



Centre for
Energy Finance

RE-Financing India's Energy Transition

Limited Period Subsidised Credit Enhancement for Domestic RE Bond Issuances

Vaibhav Pratap Singh, Arjun Dutt, and
Gagan Sidhu

Report | July 2020





To achieve the target of 450 GW of RE installations by 2030, India would need USD 199 billion worth of incremental investments in setting up generation capacity alone.

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Limited Period Subsidised Credit Enhancement for
Domestic RE Bond Issuances

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Organisation:

The **Council on Energy, Environment and Water** (ceew.in) is one of South 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.

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CEEW Centre for Energy Finance

The CEEW Centre for Energy Finance (CEEW-CEF) is an initiative of the Council on Energy, Environment and Water (CEEW), one of South Asia's leading think tanks.

CEEW-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.

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.

cef.ceew.in

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As a Senior Analyst at CEEW-CEF, Vaibhav's focus is on the climate finance space where he studies financial instrument's design and development to unlock investments in the Indian clean energy sector. Vaibhav's forte lies in developing solutions and providing a simple analysis of the current issues to a broad spectrum of audiences. Previously, he performed credit analysis to recommend a credit rating for financial institutions.

“Access to an alternative source of debt finance other than the traditional lending institute is a must for financing India's clean energy transition; else the country will have to brace for falling short on targets.”



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Arjun Dutt is an Associate at CEEW-CEF. His work is geared towards enhancing the flow of affordable finance towards clean energy in emerging economies. This includes analysing the risks constraining the flow of capital towards clean energy and developing suitable interventions to de-risk investments. Prior to his association with CEEW, Arjun worked for over three years in equity research.

“Mobilising investments 16 times the subsidy amount, the credit enhancement solution maximises the effectiveness of public capital in stimulating the flow of finance towards clean energy and thereby economic growth.”



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Gagan is an Adviser to CEEW-CEF, supporting the team on clean energy markets and the finance ecosystem. In addition to his work at CEEW, he also independently advises entrepreneurs and corporates on capital-raising and deployment strategies in the renewable energy space. He was previously CFO of a renewable energy business, and prior to that, an investment banker.

“Subsidising credit enhancement for RE bond issuances unlocks capital for further capacity growth, its cost-impact dynamics are compelling, and it will be an important milestone in the development of the domestic debt capital markets. It's a win-win in all respects.”



The scale of refinancing of debt capital deployed in existing RE projects will be a crucial driver determining the ease of availability of debt finance to future RE projects in the country.

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Abbreviations

CEEW	Council on Energy, Environment and Water
CEEW-CEF	Centre for Energy Finance at the Council on Energy, Environment and Water
CGTMSE	Credit Guarantee Trust for Medium and Small Enterprises
GW	gigawatt
IREDA	Indian Renewable Energy Development Agency
INR	Indian Rupee
MW	megawatt
MWp	megawatt peak
RE	renewable energy
USD	United States Dollar
NPA	Non performing asset
NBFC	Non Banking Finance Company
IIFCL	India Infrastructure Finance Company Limited
CBI	Climate Bonds Initiative
PFC	Power Finance Corporation
REC	Rural Electrification Corporation
IDF	Infrastructure Debt Fund
AIF	Alternate Investment Fund



The capital freed up by the proposed solution can help lend new debt of the order of INR 76,000 crore to greenfield renewable energy projects. The investments of this scale can add about one per cent to the country's GDP.

Executive summary

India, having set an ambitious target of achieving 450 GW of installed renewable energy (RE) capacity by 2030, has managed to reach only an installed capacity of 86 GW at the end of January 2020. A compounded annual growth rate (CAGR) of 16 per cent in capacity addition (MOEFCC 2018; MNRE 2020) is needed to achieve the 2030 target. The capital requirement for this massive energy transition presents an investment opportunity of around INR 13.9 lakh crore (USD 199 billion) for installing the generation capacity alone. Additional investments are further needed for building supporting infrastructure like storage and transmission to integrate the installed RE capacity into the grid.

RE installations, like any infrastructure project, are characterised by a debt-heavy capital structure. Achieving the 2030 RE target requires a debt capital of the order of USD 160 billion (assuming debt:equity of 80:20) for installing the generation capacity alone. This additional debt would entail doubling of the current debt exposure of banks and non-banking financial companies (NBFCs) to the power sector as a whole. Raising new debt of such massive proportions is an arduous task even under normal circumstances. However, at present, the banks and NBFCs evidently do not have headroom to extend further credit to the power sector. The inability to extend additional credit arises due to a couple of reasons. First, most banks are breaching their sectoral exposure limits. Second, both banks and NBFCs are facing an impending increase in non-performing assets as a result of the ongoing economic downturn caused by the ongoing COVID-19 pandemic, which would also limit their ability to lend.

Therefore, alternative sources of debt capital must be considered to augment the existing flow of debt capital towards renewables. One of the options is issuing bonds for refinancing bank and NBFC loans, thereby enabling these institutions to lend to new greenfield RE projects. Bonds are securities that act as an alternate source to refinance brownfield projects, thus helping to free up bank capital. The question then arises: is this option feasible for RE projects in India? In reality, most of the RE projects in the country may not find it easy to accomplish project refinance through bonds because

they are rated below AA, the forbidden territory as per regulations for the institutional investors who are the dominant players in the bond market. Given the challenges of domestic financial institutions and the limitations of both international and domestic bond markets, the chances of India achieving its RE target by 2030 look grim in the present scenario.

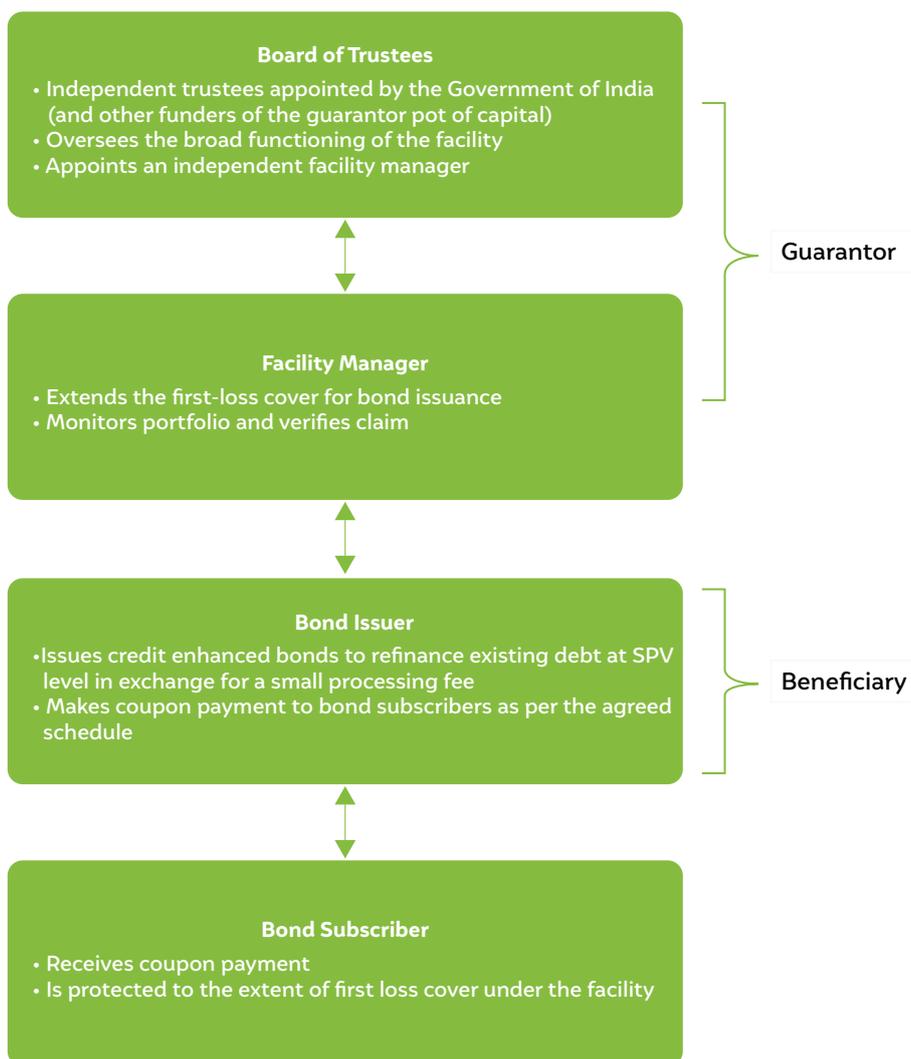
One of the ways to open up the bond market for RE issuances is through the use of credit enhancement to improve the ratings of issuances. If ratings are enhanced to AA or higher, these would become attractive to institutional investors and enable bond issuers to tap the bond market for their capital needs. While credit enhancement products exist in the market, the all-in cost of a credit-enhanced bond issuance becomes prohibitively high compared to bank finance.

Given this situation, a subsidised credit enhancement solution holds the key to unlocking the flow of capital from the bond market. The initial track record generated with the credit enhancement solution would provide risk and return guidance to future investors, facilitating the flow of additional capital from the bond market. CEEW-CEF propose a subsidised first-loss cover facility to credit-enhance bonds raised by the developers/institutions looking to refinance their underlying projects. To instantly ward off defaults, we envisage a fully funded facility.

In the proposed structure, the facility manager, under the guidance of the board of trustees, will extend a first-loss guarantee for the bonds issued by the RE companies (issuers). The facility will pay off bond investors in the event the issuer is unable to service the coupon and principal repayment. Also, the guarantee can be accessed multiple times during the tenure of the bond within the eligible amount.

A subsidised credit enhancement solution holds the key to unlocking the flow of capital from the bond market.

Figure ES1: Proposed facility structure



Source: CEEW-CEF analysis

As per our estimates, a fully funded facility with a capitalisation of about INR 4,543 crore (USD 649 million) would be able to facilitate debt refinancing of the order of INR 76,000 crore. If deployment of this amount of capital in new solar projects were realised, the existing solar capacity would be doubled from 31 GW in January 2020 to 63 GW over the tenure of the facility.¹

This massive capital mobilisation would result in 49,000 new additions to the workforce over five years (Kuldeep et al. 2017). Considering the multiplier effect of infrastructure investment on GDP, an addition of INR 1,90,000 crore to the GDP (1 per cent of GDP) may be possible (S&P Global 2016).

1. Assuming a debt to equity ratio of 80:20 and investment cost of INR 3 crore per MWp installations.

1. Context

Scale of financing requirements for India's energy transition

India's energy transition is characterised by the impressive scale of its ambitions. The renewable energy (RE) targets require a 16 per cent compounded annual growth rate (CAGR) in capacity addition from the 86.32 GW at the end of January 2020 to achieve 450 GW by 2030 (Ministry of New and Renewable Energy, Government of India 2020). This requires the mobilisation of around INR 13.9 lakh crore (USD 199 billion) in investments for generation capacity alone.² Integrating the generated power into the grid—through upgrades to transmission infrastructure and storage—would entail additional investments. Further, the setting up of RE parks for facilitating capacity deployment would also require additional investment.

Limitations of traditional sources of debt capital

Given the debt-heavy nature of infrastructure investments, this translates into a requirement for the large-scale mobilisation of debt capital. Debt finance for greenfield RE projects is primarily sourced from domestic banks and non-banking finance companies (NBFCs). The combined current exposure of banks and NBFCs to the power sector in India stands at around USD 160 billion (Reserve Bank of India 2020).³ This exposure is comparable to the additional lending needed to finance just the RE generation capacity to meet India's 2030 ambitions. Domestic financial institutions do not have evident headroom to extend fresh credit of this magnitude. Sectoral exposure limits for banks⁴ and an impending increase in non-performing assets (NPAs) in the wake of the economic disruption caused by the COVID-19 pandemic is likely to constrain the ability of both banks and NBFCs to extend adequate amounts of

credit to finance India's energy transition (Reserve Bank of India 2020).⁵

2. Bond market as a complement to the traditional sources of renewable energy debt

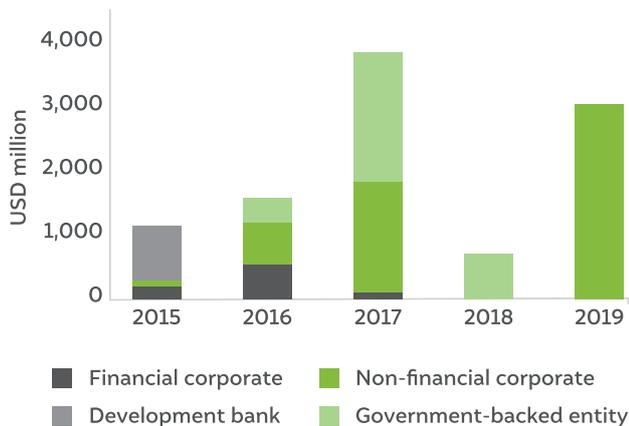
The bond markets offer infrastructure developers an alternative to banks and NBFCs for raising debt capital. Developers use funding thus raised to refinance project loans, which allows banks & NBFCs who have extended such loans in the first instance to recycle capital by lending to newer projects without additionally stretching their loan books. Also, the banks and NBFCs can by themselves refinance loan books through securitised portfolios of structured bonds and extend credit to newer projects.

International markets have accounted for the majority of existing RE bond issuances

International bond markets have demonstrated a remarkably robust appetite for Indian green bond issuances (86 per cent of which pertain to the RE sector).⁶ Of the cumulative USD 10.2 billion Indian green bonds issued till the end of 2019, 90 per cent of the bonds have been listed either exclusively on international bond markets or jointly on international and domestic exchanges.⁷ Only 10 per cent have either been listed exclusively on domestic markets or have gone unlisted. The continued interest of international bond markets in green bonds in India reflects issuers' ability to effectively make their case to international investors, in markets that are deep even below investment grade. Figure 1 illustrates the issuer profile of the Indian green bond issuances. Issuances by non-financial corporates (RE developers) have risen, perhaps indicative of a greater receptiveness of international markets to Indian RE issuances.

-
2. This translates into annual requirements of around USD 18 billion over an 11-year period. In comparison, investment flows have averaged around USD 11 billion over the previous five years (2015–2019) (UNEP and BNEF 2019; UNEP and BNEF 2020).
 3. Exposure of the banking system to the power sector stands at around INR 5.67 lakh crore (USD 80 billion) as of April 2020 (source: RBI), while the exposure of Power Finance Corporation (PFC) and Rural Electrification Corporation Ltd (REC) (the largest NBFC lenders to the power sector) is also of the same magnitude (USD 80 billion).
 4. Banking regulation requires commercial banks to set sector wise limits for credit exposure. The power sector (generation, transmission, and distribution) is one of the sectors that has been set a credit exposure limit.
 5. The existing exposure of banks to the power sector is around 6 per cent. If banks were to accommodate the additional debt requirements of the RE sector, they would have to extend 18 per cent of their existing gross bank credit to the power sector.
 6. CEEW-CEF market intelligence and Climate Bonds Initiative.
 7. CEEW-CEF market intelligence and Climate Bonds Initiative.

Figure 1: Non-financial corporates have continued to scale up the issue of green bonds in India



Source: Dutt et al. (2019) and Climate Bonds Initiative

Raising foreign currency debt, however, does not seem to be an optimal choice given that cash flows that service the foreign currency bonds are denominated in domestic currency (INR). Foreign currency-denominated debt capital thus exposes Indian RE developers to currency risk, refinancing risk (due to shorter tenures),⁸ or both.

Domestic markets as an alternative

Taking into account the risks associated with foreign currency-denominated issuances, raising INR-denominated debt over longer tenures via the domestic bond market should be the preferred alternative. This mode of raising finance remains critical for mobilising the quantum of debt required to finance India's ambitious energy transition. Domestic bond markets are dominated by institutional investors (they hold nearly 97 per cent of the outstanding bonds) (Reserve Bank of India 2019). As per regulatory mandates, these investors are largely forbidden from investing below certain thresholds (typically A or AA). RE projects have remained outside the institutional investor purview as they have not been able to achieve an AA rating on a

stand-alone basis, i.e., without some form of external support.⁹ RE issuances in the domestic bond markets face the hurdle of their lower rating.

Apart from the requirement of high credit rating, domestic bond markets are not liquid for longer tenure securities. The average tenure of domestic corporate bond issuances is around five years (Reserve Bank of India 2019). RE loans have tenures in the range of 15-18 years, commensurate with cash flows relating to 25-year project lifetimes (Dutt, Arboleya, and Mahadevan 2019). The shorter tenure preferences of domestic bond investors is an additional barrier to refinancing of RE loans through bonds of a comparable tenure.¹⁰

Options for unlocking domestic bond market flows

The existing barriers to the flow of debt from the capital markets to the RE sector can be overcome through a few options. These could span both the demand and the supply side of the markets. On the supply side, external credit support in the form of credit enhancement could help create a pipeline of attractively-rated issuances. From the demand side, alternative investment funds (AIFs) or infrastructure debt funds (IDFs) could augment the flow of capital to the sector as a whole. Funds with these corporate structures have greater regulatory freedom to potentially invest in lower rated securities, which usually lie outside the mandates of institutional investors such as pension funds. Our design study focusses on the role of credit enhancement in creating a pipeline of attractively rated issuances. Other solutions would be examined in detail in future analyses.

Raising INR-denominated debt over longer tenures via the domestic bond market should be the preferred option.

- In order to use USD-denominated bonds to refinance INR project loans, the issuer has two choices. Choice 1: borrow short tenure to match the swap window—this leads to refinance risk, because the shorter tenure USD 100 bond takes out equal value of INR, which was being repaid over a much longer tenure. So, when the bond bullet matures, the project is not able to service it, which means that bond will have to be refinanced. Choice 2: borrow long tenure to match the tenure of the project loan being taken out. In this case there is no refinance risk, but as the tenure extends beyond the hedging window, servicing such a long-tenure USD bond becomes exposed to currency risk (e.g. Adani 20-year USD bond earlier this year). A look at the long-term INR/USD swap prices indicate that hedging currency risk in the long term is prohibitive because at present costs, it results in an addition of roughly 300 basis points (bps) to the annual costs (Investing 2020).
- Based on CEEW-CEF market intelligence, the minimum-rated RE loans being financed are BBB and no loans have been able to achieve an AA rating on a stand-alone basis. Therefore, we assume that the ratings spread of the projects being refinanced through the bond market lies in the range BBB to A.
- A possible option to improve the investor appetite for longer tenure bonds may be selling bonds with a put option. A put option would enable the investor to sell back the bond to the issuer of security at a predetermined time (consistent with the investor's tenure preferences) and price.

3. Credit enhancement as a domestic bond market facilitator

The objective of any credit enhancement exercise is to provide a measure of external support (through a structured obligation) to a stand-alone credit rating that is sufficient to achieve an enhanced targeted credit rating for the issuer. Counterparties utilising the credit enhancement stand to benefit as they now get access to otherwise elusive debt capital markets and a lower cost of borrowing commensurate with the enhanced rating status. Credit enhancement as a product has been offered in India for several years. India Infrastructure Finance Company Limited (IIFCL) and Indian Renewable Energy Development Agency (IREDA) are two examples of financial institutions that offer credit enhancement on a commercial basis for RE projects.

External support is generally extended via one, or a combination of, the following two methods: (a) on commercial terms to the issuing entity—in the form of an explicit fee charged by a specialised financial institution in the business of extending credit enhancement; (b) at no cost to the issuing entity (external credit enhancement) but in the form of an opportunity cost to the issuer's parent (or some other group company) who underwrites the issuance with guarantees, cash collateral, or the parent's balance sheet.

Typically, credit enhancement for bond market issuances in India are structured via a combination of both methods. IIFCL and IREDA tend to cover part of the distance between stand-alone and targeted credit rating. The issuer's parent bridges the remaining gap via measures including guarantees and generously funded debt service reserves at the issuing entity. Issuing guarantees can impact the parent's credit rating, while large debt service reserves result in the parent company forgoing returns. The advantage for the issuing entity is that neither of these options entail an explicit cost for them.

Uptake of credit enhancement in the domestic market

There have only been a handful of credit enhanced domestic bond issuances in the wider Indian infrastructure space. However, in the renewable sector, credit-enhanced domestic bond issuances have taken place only twice (Table 1).

CEEW-CEF's interactions with stakeholders in India reveal that at the prevailing pricing levels, all-in credit enhancement cost is not competitive for refinancing RE projects. The coupon payment for the enhanced bond by itself represents a compelling alternative to the pricing of bank- and NBFC-led project debt. However, adding the fee charged for enhancement makes all-in costs unattractive.

The cost of credit enhancement is contingent on several factors such as the pre-enhanced credit rating of underlying projects and the structuring of the issuance. The following basic example illustrates how all-in costs of credit-enhanced bond issuance compares with bank financing.

Credit enhancement costs for RE issuances range between 200 and 300 basis points (bps) (IREDA 2017). The average bond yield for a long-duration AA-rated corporate bond issuance (average 13-year maturity) stands at 7.62 per cent (NSE 2020). Adding the credit-enhancement cost to the bond yield results in an all-in cost ranging between 9.62 and 10.62 per cent to the issuer. In comparison, loans for RE projects are available at a spread of 125–175 bps over the marginal cost of lending rate (Dutt et al. 2019). Adding this spread to SBI's 3-year MCLR of 7.3 per cent (SBI 2020) works out to a cost of borrowing of 8.55–9.05 per cent. Thus, banks can undercut bond refinancing by a minimum of 57 bps to a maximum of 207 bps.

Table 1 Credit-enhanced domestic RE bonds have been issued only twice so far

Issuer	Year of issuance	Face value (INR crore)	Credit enhancement providers
ReNew Power	2015	451	IIFCL
ReNew Power	2018	760	IIFCL, IREDA

Sources: ReNew Power 2015, ReNew Power 2018

Given the constraints on bank and NBFC lending, these cannot finance India's 2030 RE targets by themselves. Therefore, opening up the bond market is essential to keep India's energy transition on track. In order to do so, an intervention is urgently needed to generate an initial track record of issuances to catalyse RE bond market issuances at scale.

A subsidised credit enhancement solution could hold the key to unlocking the flow of capital from the bond markets at some scale and on competitive terms. While subsidies can be contentious, sometimes the case for a subsidy presents itself with such compelling cost-impact economics that it becomes hard to ignore. The subsidisation of the cost of credit enhancement for domestic RE bond issuances is one such example.

4. Proposed solution: subsidised credit enhancement

CEEW-CEF proposes a subsidised first-loss guarantee facility to credit-enhance bonds issued by developers/institutions looking to refinance their operational projects/loans.¹¹ The facility will pay off bond investors in the event the issuer is unable to service the coupon or principal repayment. The first-loss guarantee can be accessed multiple times during the tenure of the bond within the eligible amount. To provide comfort that the facility is available on an immediate basis to stave off defaults, it should be capitalised as a fully funded liquid facility.

Our estimates indicate that a subsidy amounting to INR 4,543 crore (USD 649 million),¹² spread over a defined period of five years, can facilitate a doubling of India's installed ground-mounted solar capacity from 31.66 GW (as on January 31, 2020), to 63.32 GW (Ministry of New and Renewable Energy, Government of India 2020). These estimates implicitly assume that the capital freed up at financial institutions as a result of the credit-enhanced bond refinancing is used for fresh lending to solar energy projects. The average annual cost of the facility's capitalisation over its proposed five-year lifetime works out to be INR 911 crore (USD 130 million). To put this figure in perspective, the Government of India's 2020-21 budget outlay for the power and renewable sector was INR 22,000 crore (USD 3,143 million) (The Economic Times 2020).

According to our estimates, an annual subsidy funding to the tune of a mere 4 per cent of the Government of India's power and renewable sector budget over a defined five-year period may be all that is required to transform India's RE landscape dramatically. Importantly, the subsidy's impact will far outlive its operative window. Once seeded, the resulting bond market flows will create a publicly accessible track record of underlying credit performance. Such a track record will be invaluable in providing risk and return guidance to future issuers and investors alike, further feeding a virtuous cycle of capital flows.

In the following sections, we provide details of our methodology used for sizing of the facility.

5. Solution design: limited period credit enhancement subsidy for domestic RE bond issuances

Cost-impact evaluation

A cost-impact evaluation is fundamental to considering the merits of any subsidy. We approached the assessment from the perspective of the quantum of debt capital required to double the installed solar capacity in India. But the facility that offers the subsidy could be open to both wind and solar projects, in which case its impact would be shared between the two generation sources.

Using a capital cost estimate of INR 3 crore (USD 0.43 million)¹² per megawatt peak (MWp) and applying a debt-equity ratio of 80:20 (Dutt, Arboleya, and Mahadevan 2019), the quantum of debt capital required to double installed solar capacity from 31.66 GW to 63.32 GW works out to INR 75,984 crore (USD 10.85 billion). Bond issuances of this amount used to refinance an equivalent value of project loans extended by traditional lenders would allow banks & NBFCs to recycle the capital and fund the new solar capacity.

The key considerations used for arriving at the facility's quantum of capitalisation and the embedded 16.7× multiplier impact (INR 75,984 crore debt mobilisation versus INR 4,543 crore facility funding) are provided in Table 2. (Further details are available in Annexure I.)

11. Exchange rate of 70 INR to 1 USD used to convert figures throughout this document

12. Assumes 30 per cent DC overloading (source: CEEW-CEF market intelligence).

Table 2: How facility capitalisation works out over five years

Consideration		Comment																														
1.	Quantum of incremental solar capacity targeted by facility	• 31.66 GW																														
2.	Per MWp capital cost assumed for incremental solar capacity	• INR 3 crore per MWp (USD 0.43 million per MWp)																														
3.	Debt/equity ratio assumed for incremental solar capacity	• 80:20																														
4.	Resulting debt capital sought to be mobilised via bond market	• INR 75,984 crore (USD 10.85billion)																														
5.	Targeted post-enhancement rating for all bonds availing the facility	• AA																														
6.	Facility window	• Five years																														
7.	Annual value of bonds credit enhanced by facility	<ul style="list-style-type: none"> • INR 75,984 crore worth of bonds mobilised as per the schedule depicted below: • Breakdown of stand-alone (pre-credit enhanced) credit rating between BBB and A assumed to be 2:1 <table border="1"> <thead> <tr> <th></th> <th>BBB</th> <th>A</th> <th>Total</th> </tr> </thead> <tbody> <tr> <td>Yr 1</td> <td>4,667</td> <td>2,333</td> <td>7,000</td> </tr> <tr> <td>Yr 2</td> <td>7,000</td> <td>3,500</td> <td>10,500</td> </tr> <tr> <td>Yr 3</td> <td>9,333</td> <td>4,667</td> <td>14,000</td> </tr> <tr> <td>Yr 4</td> <td>11,667</td> <td>5,833</td> <td>17,500</td> </tr> <tr> <td>Yr 5</td> <td>17,989</td> <td>8,995</td> <td>26,984</td> </tr> <tr> <td>Total</td> <td>50,656</td> <td>25,328</td> <td>75,984</td> </tr> </tbody> </table>				BBB	A	Total	Yr 1	4,667	2,333	7,000	Yr 2	7,000	3,500	10,500	Yr 3	9,333	4,667	14,000	Yr 4	11,667	5,833	17,500	Yr 5	17,989	8,995	26,984	Total	50,656	25,328	75,984
	BBB	A	Total																													
Yr 1	4,667	2,333	7,000																													
Yr 2	7,000	3,500	10,500																													
Yr 3	9,333	4,667	14,000																													
Yr 4	11,667	5,833	17,500																													
Yr 5	17,989	8,995	26,984																													
Total	50,656	25,328	75,984																													
8.	Tenure and repayment profile of bonds credit enhanced by facility	<ul style="list-style-type: none"> • 10 years • Annual coupon • Bullet repayment 																														
9.	Methodology to determine capital required to fund facility	<ul style="list-style-type: none"> • The methodology to determine the facility capitalisation involved deriving the amount of capital needed to reduce the probability of default (Pd) of the bonds issued to a level corresponding to an AA rating. Annual capital requirements were estimated over the facility life of 15 years. These were then discounted at the Government of India borrowing rate (6 per cent) to obtain the present value of the capital that would be eroded. 																														
10.	Methodology to determine annual 10-year probabilities of default for BBB, A and AA	• CEEW-CEF extrapolation based on CRISIL Default Study (2018)																														
11.	Capital required to fund facility (Subsidy Value)	• INR 4,543crore (USD 649 million)																														

Note: A processing fee of around 10 bps of the size of guarantee would have to be borne by the issuer. In addition, the bond issuer would also have to bear audit and legal expenses associated with credit-enhanced bond issuance.

6. Solution for capitalisation

Our proposed solution is expected to generate enough leverage for the Government of India to mobilise a large amount of private capital into the RE sector with a relatively small public investment. The government could defray its subsidy expenditure by tapping into international sources of capital, such as preferential grant lines extended by development finance institutions (DFIs) or even dedicated pools of green capital like the Green Climate Fund or the Global Environmental Facility. While our design study lays out the conceptual returns on investment through the proposed intervention, the facility structure, features, and governance, as outlined in the sections below, are critical to developing a sound implementation strategy.

7. Features of the proposed facility

The proposed subsidy represents an attractive proposition for RE bond issuers. The facility that subsidises credit enhancement should be tailored to ensure its benefits are equitably distributed, reaches the most underserved, and creates sector-wide evidence for bond subscribers for future bond issuances by renewables as a class of investment rather than the facility just used by certain issuers. Some features that may be considered in order to realise this objective are listed below:

- 1. Minimum eligibility:** Only projects with an operational track record of at least three years and with no history of delay in loan repayments are eligible for a credit guarantee under the facility. Further, applicants to the facility must have a minimum project size of 100 MW and a minimum credit rating of BBB. The loans refinanced should be either one or a portfolio of project loans at the special purpose vehicle (SPV) level.
- 2. Pre-credit enhanced ratings balance:** The subsidy by its very nature incentivises issuers to only push lower rated (pre-credit enhanced) loans for credit enhancement. In order to mitigate this moral hazard, developers are required to offer a set ratio of higher rated loans for every lower rated loan in the portfolio that is credit enhanced (for example, a maximum ratio of 2:1 for BBB:A ratings, as per the

assumption in Figure 1) (not applicable for single-loan refinancing).

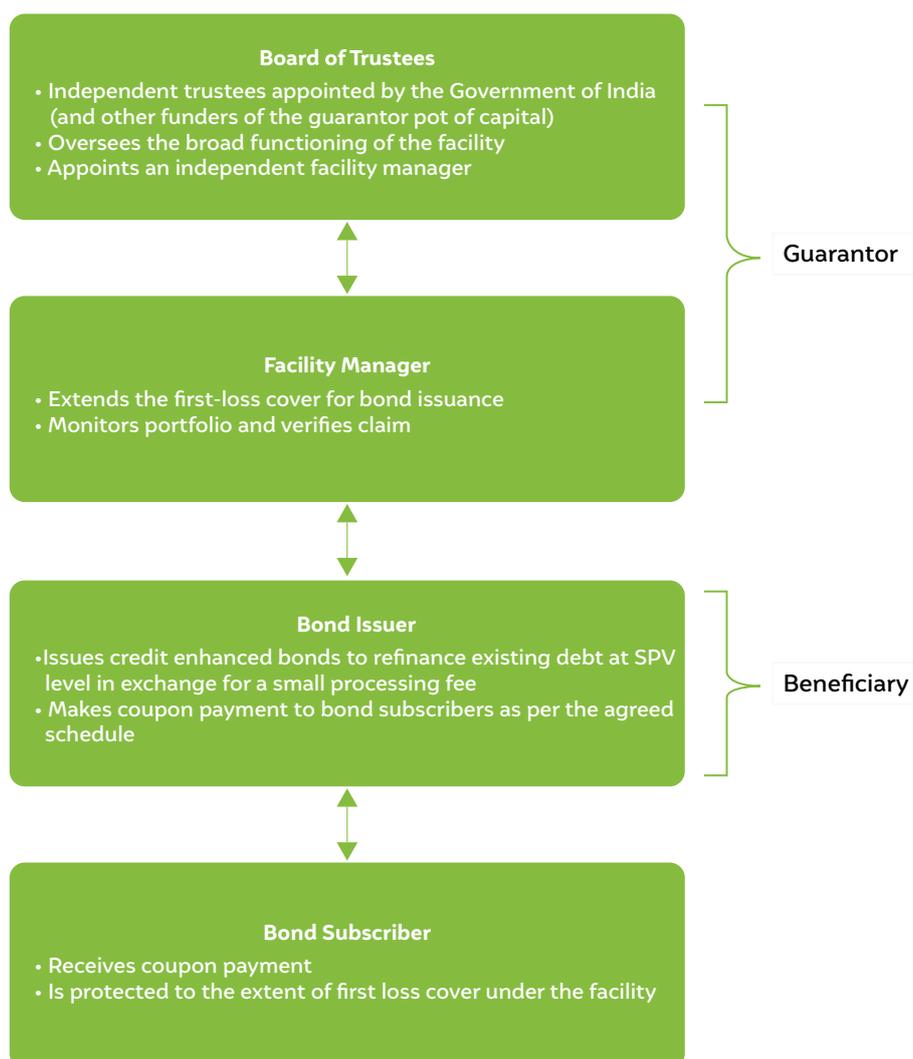
- 3. Group-level caps:** The maximum INR value of bonds that any single developer (including subsidiaries) is allowed to credit enhance over the subsidy window may be capped at a maximum of 20 per cent of facility size in order to reduce concentration risk for the facility (Reserve Bank of India 2015).
- 4. INR-only take-out:** The proceeds of bonds availing the facility may be used only for take-out of INR-denominated project debt, with no general-purpose corporate utilisation. To ensure this adherence, the value of bonds guaranteed under the facility cannot exceed the amount of debt being refinanced. If a portfolio of loans worth INR 1,000 crore is being refinanced, the guarantee cannot be extended to an issuance greater than INR 1,000 crore in size. The bond debt thus cannot be used by the bond issuer as an equity replacement for new greenfield projects.
- 5. Developer owner vs financial owner differentiation:** A mechanism may be required to further ensure that the cost of funding benefit accrues to RE developer owners (who are in the business of deploying RE capacities) rather than financial owners (for example, infrastructure investment trusts [InvITs]).

8. Structure of the proposed facility

The host institution of the facility works both as an administrator and manager of the facility. The host institution can ring-fence the capital under the facility by floating a trust. This is also the preferred structure for ring-fencing capital for similar guarantee facilities (e.g. the Credit Guarantee Fund Trust for Micro and Small Enterprises [CGTMSE]).

Under this structure, the facility manager,¹³ under the guidance of a board of trustees, extends the guarantee coverage for bond issuances (Figure 2). As already mentioned in section 7, these issuances may comprise the refinancing of project loans pertaining to either one SPV or multiple SPVs pooled together. With the subsidy guarantee, the bond issuances will be credit-enhanced to a level that is attractive to a class of institutional investors such as pension, insurance, and mutual funds (AA).

13. The facility in a ring-fenced form could be housed within existing financial institutions like IIFCL, IREDA, and PFC (with an experience of running a guarantee scheme) or the Credit Enhancement Guarantee Corporation proposed in the Union Budget 2019–20; either in-house expertise or external resources may be considered for the position of the facility manager.

Figure 2: Proposed facility structure

Source: CEEW-CEF analysis

9. Impact

The subsidised credit enhancement, as per our estimate, is expected to mobilise INR 75,984 crore (USD 10.85 billion), which can be utilised for fresh primary lending to the RE sector.

- Using the mobilised funds, solar projects that can generate 31.66 GW can be realised.
- Based upon the job creation potential of the various stages of an RE project, project deployment facilitated by credit enhancement would result in the addition of 49,000 people to the workforce over five years (continuously employed) (Kuldeep et al. 2017).
- Based upon estimates of a 2× multiplier effect of infrastructure investments on GDP, investments mobilised by credit enhancement would translate

into an addition of INR 1,90,000 crore (USD 27.14 billion) to the GDP (S&P Global 2016).

10. Conclusion

A rapid increase in RE capacities is driving the global energy transition. The capital mobilised for RE projects in India thus far pales in comparison to the massive infusion of funds that are required in the coming years. In this report, we at the CEEW-CEF have outlined a policy intervention for India, which draws on the ground realities of debt finance in the country. Meanwhile, many developing nations are taking note of the rapid strides India has made in RE and looking to emulate its best policy practices. Subsidising credit enhancement for RE bond issuances is an intervention that may be replicable in several other countries that also are faced with a similar problem—limited availability of local currency debt capital.

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Annexure I: Method used to work out the details of yearly capital requirements for the facility

This annexure provides details of the yearly capital requirements for the facility and the method used to derive the estimates.

Table 3: Annual default probability of the mix (Pd[mix]) has been derived using the CRISIL Default Study 2018 (CRISIL 2019)

Defaults every year	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 11	Year 12	Year 13	Year 14
Bonds issued Year 1	0.64%	0.76%	0.86%	0.95%	1.03%	1.10%	1.16%	1.21%	1.25%	1.28%				
Bonds issued Year 2		0.64%	0.76%	0.86%	0.95%	1.03%	1.10%	1.16%	1.21%	1.25%	1.28%			
Bonds issued Year 3			0.64%	0.76%	0.86%	0.95%	1.03%	1.10%	1.16%	1.21%	1.25%	1.28%		
Bonds issued Year 4				0.64%	0.76%	0.86%	0.95%	1.10%	1.10%	1.16%	1.21%	1.25%	1.28%	
Bonds issued Year 5					0.64%	0.76%	0.86%	0.95%	1.03%	1.10%	1.16%	1.21%	1.25%	1.25%

The difference in the default probability of the mix and the target AA ratings (Pd [AA]) default probability gives the gap (Pd[mix] – Pd[AA]) the enhancement needs to cover. This gap, when multiplied by the facility's exposure to the bond issuance, provides us with the capital required used in Table 4.

Table 4: An estimate of the annual capital raise vs capital erosion of the facility for the credit-enhanced bonds

Year	Bond issuances credit enhanced annually (USD million)	Underlying rating mix percentage of (pre-enhanced) of annual bond issuances		Size of credit-enhanced bond portfolio	Capital tied up to the facility to cover the cumulative losses of the outstanding bond portfolio (BoY) (X)	Facility capital erosion during the year (Y)	Facility net capitalisation (EOY) (Z= X – Y)
		A	BBB				
1	1,000	33%	67%	1,000	98	6	91
2	1,500	33%	67%	2,500	238	17	220
3	2,000	33%	67%	4,500	416	33	383
4	2,500	33%	67%	7,000	627	53	574
5	3,855	33%	67%	10,855	945	84	861
6				10,855	861	94	767
7				10,855	767	102	665
8				10,855	665	109	556
9				10,855	556	114	441
10				10,855	441	119	323
11				9,855	323	110	212
12				8,355	212	95	117
13				6,355	117	73	44
14				3,855	44	44	0

Note: The "Facility Capital Erosion during the year" (Y) when discounted at 6 per cent provide the figure of USD 649 million as the net present value of the minimum capital required to cover losses without any structuring support usually availed under bond issuance.



The energy transition due to the existing barriers faced by traditional lenders to lend at a scale required, will need support from alternative sources of capital.



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