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Mobilizing Investment for Clean Energy in India

Community-Developed Solutions to Help Accelerate Financing for India's Clean Energy Sectors

COMMUNITY PAPER

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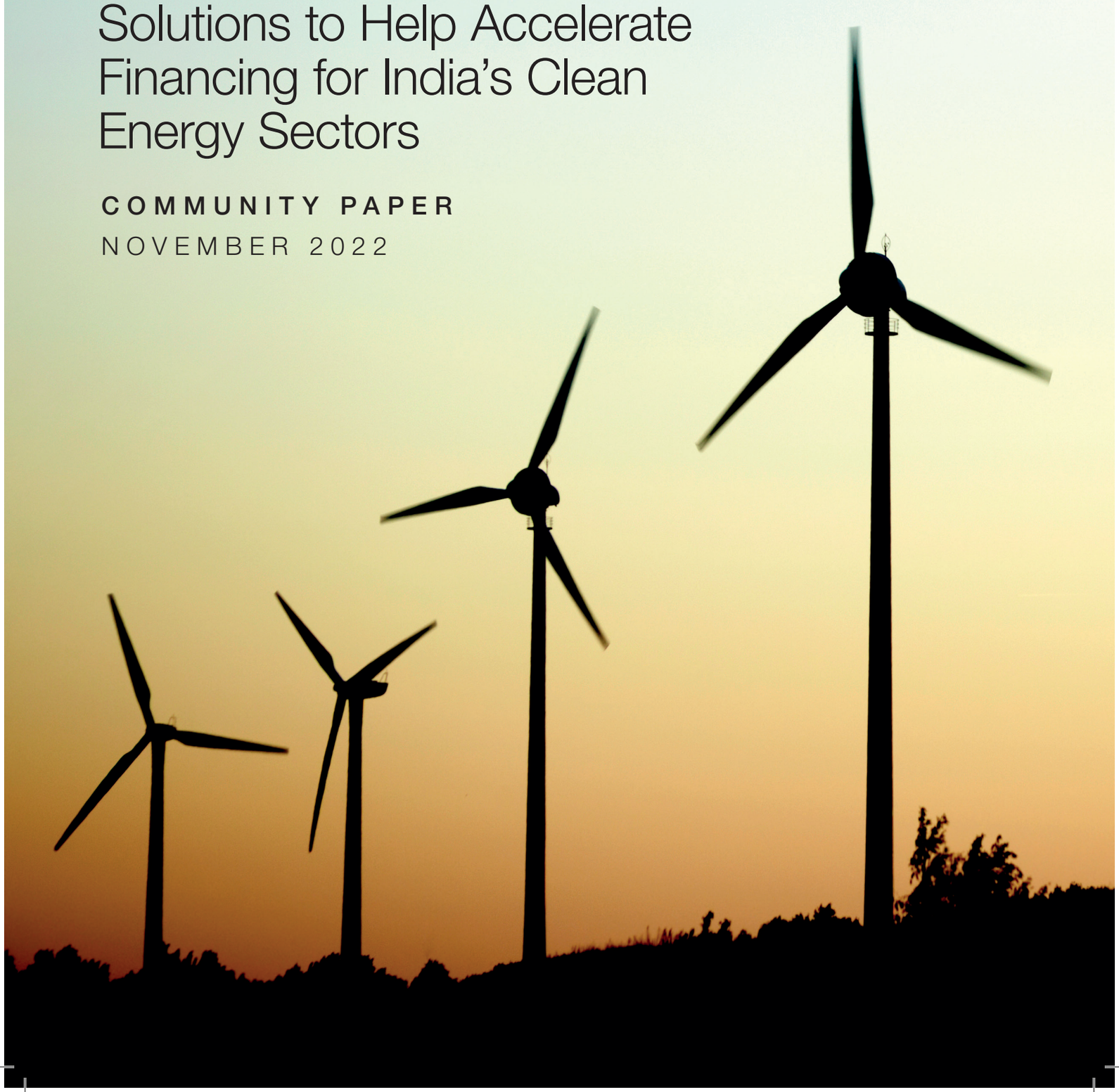

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Executive summary

India has charted ambitious goals for its energy transition. These include achieving 50% cumulative electric power installed capacity from non-fossil fuel-based energy resources.[1] Additionally, it has committed to reducing the emissions intensity of its GDP by 45% (compared to 2005 levels), also by 2030. From a longer term perspective, India has stated its goal of achieving net-zero emissions by 2070.

The associated investment requirements are immense. From a near-term perspective, the Parliamentary Standing Committee on Energy (2021-22) released the *Financial Constraints in the Renewable Energy Sector* report in January 2022 to highlight the immense amount of investment required for India to meet its 2030 targets.[2] It points out that actual investment flows in recent years have been at most half of what is required. From a longer-term perspective, a Council on Energy, Environment and Water (CEEW) report on *Investment Sizing India's 2070 Net-Zero Target* estimates that India would require $10.1 trillion to achieve net-zero by 2070.[3]

In October 2021, as part of the Mobilizing Investment in Clean Energy in Emerging Economies (MICEE) initiative, the Word Economic Forum joined with CEEW as its country co-lead to take a deep look into practices in India. The purpose of the in-depth look was to identify practical tools, financing mechanisms and policy solutions that can increase the flow of private international and domestic capital to support the achievement of transition pathways. The twin features that defined this work were a focus area and stakeholder engagement-based approach. Global consulting firm Accenture and global risk adviser Marsh supported the Forum and CEEW during this process.

From a process perspective, the in-depth look commenced with a list of 12 focus areas for potential intervention. Over the course of multiple stakeholder engagements held over several months, these 12 were reduced to 2 areas that the stakeholders felt had the highest impact potential. Next, the stakeholders proposed solutions to address the specific financing challenges faced by each focus area. Table 1 summarizes these financing challenges and solutions.

TABLE 1 **Focus area and solution summary**

Focus area	Challenge	Solution(s)
Utility-scale renewable energy	While capital is flowing at pace and generally at reasonable rates of finance, it is far lower than it needs to be in terms of scale	An intervention that results in the opening of the domestic debt capital market (bonds) to utility-scale renewable energy in a self-supporting manner and at scale
Energy storage	Attracting debt funding for storage projects is challenging due to the nascent nature of the technologies, the lack of viable business models and policy uncertainties	A technology de-risking fund focused on storage that enables lenders to extend loans to riskier storage projects

1 Utility-scale renewable energy

1.1 The case for intervention

CEEW first highlighted the Indian utility-scale renewable energy debt capital constraint challenge in its *RE-Financing India's Energy Transition* report released in July 2020.[4] That report estimates India would require $200 billion[5] by 2030 for renewable energy targets for generation alone. It also highlights the constraints for conventional sources of debt finance (banks and non-banking financial companies) for this debt capital-heavy sector and proposes an intervention to make the domestic bond market more accessible to Indian renewable energy developers. At the same time, the raising of debt capital in international bond markets by Indian renewable energy developers gathered significant pace in 2021, as highlighted in CEEW's *Financing India's Energy Transition Through International Bond Market* report.[6] However, even these record amounts last year ($5.1 billion) were not nearly enough to address the capital constraint by themselves.

The challenge received further validation in January 2022 in the form of the *Financial Constraints in Renewable Energy Sector* report by the Indian Parliament's Standing Committee on Energy,[7] which highlights that, according to the Ministry of New and Renewable Energy (MNRE), India would need annual investments of Rs. 1.50 to 2 lakh crore (some $20 to $27 billion) for renewable energy capacity additions. Against this, this report elaborates that investments for the last few years have been in the range of Rs. 75,000 crore ($10 billion). Thus, at most, only half of the capital required is actually being mobilized.

Data released by the Reserve Bank of India (RBI) empirically back this challenge, revealing that the overall credit exposure of scheduled commercial banks (SCB) to the power sector as a whole (all generating sources, as well as transmission and distribution) was more or less flat at some $75 billion between fiscal year 2015 and fiscal year 2021. This number went up only slightly in 2022 to $81 billion. This is inconsistent with the steep capital needed to meet India's renewable energy targets. In contrast, non-power infrastructure credit exposure grew by over 60% between 2015 and 2022.

TABLE 2 **Risk evaluation: Top risks identified**

Administrative risk	– Approvals required for renewable energy projects are state-specific and may vary from one state to another – Delays in land procurement and local authorities granting approvals
Off-taker risk	– Several state-owned distribution companies struggling financially due to the high level of aggregate technical and commercial (AT&C) losses, lower tariffs vs cost of supply, and ineffective subsidy support from state governments – Delays in tariff determination and its inadequate amount among the primary factors contributing to adverse financial performance
Grid & transmission risk	– Going forward, the ability of the grid to handle the tremendous amount of targeted renewable energy capacity expansion
Regulatory/ contract risk	– Challenges to signed contracts by state agencies – Changes to regulations for renewable power, e.g. changes to duty/tariff structure and export/import norms for power plant equipment

TABLE 3 | **Solutions workshop & bilateral discussion: Key findings**

State of play	– **General** – Adequate levels of finance will be a challenge to meet renewable energy targets; primary inhibiting factor is the ultimate credit quality of off-takers (DISCOMs)
	– **Equity** – Capital is not a challenge for good utility-scale renewable energy projects, macros are favourable and there is willingness to back strong teams and assets

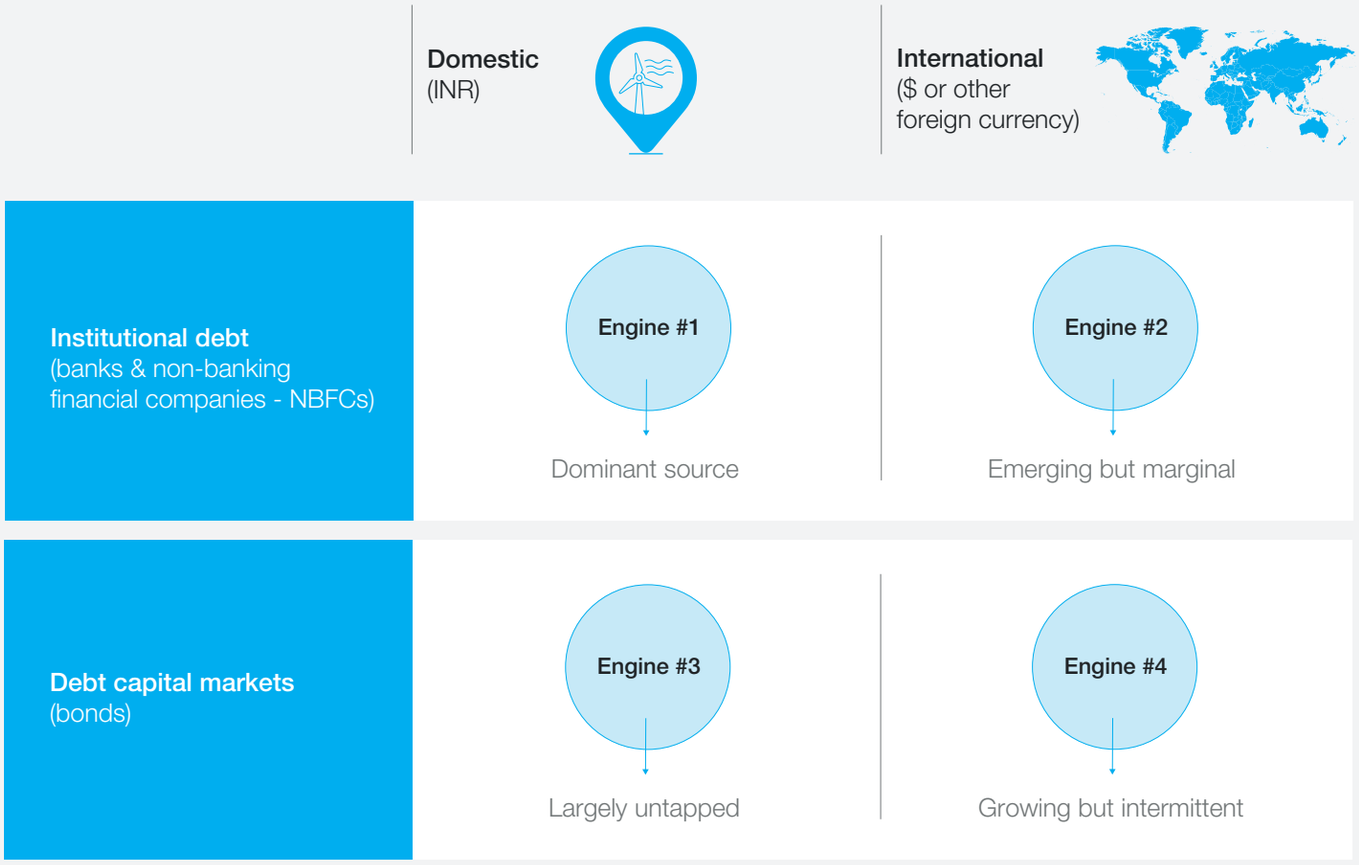
	– **Debt**
	  – Growth in lending to utility-scale renewable energy has not been there in the last few years
	  – Public sector banks have exceeded their power sector limits
	  – On the private side, banking sector has low appetite for longer term financing due to asset-liability mismatch
	  – Domestic bond market not very evolved

What is required	– **Tap new sources of debt capital & recycle existing debt capital**
	  – Local banks to play a more prominent role – lenders appear to be hesitating to increase exposure to utility-scale renewable energy, especially greenfield projects
	  – International banks could take out lenders who are assuming construction risk for renewable energy
	  – Improve access to fixed cost debt (bank loans are floating rate)
	  – Increase the capacity of the system to recycle debt
	  – Further open up the domestic bond market to utility-scale renewable energy at scale by increasing its acceptance

1.2 **Proposed solution:** A facility to bridge the rating gap and recycle capital

Among equity and debt, the process focused on debt, given that it typically accounts for about a 75% share of utility-scale renewable energy project costs.[8] Within the debt segment, the domestic debt capital (bond) market is the most suited for intervention to unlock capital flows to renewable energy. The domestic bond market is one of four principal engines of debt finance for utility-scale renewable energy but, importantly, it is also the most underexploited, as depicted in figure 1.

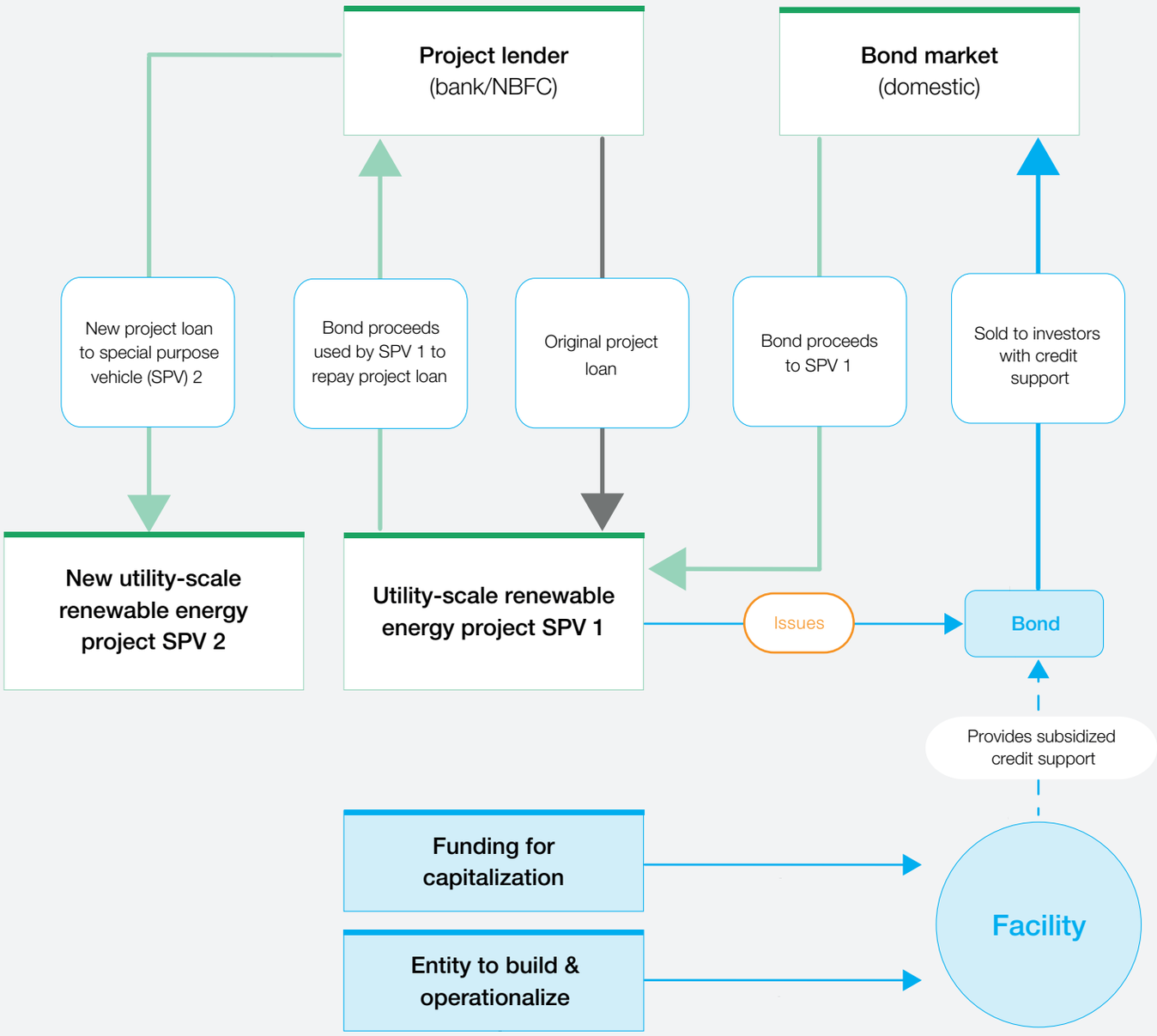
FIGURE 1 **Four engines of utility-scale renewable energy debt finance**



The domestic bond market has recently seen some limited activity[9] with respect to utility-scale renewable energy. But much more needs to be done on this front. The proposed solution bridges the gap between where credit ratings are for utility-scale renewable energy project loans and where they would need to be to access the domestic bond market in a self-supporting manner and at scale. There has been a significant upward movement in such credit ratings over recent years. A CEEW study released in December 2021 tracked the project loan ratings of 114 solar projects over the 2012-20 period. It found that "*all solar projects tracked in 2012 had a below investment grade rating, but, by 2020, almost 90 per cent had an investment grade rating, with over 60 per cent of the projects being assigned a rating of A and above.*"[10]

This means that while most project loans are still not in a position to access the domestic bond market unassisted, the cost of bridging the gap has come down significantly. The following solution, outlined in figure 2, is proposed to take advantage of these tailwinds.

FIGURE 2 | **A facility to bridge the rating gap at subsidized rates and recycle capital**



1.3 Key considerations

There are six key considerations to operationalizing the kind of facility depicted in figure 2. These considerations and some preliminary views on addressing each are provided below.

1 Extent of capitalization

- Two recent domestic bond issuances highlighted above were for underlying portfolios of 350 MW and 555 MW, respectively
- Issuances sized at $160 million and $190 million
- Using a 16.7x multiplier[11] yields facility capitalization of some $10 million for issuances in the range of $160 million to $190 million, as highlighted above; actual capitalization would vary depending on the guarantee structure created
- Using a $10 million facility capitalization for issuance of a $190 million/555 MW portfolio as a benchmark suggests a facility capable of mobilizing GW-scale bond issuances could be capitalized for as little as $20 million

2 Cost to user

- Inversely related to the extent of subsidization

3 Extent of subsidization

- Dependent on (a) the capital stack that capitalizes the facility and (b) the proposed additional charges for accessing the facility
- For an "all grant" capital stack and with zero additional charges levied, then the extent of subsidization would equal facility capitalization, resulting in "zero" cost to the user

4 Conditionality to access

- Take out of INR-only project debt extended by banks and NBFCs (no refinance of bonds or other securities)
- No top-up in excess of project debt being taken out (no general corporate purpose portion to be used as equity replacement)

Regional focus

- No regional skew in solution applicability (generally and uniformly applicable nationwide)

5 Funding for capitalization

- To be taken up by implementation leads

6 Entity to build & operationalize facility

- To be taken up by implementation leads

2 Energy storage

2.1 The case for intervention

Energy storage is an effective option for balancing the variability of renewable energy sources, as it helps to mitigate the challenges arising from grid instability issues and maximizes renewable energy generation. A wide range of energy storage options are available for use in the energy sector and more are emerging, such as flow batteries, metal-air batteries and hydrogen.

Under the cabinet-approved nationally determined contributions (NDC), India has set a target of reducing the emission intensity of its GDP to 45% of its 2005 levels and increasing the share of non-fossil installed electricity capacity to 50% by 2030. To meet these targets, the Indian grid must address challenges related to flexibility, reliability and security to provide continuous and reliable power. The government recognizes that energy storage systems will have a significant role to play and, as such, has allocated funding in its national budget for 2022-2023 to promote grid-scale battery systems. According to a 2020 *Financing Energy Storage* analysis by CEEW's Centre for Energy Finance,[12] up to $136 billion would be needed by 2030 for energy storage solutions as there is growing demand due to the scaling of renewable energy sources and the uptake of electric vehicles and the associated infrastructure requirements.

Three main challenges inhibit the energy storage sector from scaling: 1) lack of knowledge and familiarity with the technology; 2) lack of business models available to scale energy storage solutions; 3) limited financing options due to lack of project performance.

The primary challenge with energy storage is that it is a nascent industry with high perceived risk due to the lack of widespread familiarity with storage technologies. As a result, there is little incentive to innovate new technologies and channel financing to innovation. It takes time to increase acceptance of the technologies and it would be beneficial to educate investors on the benefits of storage technologies and their potential for long-term impact.

The second major challenge is that no viable business model looks at energy storage at scale. Initially, energy storage technologies come with high upfront costs and a low revenue base – making them less attractive compared to other solutions. Mainstreaming the sector will be vital to unlocking long-term financing options.

Third, there is a significant gap in finding lenders willing to finance this sector. CEEW has identified that the lack of project performance and credit readiness impedes the development of a domestic bond market for long-term borrowing. According to the *Paris Alignment of Power Sector Finance Flows in India* report from Sustainable Energy for All and the Climate Policy Institute,[13] developing innovative financial mechanisms and leveraging blended financing structures will help crowd-in private finance.

TABLE 4

Risk evaluation: Top risks identified

The challenges of financing the energy storage sector in India can be grouped into three main categories:

Technology risks	– Costs of engineering R&D to keep up with demand – Lack of standardized criteria for early-stage deployment – Unreliable grid infrastructure
Commercial risks	– Lack of project performance track record – Demand for consistent power without cuts – Lack of business models to scale energy storage solutions
Policy risks	– Procurement process challenges – Lack of technical support for pilots

2.2 Proposed solution: A technology de-risking fund

What is it about?
A technology de-risking fund focusing on reducing risks associated with the nascency of storage technologies and business models in India could be a valuable tool in promoting financing for energy storage projects.

How would it work?
The fund would be applicable in states where variable renewable energy generation is exceptionally high and would have two mandates: financial coverage and technology education.

Financial coverage
At its core, the fund would offer two forms of coverage to participating lenders:

a. A payment security mechanism to cover any delays experienced by the project developer in collecting invoices from off-takers.

b. A super senior loan facility to be extended to project developers to provide partial coverage for performance-related and other delays arising from technological and operational issues across the project life cycle.

These forms of coverage would help facilitate more lending to risky technologies like storage while alleviating the risks of lenders accumulating more non-performing assets on their balance sheets associated with such lending.

Storage technology education
The fund, in association with banks, financial institutions, governments, regulators, media and other key players, would organize workshops with audiences from the sector and investors to educate them and get ideas to create and build lower risk commercial and financing models. Experience sharing and idea exchange can help develop more sustainable solutions.

Who would contribute capital to the fund?
The government and its development finance institutions (e.g. the Indian Renewable Energy Development Agency (IREDA), India Infrastructure Finance Company Limited (IIFCL)) would have a pivotal role to play in kick-starting the fund. One suggestion is to initially have the fund housed under IREDA for easy off-take. IREDA's mandate focuses on developing and extending financial assistance to set up new and renewable energy projects, so it is well suited to understand the sector's challenges. While the government would provide an initial push to the agenda, significant scaling of the fund would require capital contributions from other key groups, such as multilateral institutions, businesses, financial institutions, NBFIs and funds with strong ESG goals and the ability to invest.

Who would be the primary beneficiaries of the fund?
The primary beneficiaries of the fund should be the leading providers of debt capital to storage projects, namely banks and NBFIs. Coverage for equity investors may be considered at a later stage.

What are some examples of similar funds?
A couple of other funds and schemes in India that this storage de-risking fund could draw inspiration from are:

1. *Partial Risk Guarantee Fund for Energy Efficiency (PRGFEE):* Put in place by the Bureau of Energy Efficiency under the Ministry of Power, this $40 million fund provides partial coverage of risks to financial institutions extending loans to energy efficiency projects by guaranteeing up to 50% of amounts loaned.

2. *US-India Catalytic Solar Finance Program:* A $40 million commitment from various US foundations, the U.S. International Development Finance Corporation (DFC) (formerly known as the Overseas Private Investment Corporation (OPIC)) and the Government of India to help finance rooftop solar. Some proposed financial interventions include a credit guarantee mechanism, payment security mechanism and foreign exchange hedging facilities.

What are some other initiatives that could supplement this fund?
Other initiatives and enablers that could work alongside the fund to help satisfy similar objectives include:

1. *Credit insurance* – this is now allowed in India. Banks and financial institutions can also structure transactions through coverage by insurance agencies to cover the risk of repayment.

2. *Hybrid projects* – Projects could take a more hybrid route to development rather than focusing solely on energy storage solutions to mitigate the technology risk and diversify the production base

3. *Parental support policy reform* – If companies with multinational backgrounds put up the projects, parental guarantees can also help with risk mitigation. Current policies for parental support from an offshore entity are quite tricky to navigate.

4. *Intraday power pricing reforms* – Reforms focusing on pricing power during different times of the day are essential for energy storage to take off substantially. Non-availability of a peak power tariff currently makes higher pricing for storage unviable.

Conclusion

In the coming months, the working group will identify implementation leads for each proposed solution and support in operationalizing the solutions to mobilize finance at scale for the utility-scale renewable energy and energy storage sectors in India. The working group hopes that insights from the exercise can support additional decarbonization and accelerate the clean energy transition in India.

Contributors

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