper bond market. SEBI must strive to provide a friendly environment for the growth of the green bond market in India. India has vast potential in renewables like solar and wind. Addressing these lacunae can help the country achieve its target of 175 GW by 2022 under the Paris Agreement.

7.1.5. Awareness programs: To increase the number of stakeholders/ players at a large scale is a challenge to the government. MNRE has conducted a number of workshops and conferences to educate the various Stake Holders, Some State Agencies like SERC along with the project developers relating to the regulatory procedures and the technical domain of the REC scheme to felicitate the process. Capacity addition of Renewables: to Encourage industrialists for installation of more RE Generation facilities is a basic requirement for the growth of the REC Mechanism. With more and more development in this Sector with an adequate and robust transmission system. It is important to maintain a secure and efficient grid operation by creating a separate Renewable Regulatory Fund (RRF) are required to tackle various generation sources.

7.1.6. Audit Compliance by Auditors: auditors involved in Compliance under REC Mechanism are crucial to make sure truthfulness and righteousness of the entire

mechanism at a maximum level along with transparency.

8. CONCLUSION

In this article the balance between the two, RPO and REC has been made, and with the current growth of REC mechanism in India. A brief introduction and the relevant characteristics of India's policy and framework on RE are being discussed and thereafter a brief mentioning of RPO and Fixed targets of every state is analysed to indicate REC mechanism in Indian market. RPOs is the Simple and implied subsidy provided for the development of RE power.

There are some judicial pronouncements on which the APTEL and Apex court is of the opinion to relaxed some captive users to obligated with RPO targets which is also one of the aspects in failing of RPOs in India. This is happened due to uncertainty and ambiguous language used in the Act which require amendment for the promotion of RPOs in India. Also, the truth is, recently organized auctions revealed that grid parity in solar energy is being achieved. In the solar auction, the most recent winning bid was Rs. 2.44/-. Because the state government making the land accessible and the offer being based on a long-term power purchase deal backed by a state government guarantee. The fact is that solar has become commercially feasible, but we are still propping it up with RPO objectives that we aren't even meeting.

India is having a very high vision of NAPCC, its international promises for action to accomplish counter to climate change are tremendous and it is on the way to achieve its goals by reducing carbon emission. Some states give their contribution in RPOs targets and the rest of the states must analysis their policies on RPO, Tax Incentives, etc. to surge their involvement in attaining the targets of NAPCC. Currently, only a small part of the assessed Targets is enumerated beneath the mechanism of REC. This situation is also enlightened by Amending the current policy regime and anatomy of the market to achieve the targets from RE for REC. The technology in the said sector is high in potential but not exhausted properly to attain desire results. But we cannot neglect the fact that the recently given directives by MNRE on the Solar energy sector about the REC mechanism have been pervading positive changes in this direction.

This study also comes out with some recommendations which may lead to the effective and efficient working of the current REC market in India, and also demonstrates about the portfolios in RE development under currently mounted and listed potential are less diverse portfolio than RE. Hence, it is also experiential that the market of REC Aids eclectic variety of usual sizes of RE Power plant. But just like, ‘Rome wasn’t built in a day’ we have to re-examine our policy and should give relief to the power industry.

9. RECOMMENDATIONS

However, with some of the recommended ways it can be solved:

9.1. Net-Metering system can be introduced in a rapid pace by state utilities to encourage investments in roof-top solar.

9.2. Prices remain a very important issue for a middle-class family. If “inclusive energy access” has to facilitate then this is the key factor on which attention can be centered upon.

9.3. Access to the Green energy corridors.

9.4. RPO monitoring should improve to catch defaulters.

9.5. To pass a Separate Act by the Legislature for the Renewable Energy Sector and till then Existing Policies should be implemented Effectively.

9.6. Considering all stakeholders during certain phases like land acquisition.

9.7. Building an energy market for the consumers and states too.

9.8. The cost incurred in renewable energy is high as compared to conventional sources like oil, gas, petrol, etc. This is because of the high cost of technology used in the sector, which may be resolved by proper R&D, innovation, and availability of equipment used in the sector by domestic supply.

However, India has been acquiring lots of energy fronts. With time, recognition has also been done but lack of proper implementation of policies has resulted in the backwardness of the country regarding clean energy which now has to be resolved as soon as possible.

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