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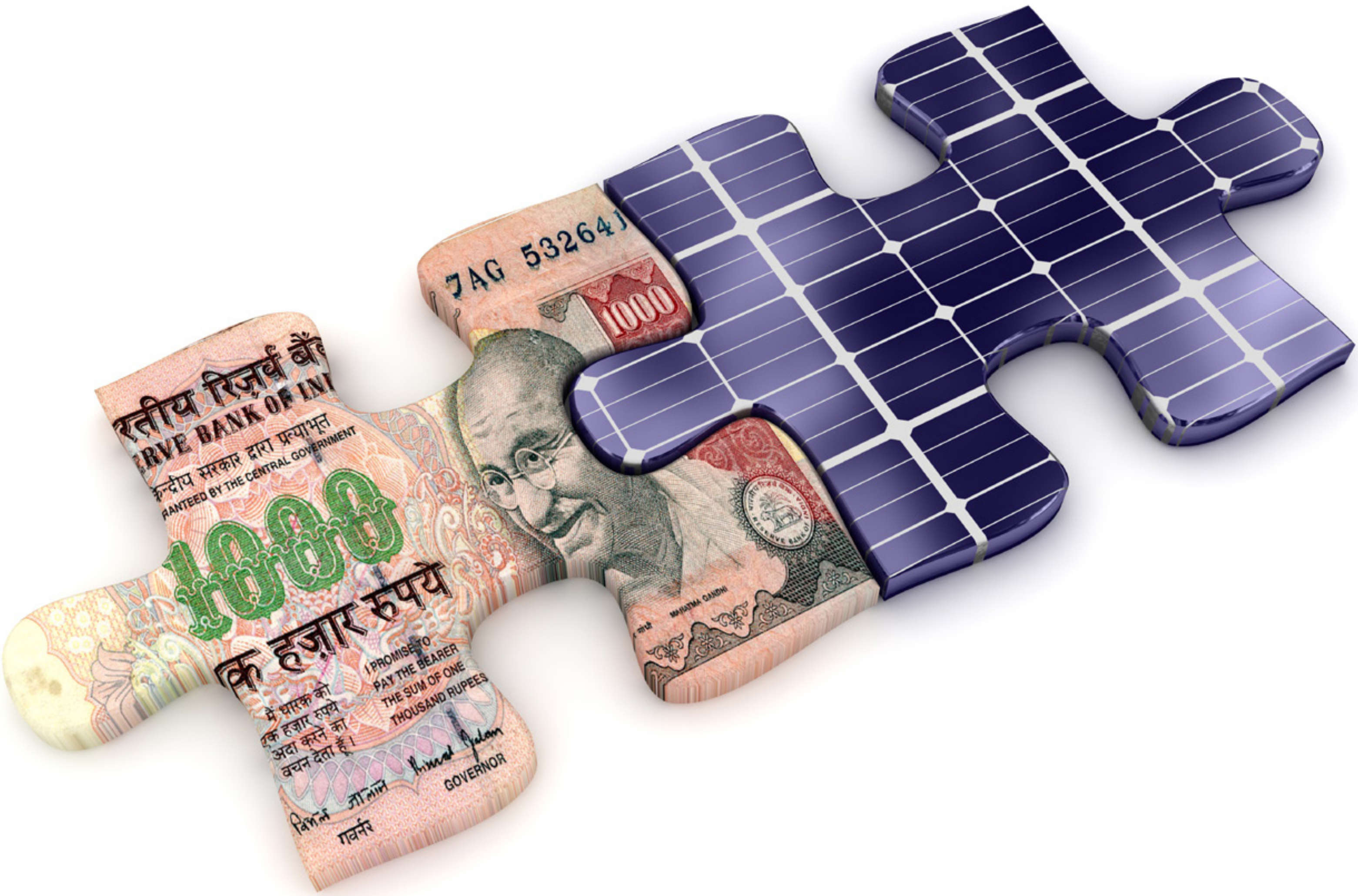
Rebooting Renewable Energy Certificates for a Balanced Energy Transition in India

Gagan Sidhu and Saloni Jain

Issue Brief | May 2021



RECs are market-based instruments that allow unbundling of green power. Since their launch a decade ago, RECs worth INR 9,266 crore have been sold on India's two power exchanges.

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ceew.in

Suggested citation

Sidhu, Gagan, and Saloni Jain. 2021. *Rebooting Renewable Energy Certificates for a Balanced Energy Transition in India*. New Delhi: Council on Energy, Environment and Water.

Cover image:

iStock.

Peer reviewers:

Vibhav Nuwal, Co-founder and Director, REConnect Energy; Souvik Biswas, Regional Manager, Indian Energy Exchange; Shruti Bhatia, Head Corporate Communications, Indian Energy Exchange; Karthik Ganesan, Fellow & Director - Research Coordination, CEEW; Vaibhav Pratap Singh, Senior Analyst, CEEW-CEF; and Harsha V. Rao, Research Analyst, CEEW.

Publications team:

Alina Sen (CEEW), The Clean Copy, Aspire Design, and Friends Digital.

Organisations/Initiatives:

The **Council on Energy, Environment and Water** (CEEW) is one of Asia's leading not-for-profit policy research institutions. The Council uses data, integrated analysis, and strategic outreach to explain and change the use, reuse, and misuse of resources. It prides itself on the independence of its high-quality research, develops partnerships with public and private institutions and engages with the wider public. In 2020, CEEW has once again been featured across nine categories in the 2019 Global Go To Think Tank Index Report. It has also been consistently ranked among the world's top climate change think tanks. Follow us on Twitter @CEEWIndia for the latest updates.

The **CEEW Centre for Energy Finance (CEEW-CEF)** is an initiative of the Council on Energy, Environment and Water (CEEW), one of Asia's leading think tanks. CEF acts as a non-partisan market observer and driver that monitors, develops, tests, and deploys financial solutions to advance the energy transition. It aims to help deepen markets, increase transparency, and attract capital in clean energy sectors in emerging economies. It achieves this by comprehensively tracking, interpreting, and responding to developments in the energy markets while also bridging gaps between governments, industry, and financiers.

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CEEW Centre for Energy Finance

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The need for enabling an efficient and timely energy transition is growing in emerging economies. In response, CEEW-CEF focuses on developing fit-for-purpose market-responsive financial products. A robust energy transition requires deep markets, which need continuous monitoring, support, and course correction. By designing financial solutions and providing near-real-time analysis of current and emerging clean energy markets, CEEW-CEF builds confidence and coherence among key actors, reduces information asymmetry, and bridges the financial gap.

Financing the energy transition in emerging economies

The clean energy transition is gaining momentum across the world with cumulative renewable energy installation crossing 1000 GW in 2018. Several emerging markets see renewable energy markets of significant scale. However, these markets are young and prone to challenges that could inhibit or reverse the recent advances. Emerging economies lack well-functioning markets. That makes investment in clean technologies risky and prevents capital from flowing from where it is in surplus to regions where it is most needed. CEEW-CEF addresses the urgent need for increasing the flow and affordability of private capital into clean energy markets in emerging economies.

CEEW-CEF's focus: analysis and solutions

CEEW-CEF has a twin focus on markets and solutions. CEEW-CEF's market analysis covers energy transition–related sectors on both the supply side (solar, wind, energy storage) and demand-side (electric vehicles, distributed renewable energy applications). It creates open-source data sets, salient and timely analysis, and market trend studies.

CEEW-CEF's solution-focused work will enable the flow of new and more affordable capital into clean energy sectors. These solutions will be designed to address specific market risks that block capital flows. These will include designing, implementation support, and evaluation of policy instruments, insurance products, and incubation funds.

CEEW-CEF was launched in July 2019 in the presence of H.E. Mr Dharmendra Pradhan and H.E. Dr Fatih Birol at Energy Horizons.

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Acknowledgments

The authors of this issue brief would like to thank the reviewers – Vibhav Nuwal, Co-founder and Director, REConnect Energy; Souvik Biswas, Regional Manager, Indian Energy Exchange; Shruti Bhatia, Head of Corporate Communications, Indian Energy Exchange Limited; Karthik Ganesan, Fellow & Director - Research Coordination, CEEW; Vaibhav Pratap Singh, Senior Analyst, CEEW-CEF; and Harsha V. Rao, Research Analyst, CEEW, for their valuable comments and suggestions on the brief and on the proposed solutions for the revival of the renewable energy certificates (RECs) market in India.

From CEEW-CEF would like to thank, Rishabh Jain, Manager; Arjun Dutt, Senior Analyst; and Nikhil Sharma, Associate, for their research inputs.

We would also like to thank the Outreach team at CEEW for helping us with the design, publishing, and release of the report.

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"RECs are instruments that can play an important role in balancing the pulls and pressures that are expected to accompany the ambitious roll-out of green power capacity in India. However, their performance to date has fallen far short of their potential. Demand-side limitations are one side of the story. But the supply side will also face challenges if the full demand potential is unleashed. It's time to address both sides and bring RECs back on track."

Saloni Jain
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Saloni tracks and analyses policy and regulatory developments in the clean energy market at the CEEW Centre for Energy Finance.

"The uniqueness of renewable energy certificates lies in their flexibility. Suitable measures to revive India's REC market can go a long way in advancing and balancing both the pace and scale of the energy transition."

Trading in renewable energy certificates (RECs) remains suspended since July 2020 owing to a legal battle with CERC over removal of floor prices for these certificates.

Image: iStock

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Acronyms

APPC	average power purchase cost
CDM	Clean Development Mechanism
CER	certified emission reduction
CERC	Central Electricity Regulatory Commission
COP26	Conference of Parties
DERC	Delhi Electricity Regulatory Commission
DISCOMS	distribution companies
DSM	Deviation Settlement Mechanism
FY	financial year
GTAM	Green Term Ahead Market
GW	giga-watt
HERC	Haryana Electricity Regulatory Commission
IEX	Indian Energy Exchange
JNNSM	Jawaharlal Nehru National Solar Mission
kWh	kilowatt-hour
MoP	Ministry of Power
MU	million units
MWh	mega-watt hour
NAPCC	National Action Plan on Climate Change
NDC	nationally determined contribution
POSOCO	Power System Operation Corporation Limited
PXIL	Power Exchange of India Limited
RE	renewable energy
REC	renewable energy certificates
RPO	renewable purchase obligations
SERC	State Electricity Regulatory Commission
UDAY	Ujjwal DISCOM Assurance Yojana
YTD	year to date

The REC market in India has not reached its true potential. Both demand and supply side limitations need to be addressed to bring the REC market back on track for a balanced clean energy transition.

Image: iStock

Executive summary

Renewable energy certificates (RECs) are market-based instruments that allow the unbundling of green power into two products – a green attribute that can be traded in the form of certificates and the commodity itself, i.e., electricity (CERC 2010). Since their launch a decade ago, RECs worth an aggregate INR 9,266 crore (USD 1.24 billion[1]) have been sold on India's two power exchanges.

RECs play an important supporting and balancing role in India's energy markets, but insufficient demand has plagued them to varying degrees. Although down from a peak of 18.6 million in October 2017, the December 2020 closing balance of 5.1 million unutilised RECs still points to a seven per cent shortfall in demand. Although 99 per cent of REC purchases on power exchanges are done to meet renewable purchase obligations (RPOs), organisations in India, including state discoms, are far from being RPO compliant. In addition, purchases for voluntary reasons are negligible.

Moreover, solar, which forms the centrepiece of India's renewable energy (RE) ambitions, remains vastly under-represented in terms of REC issuances. To date, only 16 per cent of RECs issued to power generators were against solar projects; wind and other renewable energy projects accounted for 84 per cent of REC issuances to power generators.

The participation of distribution companies (discoms) too has remained muted, both in terms of issuances as well as purchases. The fact that RPO-compliant discoms only accounted for 12 per cent of all REC issuances reinforces how far behind discoms as a whole are from meeting their RPO targets. On the other hand, the 5.3 million RECs bought by RPO-shortfall discoms in FY 2020 pales in comparison to the 72.5 million RECs that they should have bought to meet their RPO targets. Leeway granted by the respective state electricity regulatory commissions (SERC) to the discoms under their purview is a key factor contributing to lax RPO compliance.

RECs play an important supporting and balancing role in India's energy markets. RECs worth INR 9266 crore have been sold on India's energy exchanges.

The disruption caused by COVID-19 and the resulting economic shutdowns in 2020 appear to have made RE a priority concern for policymakers, investors, and consumers alike. However, adapting RECs to fundamental changes in the RE ecosystem is more nuanced than merely boosting demand. Muted demand is certainly an issue, but there are challenges on the supply side as well: the current supply of RECs would be just a fraction of what would be required if the full demand potential of RECs was realised

Incentivising RPO compliance and REC purchases, creating regulatory demand for RECs beyond RPO compliance, and promoting voluntary purchasing of RECs as a way for corporates to go green are some demand-side measures that may be considered. At the same time, on the supply side, removing out-of-date conditionalities for REC issuance and a more flexible market design can make RECs more appealing to stakeholders.

Looking beyond India to the international arena, the 26th United Nations Climate Change Conference (COP26) is to be held in Glasgow in November 2021. The future of green energy instruments, including certified emission reductions (CERs), is expected to be a key discussion point at the conference. Given the similarities between RECs and CERs, the international community could take a leaf from India's learnings on RECs when shaping their own roadmap for CERs.

1. Introduction

2020 will forever be remembered as the year of the pandemic. However, it was also the year that the energy transition came into its own. Clean energy managed to decouple itself from traditional fossil fuel-based generation sources in 2020. In the process, it became a mainstream energy option in the minds of investors. All this happened in the backdrop of severe economic disruption at a global level.

Evidence of this is as compelling in India as it is elsewhere. To begin, RE[2]-based generation was far less impacted compared to coal-based generation in the immediate aftermath of the nation-wide lockdown in March in India (CEEW-CEF 2020a). On their part, policymakers stepped up efforts to increase RE

1 INR figures converted to USD in this document at an exchange rate of USD 1 = INR 75

2 From a generation source perspective, RE in India has been traditionally defined by regulators as encompassing solar, wind, biomass, small hydro, and co-generation, with large hydro (>25MW) only recently being included in the definition, but still accounted for separately for installed capacity. Generation sources other than solar & wind comprise a very small portion of installed RE capacity.

deployment despite the sharp fall in power demand (CEEW-CEF 2020b). In fact, new hybrid and round-the-clock (RTC) auctions were introduced to address RE's intermittent generation. Further, a pan-India Real Time Electricity Market was launched to enable a higher quantum of intermittent RE in the grid (PIB 2020). This was followed by the launch of a Green Term Ahead Market (GTAM) to allow for the exchange-based trading of RE (MNRE 2020).

The private sector responded enthusiastically. Tenders for new capacity were oversubscribed and record-setting low tariff levels were achieved both during the lockdown (Mint 2020a) as well as afterwards, when the economy gradually opened up (Mint 2020b). Investors also voted with their wallets, driving up the share prices of RE developers (CEEW-CEF 2020), mirroring a trend seen globally. At the global level, 2020 also saw green bonds cross the USD 1 trillion "cumulative issuances since inception" milestone (BloombergNEF 2020).

In February 2021, the Union Budget 2021–22 laid down a few incentives for enhancing clean energy generation. Capital infusions of INR 1,000 crore (USD 0.13 billion) into the Solar Energy Corporation of India (SECI) and INR 1,500 crore (USD 0.2 billion) into the Indian Renewable Energy Development Agency (IREDA) were announced. These infusions will allow the SECI to float 15 GW of RE tenders every year, and the IREDA will be able to extend additional loans of INR 12,000 crore (USD 1.6 billion), which will attract investments worth billions of dollars in the sector (Verma 2021). Further, the expected launch of the *Hydrogen Energy Mission*

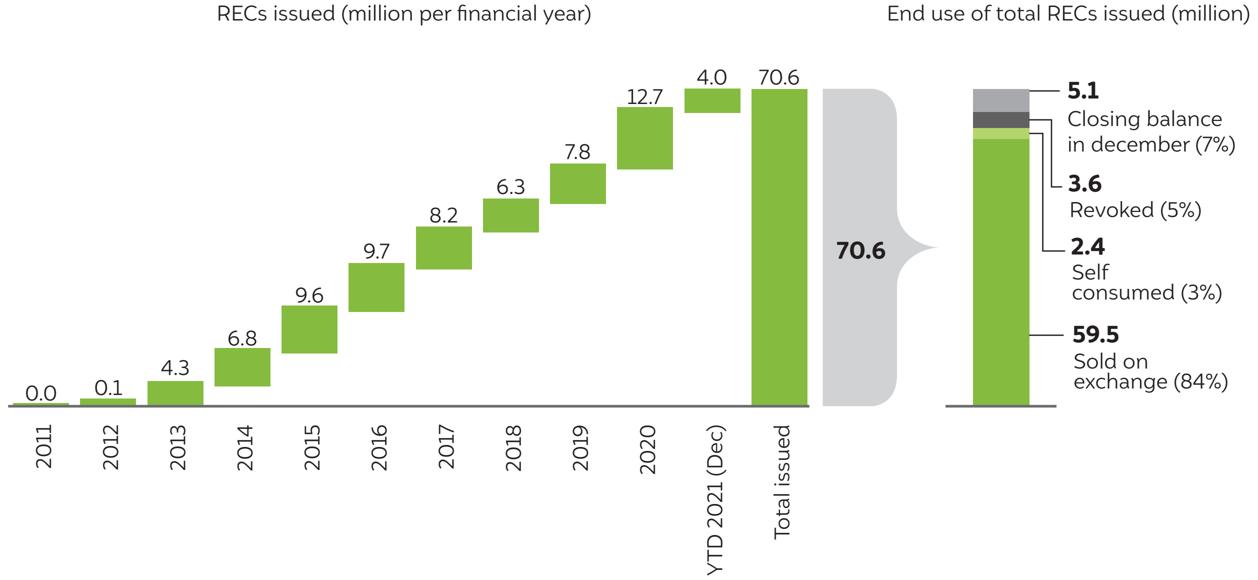
The one dark cloud in the otherwise upbeat picture of clean energy in India in 2020 are RECs whose trading remains suspeneded till date.

to generate hydrogen from green energy resources, is expected to create a massive demand for green energy in the decades to come (Government of India 2021).

The one dark cloud in the otherwise upbeat picture of clean energy in India is the renewable energy certificate (REC). RECs are instruments that facilitate the separation of the green attributes of RE from the underlying electricity generated. They are single-use, meaning they cannot be resold once they have been purchased on the power exchange or retained for self-consumption, which are the only two ways they may be utilised. RECs also have a finite lifespan – currently three years – within which they must be utilised. If unused, they are revoked, resulting in what amounts to an inventory loss for the holder.

The trading of RECs in India's two power exchanges, Indian Energy Exchange (IEX) and Power Exchange of India Limited (PXIL), was suspended in July 2020 because of a legal contestation against a Central Electricity Regulatory Commission (CERC) order that removed floor prices for both solar and non-solar RECs (CERC 2020). Although the Appellate Tribunal for Electricity (APTEL) initially envisaged a four-week suspension in trading, trading had not resumed as of February 2021 due to continuing arbitration. While solar REC trading was suspended in 2017 following a similarly contentious

Figure 1 RECs issued per financial year vs end-use



Source: CEEW-CEF analysis[3]

3 The numbers are based on the data sourced from "Renewable Energy Certificate Registry of India

floor price reduction (Prateek 2018), the current trading suspension has carried on for much longer.

RECs faced other bumps on the road in 2020. Take the revocation of 3.6 million RECs in August, the first such instance since their launch a decade ago. It is important to note that these RECs were not revoked because they had expired, but rather because it was determined that they had been erroneously issued in the first place and the revocation was undertaken to rectify the error (APTEL 2020). More generally, and to allay fears of inventory loss, CERC exercises its power under clause 15 of the REC regulations and extended the validity of RECs from time to time. For example, recently the validity of RECs which expired or were due to expire between April 01, 2020, and September 30, 2020, were extended up to October 31, 2020 (CERC 2020).

As a result, to date, there has never been a revocation of RECs due to lifespan expiry. However, this should not be misconstrued as an indication of robust demand for RECs. This is apparent from the 5.1 million RECs that remained unsold and unconsumed (closing balance) as of December 2020 as shown in Figure 1. Insufficient demand, as represented by the quantum of unconsumed RECs in the closing balance, has plagued this instrument to varying degrees ever since its inception. Although down from a peak of 18.6 million in October 2017, the December 2020 closing balance still points to a 7 per cent shortfall in demand.

The recent introduction of the Green Term Ahead Market (GTAM), a possible competitor to RECs, raises further questions about their future. Under the circumstances, it appears valid to ask, what lies ahead for RECs? What types of course correction or interventions may be required to reboot the REC market and bring it back on track? These are some of the questions this paper seeks to answer, preceded by a brief explanation of the salient features of the REC mechanism.

2. Origin of RECs

RECs were conceived as instruments that would allow the separation of the green attributes of RE from the underlying electricity generated. They act as a bridge between those generating RE and those not in a position to procure sufficient amounts of RE even though they may wish to do so for either voluntary or compliance reasons. Their origin can be traced to regulatory evolution, which commenced a little over 15 years ago, and which had a wide-ranging impact on the Indian power sector.

To begin, section 86.1.(e) of the *Electricity Act (Act), 2003*, mandated that state electricity regulatory (SERC) to specify a quantum of purchase from RE sources. The Act further required SERCs to determine the quantum of RE as a percentage of the total consumption of electricity in the areas covered by each discom under their purview. This quantum of required RE purchase was called a renewable purchase obligation (RPO). RPOs apply to three categories of consumers (obligated entities) – namely, discoms, open access consumers, and captive consumers (Ministry of Law and Justice 2003).

This was followed by the launch of a National Action Plan on Climate Change (NAPCC) in 2008, which constituted eight sub-missions. The plan emphasised increasing the share of RE in the country's total electricity consumption to combat climate change and global warming. In line with this goal, the *National Solar Mission* (later named the *Jawaharlal Nehru National Solar Mission* (JNNSM)), one among the eight sub-missions under the NAPCC, set a target for solar energy deployment in the country (MoEF 2009). It was initially set at 20 GW by 2022, which was later raised to 100 GW in 2015 (MNRE 2019). The scale of RE deployment envisaged in the NAPCC set the course for future revisions in RPO targets across the country, and the development of a suitable mechanism like RECs to promote RE sources (FoR 2008).

Later, section 6.4.(1) of the *National Tariff Policy (Amended), 2011*, took steps towards quantifying RPO percentages. Over the years, notifications on the long-term growth trajectory of RPOs followed. The latest notification, issued in 2018 (MoP 2018), stipulates a 21 per cent RPO for obligated entities by 2021–22, evenly split at 10.5 per cent each, between solar and non-solar. This RPO percentage is to be applied to the total electricity consumed by an obligated entity, excluding its consumption from hydro.

The same section 6.4.(1) of the amended policy also endorsed the idea of RECs. Their use was proposed as a way to balance the availability of RE resources in certain states on the one hand, with the desirability of having the purchase of RE take place more or less evenly across the country on the other.

> **5.1 million RECs remain unsold as of December 2020. Although down from a peak of 18.6 million in 2017, the December 2020 closing balance points to a 7% shortfall in demand.**

In the meanwhile, the working group constituted by the Forum of Regulators (FoR) in 2008, to evaluate and address policy issues concerning renewables, reiterated the need to develop a facilitative framework like the REC mechanism to address challenges related to connectivity and inter-state exchange of power. It observed that such a mechanism can go a long way in enabling states to meet their RPO obligations while also encouraging developers to set up generation facilities at optimal locations (FoR 2008). As a result, regulations specifically pertaining to RECs were eventually notified in January 2010. The instruments themselves were officially launched in November 2010. Their trading on power exchanges commenced a few months later in March 2011.

3. RECs today

Each REC issued corresponds to 1 MWh, or 1,000 kWh, of electricity injected into the grid. Depending on the generating source, there are two types of RECs –solar and non-solar. Power System Operation Corporation (POSOCO) is the REC issuing authority, and as depicted in Figure 2, RECs may be issued to two categories of eligible entities, discoms and RE generators, each with some qualifications. Once issued, sale on the exchange and self-consumption are the only two ways they may be put to use. Further, RECs sold on the exchange must be priced in between the specified floor and forbearance (ceiling) prices, both of which have undergone several downward revisions over the years.

As also mentioned at the outset, RECs are single-use instruments. This means that they cannot be resold once put to either of the two permitted end-uses. Finally, their trading on the exchange takes place on the last Wednesday of each month (Indian Energy Exchange 2019).

Figure 2 **RECs issuance source vs end-use**

Issuance source of RECs (supply)	mn	%
Discoms		
1. Only to the extent of their RE consumption exceeding RPO target	8.5	12
RE Generators		
1. Selling to discoms at avg. pooled purchase cost (APPC) (2) Selling via open access (but not availing wheeling & banking concessions) (3) For self consumption as captive (but only if commissioned b/w 2010 & 2016, and not availing concessional wheeling/banking) Breakup mn: Solar 10.2; Wind 26.9; Other RE 25.1	62.1	88
Total RECs issued from inception till Dec 2020	70.6	100

End use of RECs (demand)	mn	%
Purchased on exchange		
1. By obligated entities (Discoms & Captive/Open Access) (2) For voluntary purposes Breakup %*: Discoms 60%; Cap/OA 40%; Voluntary <1%	59.5	84
Retained by RE generators		
1. For self consumption to meet RPO stemming from non-RE generating capacity	2.4	3
Revoked	3.6	5
Closing balance		
As of december 2020	5.1	7
Total RECs issued from inception till Dec 2020	70.6	100

Source: CEEW-CEF analysis[4]

**(1) Breakup percentages for RECs purchased on exchanges are CEEW-CEF estimates based on stakeholder interactions.*

4 The numbers are based on the data sourced from "Renewable Energy Certificate Registry of India".

The four key takeaways that follow from Figure 2 are summarised below.

01
The REC market is obligation (RPO) driven

- Approximately, 99 per cent of REC purchases made on the two power exchanges are done to meet RPOs
- Even RECs retained by generators are for purposes of meeting their RPOs
- Voluntary purchases are non-existent

02
Net buyer and net seller differentiation

- Discoms and RE generators appear on both, the issuance and end-use sides of the equation; it is their net position as buyers or sellers which distinguishes them
- Discoms are overwhelmingly net buyers of RECs (purchased > issued)
- RE generators are overwhelmingly net sellers of RECs ((issued – retained) > purchased)

03
Muted discom participation

- As of March 2020, the installed capacities (ex-RE and ex-hydro) for discoms and captive power plants in India stood at 237 GW and 75 GW respectively, representing a 76 per cent share for discoms (CEA 2020)
- In contrast, discoms only account for 60 per cent of REC purchases on the exchanges
- On the supply side, the 12 per cent share of discoms in REC issuances is remarkably low

04
Solar vastly under-represented

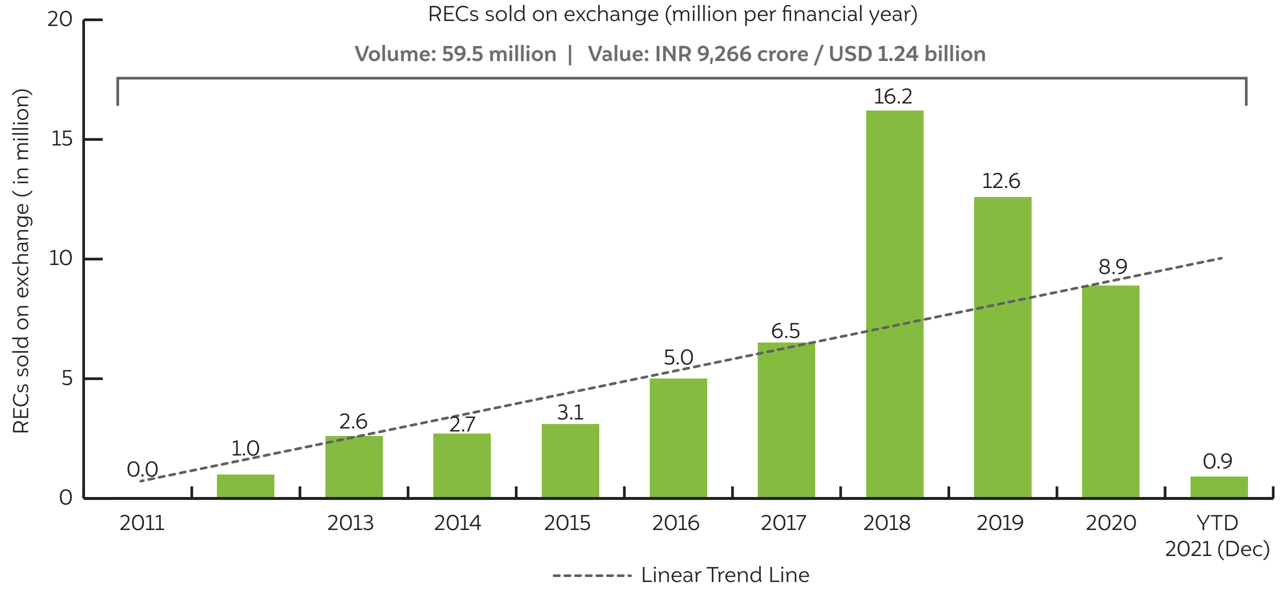
- India's ambitious plans to expand its RE capacity are geared heavily towards solar
- As highlighted above, discoms, which are the largest consumers of solar power, have lagged in issuing RECs – their share of aggregate REC issuances (solar and non-solar both) is only 12 per cent
- This makes private generators the only alternative source of solar REC issuances, but solar accounts for only 10.2 million (16 per cent) of the aggregate 62.1 million RECs issued in this category as well

4. An INR 9,266 crore (USD 1.24 billion) market

An aggregate of 59.5 million RECs worth INR 9,266 crore[5] (USD 1.24 billion) have been sold on the two power exchanges in the time since they were launched in 2010. Breaking the volume into respective financial years reveals a general upward trend as shown in Figure 3. The sharp peak in volumes recorded in FY18 was a result of buyers taking advantage of a reduction in the REC floor price. The decline in volumes post-FY18 was perhaps inevitable given the significant quantum that was cleared in FY18. However, reduced as they were, the FY19 and FY20 numbers remained consistent with the linear trend line for REC volume growth. The dismal volumes recorded till date in FY21 are of course an altogether different matter, being the result of the ongoing suspension of REC trading, which has carried on for more than six months now.

5 Value traded estimated by CEEW-CEF by multiplying the average monthly market clearing price for solar and non-solar RECs with the volume cleared in that month.

Figure 3 INR 9,266 crore (USD 1.24 billion) generated via the sale of RECs on power exchanges



Source: CEEW-CEF analysis[6]

5. Not enough demand or not enough supply?

RPO under-compliant states have a choice of achieving compliance by either paying a penalty or purchasing RECs. While a stricter penalty mechanism has been proposed to the draft *Electricity (Amendment) Bill, 2020*, the prevailing system has not been proven to be robust, as highlighted in Boxes 1 and 2.

Under the current regime, failure to meet the RPO target attracts a penalty as per the direction of the relevant state electricity regulatory commissions (SERC). Most state regulations link the penalty and payment of regulatory charges to the forbearance price[7] of RECs. But they also grant discretionary powers to SERCs to specify what charges are to be levied for RPO non-compliance (Joshi and Agarwal 2018). These discretionary powers have led to variations in penalty payments across states. In many times, these powers have also led to obligated entities being granted permission to carry forward RPOs despite the availability of RECs in the market (Chaturvedi 2015).

Box 1 Watering down of RPO: anatomy of a "rarest of rare" case

The Ministry of Power (MoP) has set uniform targets for RPO for all the states and union territories. However, in several instances, SERCs have relaxed the targets, and further, have been unable to ensure compliance even with those relaxed targets.

A case in point is that of Haryana, where the RPO trajectory of 17 per cent for FY19, 17.5 per cent for FY20, 19 per cent for FY21, and 21 per cent for FY22, set by MoP, were reduced to 7 per cent for FY19, 8.5 per cent for FY20, 10 per cent for FY21, and 11 per cent for FY22 (MoP 2018). Despite the reduced targets, the State Electricity Regulatory Commission of Haryana (HERC) allowed further relaxations to state utilities in FY21 and FY22, and the targets dropped from 10 per cent and 11 per cent, respectively, to a mere 5 per cent and 6 per cent (HERC 2020).

Additionally, for FY19, HERC allowed a one-time waiver of RPO backlog amounting to 910 MU (solar) and 1,850 MU (non-solar). The commission categorised this decision as a "rarest of rare" case owing to the challenges highlighted by the discoms such as delayed approvals, frequent policy changes, and other policy uncertainties. The commission also observed that without the waiver, the RPO for non-solar and solar by the end of FY20 is expected to increase to 1,160 MUs and 3,550 MUs, respectively, which would amount to an expenditure of INR 11 billion (USD 147 million) on purchasing RECs for the state discoms (HERC 2020).

6 The volume numbers are based on data sourced from "Renewable Energy Certificate Registry of India" and the value numbers are based on data from IEX and PXIL.

7 In the power exchange, forbearance price is the maximum trading price of REC beyond which RECs are not allowed to be traded (CERC 2010)

Box 2 Delayed RPO enforcement and insufficient penalties for default

In 2014, petitions were filed in the Delhi Electricity Regulatory Commission (DERC) against three Delhi discoms – BYPL, BRPL, and TPDDL – for non-compliance with RPOs for the years 2012–13, 2013–14, and 2014–15 (DERC 2019). Even though the petitions were filed in 2014, the final resolution took place only in 2019. By this time, two of the Delhi discoms – BRPL and BYPL – had defaulted by over 2,000 days on their RPO targets for the year 2012–13.

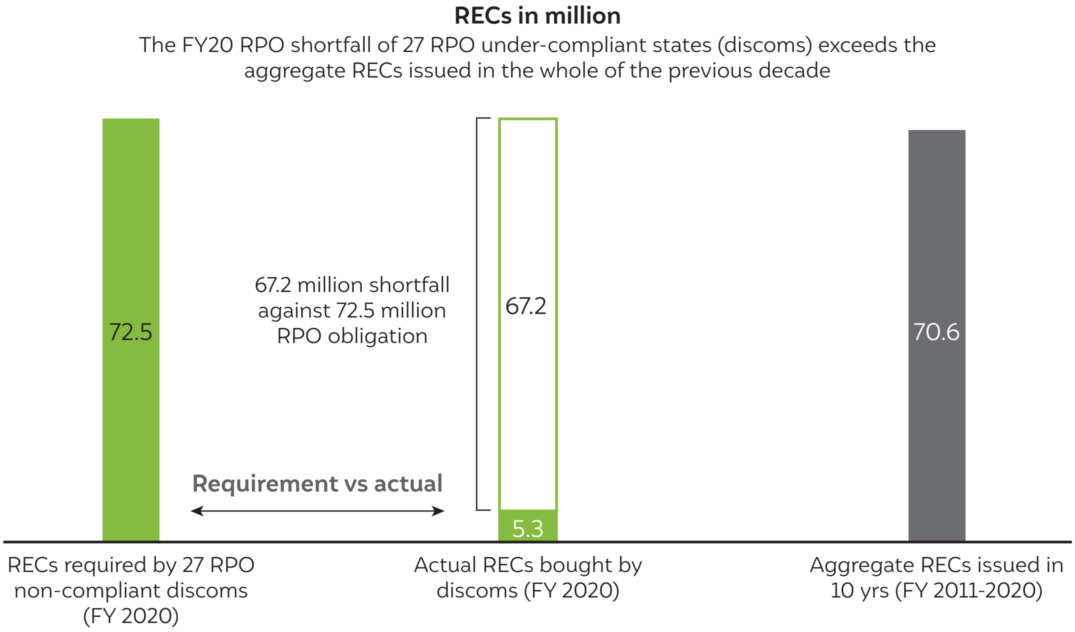
In the petitioners' plea, it was highlighted that for three continuous years, the three discoms had been "wilfully defaulting" on the RPOs despite the allocation of funds by DERC to meet the RPOs. The discoms, on the other hand, argued against the levy of any penalty owing to reasons such as deficient RE sources in the state to meet RPOs, the cost of RE procurement, which would have led to a tariff hike for consumers, and a lack of knowledge about the RPO target in the beginning of the financial year (DERC 2019).

After going through the merits of the case, the commission did penalise the discoms for non-compliance with the RPOs, but at the same time, gave them much leeway and rebates in penalties. For example, in Delhi, 21,361 MU of electricity was supplied by the three discoms to its consumers in 2013. Even assuming 90 per cent RPO compliance in 2013, the resulting penalty for the discoms per our calculations would have collectively amounted to several tens of crore rupees. In contrast, the actual penalty levied by the commission was only INR 57,75,000 (USD 0.07 million), if settled within the subsequent year (DERC 2019).

The consequences of the leeway accorded to discoms on REC demand comes across clearly in Figure 4. The aggregate shortfall for FY20 for the 27 RPO under-compliant states, if met through REC purchases alone, would have resulted in a demand for 72.5 million RECs, while the actual RECs purchased by discoms in FY20 is only 5.3 million.

It is hoped that stricter penalties envisaged in the draft *Electricity (Amendment) Bill, 2020*, will push discoms towards RPO compliance. But to what extent is it possible for them to do so via REC purchase? The short answer is that there just is not enough supply in the market for that to happen. As Figure 4 demonstrates, bridging the FY20 RPO shortfall of 27 RPO under-compliant states alone would exceed all the RECs issued in the previous decade.

Figure 4 Discom demand shortfall



*Source: CEEW-CEF analysis[8]**

8 The numbers are based on data sourced from Renewable Energy Certificate Registry and "Conference of Power & Renewable Energy Ministers of States & UTs, Ministries of Power & Renewable Energy (Annexure V), July 3, 2020" (MoP and MNRE 2020).

6. Bringing RECs back on track

RECs were launched a decade ago. Over the years, several amendments have been made to the regulations that govern them. These amendments have tended to focus on extending REC validity, lowering their floor price, and bringing more entities into the REC fold, such as discoms as issuers and RE generators as self-consumers.

The RE ecosystem has also witnessed a fundamental change in that period: clean energy has gained tremendous, irreversible momentum, and unprecedented volumes of capital have followed suit. The report card for RECs is mixed in contrast.

While demand-side issues certainly pose a challenge, the present supply levels might prove inadequate to meet if the full demand potential of RECs were to be unleashed. In this context, a healthy REC market, commensurate in size with the world's most ambitious RE deployment programme, is vital to balance the pulls and pressures that will inevitably accompany such ambitious scale.

With this context in mind, we propose the following seven measures to reboot RECs.

Demand-side measures

1 Incentivising RPO compliance

- As shown in Figure 2, the REC market is obligation (RPO) driven.
- The RPO compliance of the obligated entities in the states has been consistently poor. In FY20, compliance was less than 55 per cent for about 20 states. In states and union territories like Chandigarh, Lakshadweep, and Manipur, RPO compliance was below 10 per cent (MoP and MNRE 2020).
- Obligated entities in the states like discoms attribute poor RPO compliance to their financial health. Sometimes, they also cite the high cost of procuring power from renewable energy, a claim that stands in stark contrast to the rapid decline in RE tariffs seen in recent years.
- Incentivising RPO compliance by state entities via a carrot and stick framework in the financial assistance schemes/bailout packages like UDAY provided to them may be the answer.

2 Penalties that incentivise REC purchase

- RPO regulations link penalties to the forbearance price of RECs.
- In practice, SERCs give rebates to obligated entities with large RPO backlogs. Sometimes, a calibrated penalty mechanism is used, where a part of the penalty is fulfilled monetarily and the rest via the purchase of RECs.
- Such mechanisms accord under-compliant entities much leeway and hence are not nearly a strong enough deterrent.
- The draft Electricity (Amendment) Bill, 2020, proposes an initial penalty of INR 0.50/kWh and an increase to INR 1/kWh after the first year for RPO non-compliance (MoP 2020).
- This monetary penalty may also be accompanied by measures that incentivise REC purchase over monetary settlement. This would be particularly relevant if REC prices emerge to be higher than monetary penalties when REC trading resumes.

3 Creating demand for RECs beyond RPO

- Current REC regulations restrict the demand for RECs by limiting its end-use to RPO fulfilment alone.
- RE generation is intermittent, which makes grid integration of RE extremely challenging. To ensure grid stability, deviation settlement penalties (DSM) are imposed on RE developers.
- One way how CERC can expand the end-use of RECs is by allowing them to be used as offsets for settling the DSM penalties of RE developers and discoms.

4 Active promotion of voluntary REC purchase as tools to go green

- While there is generally heightened awareness of the need to go green, voluntary purchases account for a mere 1 per cent of all RECs sold.
- Meanwhile, capital that funds businesses is increasingly demanding green credentials.
- Securing open access supply of RE, or purchasing green power via the Green Term Ahead Market (GTAM), are some of the ways to go green, but the complexity involved means they are beyond the reach of many businesses.
- RECs represent an extremely easy way to go green, and the cost involved, particularly with the removal of the REC floor price, may not be onerous either.
- Effectively promoting this option to go green would help promote voluntary REC purchases.

Supply-side measures	
5 **Delinking APPC as a pre-condition for REC issuance to discoms**	• Linking the issuance of RECs to only those power purchase agreements (PPAs) signed at average power purchase cost (APPC) was conceived to compensate RE generators at a time when APPC was far lower than the prevailing RE tariffs; the situation is reversed now. • Some auctions for RE capacity may be structured such that the green attributes continue to remain with generators. • Participating in such auctions would result in further lowering the cost of delivered RE to discoms – this could be particularly attractive to RPO over-compliant states.
6 **De-linking concessional wheeling/ banking as a pre-condition for REC issuance to open access**	• Utility-scale RE tariffs are now below INR 2.0 per unit. • However, discom-level inefficiencies mean that the benefit of such low tariffs is not transmitted to end consumers, including bulk purchasers of power. • While open access RE tariffs represents an attractive proposition compared to metered grid tariffs, some limits constrain them from matching utility-scale tariffs. • Currently, as per the fourth amendment to the REC regulations, open access and captive power projects availing concessional wheeling and banking facility benefits are not allowed to be issued RECs until after foregoing such benefits (CERC 2016). • Delinking concessional wheeling and banking from REC issuance can go a long way toward further reducing open access RE tariffs and spur its penetration.
7 **More flexible REC market design**	• Small RE projects like rooftop solar and floating solar that do not feed into the grid are ineligible for REC issuance. • Even if they were to be made eligible, their small size would be a hindrance, as individually many may not generate 1 MWh of power annually (the minimum REC denomination). • A technology capacity multiplier can enable low-capacity projects to participate in the REC market – for example, if 1 kWh of generation is awarded a suitable multiplier to meet the 1 MWh threshold. • A variant of such a mechanism already exists in the United Kingdom, where renewable obligation certificates (ROCs) have different denominations for different technologies, and emerging technologies are awarded 2 ROCs per MWh generated (Ofgem 2020).

Source: CEEW-CEF analysis

7. RECs and international relevance: CERs

Market based mechanisms and instruments are not unique to India, and 2021 is poised to be a pivotal year in charting the way forward for certain instruments that straddle the international arena. Specifically, a broad consensus exists on some key issues that need addressing at the 26th United Nations Climate Change Conference (COP26) which is slated to be held in Glasgow in November 2021. Among them is Article 6 of the Paris Agreement, which deals with voluntary international cooperation in the implementation of nationally determined contributions (NDCs), including via market mechanisms that mitigate greenhouse gas emissions.

The Paris Agreement is an international treaty on climate change that was adopted in December 2015 at COP21 in Paris and which entered into force in November 2016 (UNFCCC n.d.). As guidelines on how the agreement would be practically implemented were also needed, countries set themselves a deadline to negotiate implementation guidelines (widely termed the “Paris Rulebook”) by COP24 in Katowice in 2018 (UNFCCC n.d.). The outcome of COP24 was the Katowice climate package, which finalised most of the Paris Rulebook. However, consensus on some aspects of the implementation proved elusive at Katowice and later at COP25 in Madrid as well.

As such, it should come as no surprise that the unresolved aspects of the Paris Rulebook should feature high on the list of items to be deliberated in Glasgow. This is more so given the renewed urgency in favour of climate action in the post-pandemic normal. One of these unresolved aspects is agreeing on how Article 6 (specifically carbon markets) will work (Dagnet, et al. 2020). In light of this, it is important to determine how various instruments operating under existing market mechanisms will transition under the Paris Rulebook.

One such instrument is certified emission reductions (CER). A single CER represents one metric tonne of CO_2 emissions abated from the atmosphere. A clean development mechanism (CDM), originally established under the Kyoto Protocol, was provided to help developing countries such as India set up greenhouse gas emission reduction projects. Such projects allowed host countries to sell emission reduction units to countries with emission reduction targets under the Kyoto Protocol (UNFCCC 2021). Thus, emerged the market for CERs under the CDM.

Unlike RECs, CERs are not traded on any specified exchange; sale and purchase take place on a bilateral basis. However, they share several similarities in terms of construction, design, and challenges. Both instruments separate the green attributes from the underlying mitigation activity. Demand for both is essentially obligation driven. Prices for both have seen significant declines over the years. Finally, both suffer from a supply overhang.

China, India, South Korea, and Brazil account for 54 per cent, 12 per cent, 9 per cent, and 8 per cent, respectively, of all CERs ever issued (Centre on Energy, Climate and Sustainable Development n.d.)The issues facing CERs are thus as much India's problem as they are global problems. Given the similarities between RECs and CERs, taking a leaf from India's learnings on how to address the issue of RECs may provide valuable insights that help shape the international community's roadmap with respect to CERs.

8. Conclusion

While RECs were never meant to be mainstays of the energy transition, they remain important supporting instruments that act as a balancing force in India's energy transition. And with the aggregate value of RECs traded on power exchanges estimated to be INR 9,266 crore (USD 1.24 billion), their scale is not trivial. Moreover, India's RE ambitions for the next decade far exceed anything seen or even thought of in the previous one. As such, the stakes are that much higher for even supporting instruments such as RECs. Under the circumstances, positioning them to reflect the fundamental changes that the RE ecosystem has undergone in the past decade, and preparing them for the even more dramatic changes that lie ahead, is not just desirable, but imperative.

The brief highlights both the demand and supply side challenges which plagues the REC market to varying degrees. On the demand side measures such as incentivising RPO compliance and REC purchases, creating regulatory demand for RECs beyond RPO compliance, and promoting voluntary purchasing of RECs as a way for corporates to go green may be considered. At the same time, on the supply side, measures such as, removing out-of-date conditionalities for REC issuance and a more flexible market design may be considered. Implementing these measures can make RECs more appealing to stakeholders and can go a long way in rebooting the REC market for a balanced energy transition in India.

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India's RE ambitions for the next decade are far higher than the previous one and thus stakes for RECs are also higher. Thus, rebooting them for the dramatic changes in the RE ecosystem that lie ahead is both desirable and imperative.

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