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Credit Support Pathways for Rooftop Solar Projects in India

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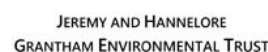
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A Design Case Study for
The U.S. – India Catalytic Solar Finance Program

About the U.S. – India Catalytic Solar Finance Program (USICSF)

The U.S. – India Catalytic Solar Finance Program (USICSF) was conceived when Indian Prime Minister Narendra Modi visited the U.S. in June 2016. The aim of the program is to provide an impetus to the Distributable Renewable Energy (DRE) sector in India through development of financial interventions that can mobilize private capital at scale, thus assisting in India’s policy targets of achieving 40 GW installed capital in the DRE sector by 2022. The program is a commitment made jointly by US Foundations and the Government of India.

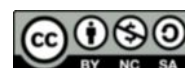


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Descriptors

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Related CPI Report	Driving Foreign Investment to Renewable Energy in India: A Payment Security Mechanism to Address Off-Taker Risk The Drivers and Challenges of Third Party Financing for Rooftop Solar Power in India Reaching India's Renewable Energy Targets Cost-Effectively: A Foreign Exchange Hedging Facility
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Executive Summary

India, under the Intended Nationally Determined Contribution (INDC), has set an ambitious target to achieve installed capacity of 175GW of renewable energy by 2022, including 100GW of solar power. Of that, the government aims for 60 GW to be utility-scale solar, and the rest to be rooftop solar. Though India has made significant progress on the 60 GW utility-scale solar target, getting to the 40 GW rooftop solar target will be a significant undertaking. As of March 2018, installed capacity of rooftop solar was only ~2.53 GW, which means in the next four years India needs to achieve more than 15 times the current capacity. Filling this gap between the current installation and the 40 GW goal will require significant efforts from policy makers, lenders, and other stakeholders in this area, quickly.

One area of opportunity to fill this gap lies with small and medium businesses. Currently, the majority of rooftop solar installations are in the Commercial and Industrial (C&I) segment, primarily due to a business case for rooftop solar tariffs against the prevailing electricity tariffs. Market expansion under the C&I segment, however, has been limited to large corporates and high credit rated entities, for both the developers and off-takers, and does not extend to Micro, Small and Medium (MSME) entities. While these entities offer a huge potential for rooftop solar installations, they typically do not have high enough credit ratings to access finance under the two prevailing rooftop solar business models, the Capital Expenditure model and the Power Purchase Agreement model.

Lack of access to debt is the key barrier to expansion of rooftop solar to low rated/unrated MSME and general enterprises. It results from lack of credit benchmarks and credit history of such entities. For the market to move forward, it is essential to find a solution to address this barrier.

Our preliminary analysis shows that developers are hesitant to offer Power Purchase Agreement-based terms to a large section of prospective clients in the MSME segment. This is mainly due to the lack of historical financial performance record and uncertainty around the creditworthiness of off-takers. Further, lack of collateral makes banks reluctant to provide long-term

financing to these projects. Thus, there exists a strong need for credit support mechanisms that can help address the key barriers to access to debt financing, i.e. payment delay and/or payment default, for expansion of rooftop solar to MSMEs.

This instrument design case study for the U.S.-India Catalytic Solar Finance Program (USICSF) proposes the use of a Credit Guarantee Mechanism to overcome these barriers to further scale-up rooftop solar for MSMEs.

The proposed Credit Guarantee Mechanism (CGM) works as a bilateral loss-sharing agreement between a CGM Trust Fund and Lending Institutions (Banks/FIs) as illustrated in Figure ES1. In this structure, a Facility Manager, under the guidance of the Trustees of the CGM Trust Fund, extends credit guarantees to participating lending institutions. Based on these credit guarantees, lending institutions then extend debt financing to renewable energy service companies (RESCOs), who enter into off-take agreements with MSMEs to install rooftop solar.

The Facility Manager, as per the agreement within the credit guarantee, commits to support lending institutions in case of delay in debt servicing and also reimburses the lending institutions for a portion of the losses incurred due to payment default by the RESCO.

Such a mechanism could be launched as a funded public intervention by the Ministry of New and Renewable Energy (MNRE) through suitable host financial institutions who could manage and administer the CGM Facility.

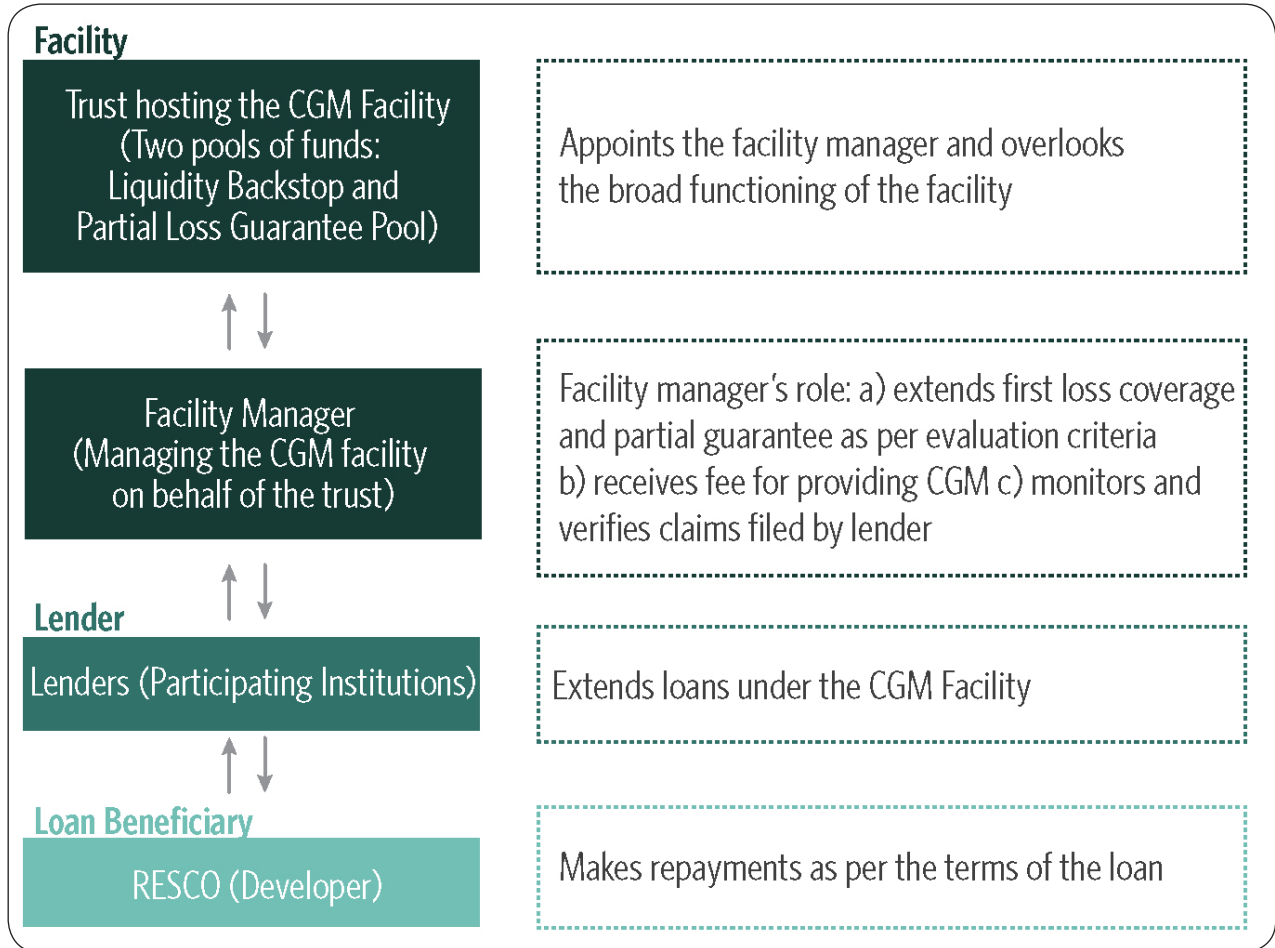
We find that under Credit Guarantee Mechanism, one million dollars of donor grant capital invested in the facility enables US\$14 million of capital mobilization, and a capacity installation of 18 MW in the rooftop solar sector.

Overall, a CGM is effective because it takes lenders' requirement for credit support in the event of payment delay or payment default into consideration. A CGM has an additional benefit of lowering the collateral required against the loan raised by the RESCO.

The proposed Credit Guarantee Mechanism addresses the most important barriers to scaling rooftop solar in the MSME sector; and could be crucial if India wants to achieve its rooftop solar target by 2022. Thus, we recommend the use of a Credit Guarantee Mechanism

to scale-up rooftop solar in the low rated/unrated MSME/ general enterprises segment.

Figure ES 1: Structure of Credit Guarantee Mechanism



1. Introduction

In the past few years, India's rooftop solar power industry has made significant strides in moving towards its ambitious renewable energy target of 40 GW of installed capacity by 2022. This is primarily due to the declining cost of installations and favorable government policies. However, the growth rate of rooftop solar installations remains slower than what will be required to achieve India's targets. As of March 2018, India's installed capacity of rooftop solar stands at ~2.53GW¹, that is ~6% of the 40 GW installed rooftop solar capacity target. This means in the next four years India will require a compound annual growth rate of ~100% to reach its target by 2022.

The two dominant business models for the rooftop solar sector in India are the Capital Expenditure (CAPEX) model and Power Purchase Agreement (PPA) based model. Under the CAPEX model, the solar project is owned by the roof owner. The power produced from rooftop solar project is used for captive consumption and the surplus power can be banked or sold to the electricity distribution company (DISCOM) under the net metering arrangement. Based on the financial strength of the rooftop owner, the project could be funded through the owner's internal accruals or by way of loans availed from lenders. As of March 2018, the CAPEX model accounts for ~76%² of the total installations in India. Figure 1 presents a representation of the cash-flows under CAPEX (loan) model.

Under the PPA-based model, the rooftop solar project is owned by a third-party project developer, also called as a "Renewable Energy Service Company (RESCO)". The RESCO could avail term loans from lenders to fund part of the project cost, and then enter into a long-term PPA with the rooftop owner for the sale of power. As of March 2018, the PPA-based model accounts for about 24% of the total rooftop installations in India. The PPA-based model is represented in Figure 2.

Currently, the majority of installations under the above two business models are in the Commercial and

Industrial (C&I) segment, primarily due to a business case for rooftop solar tariffs against the prevailing electricity tariffs (Bridge to India, 2017). Of the installed capacity of 2.53 GW as of March 31, 2018, 65% of the rooftop solar installations are in the C&I segment. The overall rooftop solar market potential within the C&I segment is estimated at 31 to 41 GW by 2024 (Bridge to India, 2014). The Government has taken up several initiatives to provide more capital to the rooftop solar sector. For example, the World Bank issued US\$ 625 million credit line to the State Bank of India (SBI) and the Asian Development Bank (ADB) issued a US\$ 500 million multi-tranche financing facility to Punjab National Bank (PNB). These banks are, however, financing large, well-capitalized corporate developers who sign PPAs with entities with a credit rating of BBB+ and above.

That is, at present, the market expansion under the C&I segment has been limited to the large corporates and high rated credit entities, whether as off-takers under CAPEX (loan) or developers/off-takers under PPA-based model. In our primary research, stakeholders have expressed a concern that the rooftop solar market is reaching a plateau and does not extend to the Micro, Small and Medium (MSME)^{3,4} entities, which typically do not have high enough credit ratings to benefit from the two business models discussed above.

That noted, the MSME segment offers huge potential for rooftop solar installations in India. India has over 44 million MSME entities,⁵ which contribute more than 45% of India's manufacturing output and employ more than 60 million people in the country. For majority of these MSMEs, energy consumption continues to be the single largest operational cost.⁶ It is increasingly becoming imperative for these entities to adopt clean energy solutions to not only save on their operation costs, but also to be a part of the green agenda being driven by the larger companies they work with as vendors (TERI/ YES Bank, 2015).

1,2 <http://www.bridgetoindia.com/wp-content/uploads/2018/07/BRIDGE-TO-INDIA-India-Solar-Map-March-2018.pdf>

3 [Current MSME definition](#)

4 [Cabinet approved proposed definition of MSME](#)

5 <https://beeindia.gov.in/content/small-medium-scale-enterprises-sme>

6 <https://beeindia.gov.in/content/small-medium-scale-enterprises-sme>

Figure 1: CAPEX (loan) model

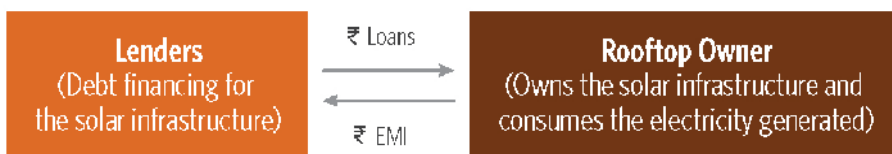


Figure 2: PPA-based model



Existing rooftop solar installations fall into two main business models that work well in the commercial and industrial sector, however, the segment is reaching a plateau in its growth potential, due to lack of uptake in small and medium enterprises

The rooftop solar market is reaching a plateau within the C&I segment due to lack of requisite number of credit worthy MSME developers and/or perceived risks historically associated with off-takers in the C&I segment. Our primary research has identified lack of access to debt as the key barrier in the expansion of rooftop solar market to MSME entities. This results from lack of credit benchmarks and credit history of MSME entities. As such, in order for the market to move forward, a solution to address this lack of access to debt finance is essential.

Our focus in this report, therefore, is on addressing the barriers constraining the expansion of the PPA-based model for the low rated/unrated MSME segment, and other general enterprises, and offers potential public

interventions to improve access to finance for rooftop solar projects and businesses. This report is part of a series of design case studies that Climate Policy Initiative (CPI) and cKinetics Consulting Services (cKinetics) are investigating, as part of U.S.-India Catalytic Solar Finance Program (USICSF), which looks into possible interventions to ease the most important barriers to financing solar rooftop projects, and make additional capital available. USICSF is a joint program between the Government of India and a consortium of philanthropic foundations to explore and implement innovative financial interventions to catalyze private investment into the distributed renewable energy sectors in India.

Section 2 of the report analyses the barriers to uptake of rooftop solar in India and sets the background for the necessity of an intervention to facilitate access to financing for the low rated/unrated MSME entities and general businesses.

Section 3 details the Credit Guarantee Mechanism along with the design and fund requirement for the mechanism

Section 4 summarizes the impact of the proposed mechanism and the way forward for implementation.

2. Barriers to scaling up rooftop solar for MSMEs

Historically, access to credit has been a challenge for the MSME sector – the very segment that is key in scaling up the rooftop solar segment. Our primary research indicates that developers are hesitant to offer PPA-based terms to a large section of prospective clients in the MSME segment due to the lack of historical performance record and uncertainty around the creditworthiness of off-takers. Further, lack of collateral makes banks reluctant to provide long-term financing to these projects.⁷ The project developers, financial institutions and Solar Energy Corporation of India (SECI) have, therefore, expressed a strong need for credit support mechanisms which can help address the key barriers to access to debt financing i.e. payment delay and/or payment default. We can map these two barriers to the two sides of the PPA-based model as follows (we note that similar issues, especially payment default, may also arise in CAPEX model; however, to keep the coverage concise, we mostly focus on the PPA-based model going forward):

1. Payment default: In a rooftop solar project operating under the PPA-based model, the payments made by the off-taker for the consumption of the electricity generated are used by the developer/RESCO to meet its debt obligations related to the project. In case the off-taker is unable to honor the payments (even beyond a delay, usually 90 days post raising the demand bill) as per the terms of the PPA to the RESCO, this may in turn lead to a default from the RESCO towards its debt obligations to lenders. This is based on the assumption that:
 - b. RESCO's only source of funds to meet the debt obligations is the payments received from off-taker from sale of electricity.
 - c. RESCO may not be able to receive termination payment, if any, from the off-taker in case of a payment default.⁸

Such payment defaults would not only impact

⁷ While banks do have thresholds for collateral free lending, the limit set by RBI for collateral free loans is up to US\$ 15,000 lakh and under CGTMSE scheme, MSME can borrow collateral-free loans up to US\$ 300,000. The same is generally utilized by the entity for their core activities and not for setting up a solar power project.

⁸ Termination payment is a provision in the PPA which states that the off-taker is obligated to make a certain amount of payment to the RESCO in case of an early termination of PPA at off-taker's convenience and/or due to off-taker's default. The payment amount is typically either a premium on the book value of the asset or a discounted value of future cash flows of the project. Given the challenges in contract enforceability in India, it is assumed that the RESCO is unlikely to receive a termination payment from the off-taker.

the credit rating of the RESCOs, but also have an adverse impact on the financial performance of the lenders.

2. Payment delay: Off-takers may delay payments due to cash flow constraints, arising primarily due to variability of cash flows to the entity or a practice followed in the normal course of business by the off-taker to maintain the working capital cycle. A delay in the payments will result in cash flow constraints/ liquidity issues for the RESCO, leading to a delay in meeting the debt obligations. Such delays in meeting the debt obligations may lead to an adverse impact on the credit ratings of the RESCO. Payment delay is, therefore, a key barrier to access debt financing for RESCOs who sign PPAs with low rated/unrated MSME and other general enterprises.

Considering that the entities in MSME segment typically have credit ratings of BBB or lower, lenders are not willing to lend to RESCOs which have a PPA with such MSME entities, due to concerns on payment delay and default. Moreover, due to lack of available information to assess the credit worthiness of an unrated MSME entity, access to debt financing is further constrained for the RESCOs. While the payment delay and payment default, are due to off-taker specific factors, the same could also arise due to RESCO-specific factors, i.e. technology failure, lack of appropriate operations, maintenance, etc. These factors could have an adverse impact on the power generation potential of the rooftop solar project, and may result in lower-than-estimated revenues for the RESCO. This could, in turn, constrain the RESCO's ability to service the debt obligations. So, lenders are willing to fund RESCOs with a higher credit rating (resulting from a better operational track record and financial strength) but not to the low or unrated RESCOs.

We conducted a survey with several key banks and financial institutions to understand the key barriers for financing rooftop solar and also the possible solutions to address these barriers. Further, our primary research points to a strong need for credit support in the form of: (1) **credit guarantee support** to address debt servicing to lenders in the event of **payment default** and (2) **liquidity support**⁹ to address the **payment delay** for a certain period of time. The former solution tries to solve the access to debt issue through comforting the

⁹ It should be noted that the genesis of this work lies in exploration of a liquidity support mechanism for the case of government off-takers.

lenders. The latter is primarily targeted for entities with businesses prone to cash-flow variability, where payment delay is a concern and not payment default.

We identified the following stylized facts based on our survey:

1. Preferred characteristics for financing a project with a PPA-based model:

- RESCO backed by a strong private equity or a corporate to ensure adequate margin commitment (equity component of the project cost)
- At least 10 MW of installed capacity and operating cashflows for a minimum of 2 years, to ensure RESCO has a good implementation track record
- Corporate guarantee/ personal guarantee of RESCO's promoters should be available throughout the tenor of the loan
- The off-taker with an investment grade rating

2. Barriers for financing PPA-based rooftop solar projects:

- All respondents identified lack of creditworthiness of RESCOs and of off-takers as the two major barriers for financing.
- The concern on off-taker creditworthiness is primarily related to those projects with off-take arrangements with low rated or unrated MSME and general enterprises
- This concern arises due to inadequate

information to assess the entity's creditworthiness, leading to a perceived risk of payment delay or default.

- Lack of collateral, lower equity commitment from RESCOs, lack of standardization, and high transaction costs related to due-diligence of transactions are some of the other barriers the respondents identified.

Stakeholders suggest that credit support mechanisms which address the barriers of payment delays and defaults, due to off takers/RESCOs, leading to an adverse impact on debt servicing to lenders, are essential for the growth of the Indian rooftop solar segment and to enable RESCOs to access credit from banks.

The above feedback highlights the barrier of lack of access to debt financing for RESCOs who enter into offtake arrangements with low rated/ unrated MSME entities and other general enterprises.

Further, the respondents agreed that in order to overcome these barriers, it is essential to have risk mitigation instruments in the form of credit guarantee structures or risk insurance products. This would help mitigate the risks of payment delay and default, thereby enhancing the flow of debt finance into MSME rooftop solar segment.

3. The Credit Guarantee Mechanism

Pursuant to the engagement with the key stakeholders, it is clear that an integrated solution addressing both the aforementioned barriers, payment delay and payment default, is essential to unlock access to debt financing for the PPA-based models with low rated/unrated MSME and general enterprises. In this section, we discuss this integrated solution characterized as a Credit Guarantee Mechanism in detail. We will also walk through the analysis we undertook to estimate the size and impact of a CGM.

3.1 Background

As mentioned in Section 2, a large section of the MSME segment is comprised of entities with low or no credit ratings. Moreover, MSME entities whose businesses are cyclical in nature often resort to payment delays due to a temporary cash flow mismatch. In view of the lack of adequate information to assess the credit-worthiness/payment capability of the MSME off-takers, and in view of the seasonality of the off-taker businesses, RESCOs are not willing to sign PPAs with such entities as payment delays may adversely impact their debt servicing ability with the lenders.

In addition to payment delay risk due to off-taker specific factors, there is a separate, but related risk challenging access to debt for rooftop solar. That is, lenders are unwilling to take exposure on RESCOs who sign PPAs with MSME entities, due to the potential risk of loan defaults resulting from the non-payment of dues by the off-takers. In many cases, even if the RESCOs have an investment grade credit rating,¹⁰ access to debt financing is constrained due to the perceived default risk from off-taker's financial performance.

Moreover, in case of RESCOs (possibly heightened for RESCOs with below investment grade rating - typically the MSME RESCOs), access to debt financing is also constrained due to lenders' concerns on payment delay and payment default arising due to factors specific to the RESCO, i.e. technology failure, lack of appropriate operations and maintenance, etc. These factors could have an adverse impact on the generation and may result in lower than estimated revenues for the RESCO. This could in turn constrain the RESCO's ability to service the debt obligations. Therefore, lenders are more comfortable to fund RESCOs with a higher credit rating and not to the MSME RESCOs. Thus there is a requirement for a comprehensive solution that can mitigate the adverse impact of both the delay and

default in payments by MSME off taker on the lender to the project.

A Credit Guarantee Mechanism (CGM) is a structure where the credit risk is shared between participants and the guaranteeing agency. A CGM is widely considered to be a risk mitigation facility to improve access to financing. Under the CGM facility, the lending institution is protected partially against any losses on account of delay or default by the loan beneficiary. This helps the lending institutions to lend to a sector considered to be of a higher risk and thus remains underserved. More details of the impact, the leverage, key attributes, and learnings from some schemes are included in Annexure 6.1 and 6.2.

This type of mechanism would be a suitable solution to not only address the lenders' concern on loan default due to factors specific to off-taker, but also due to factors specific to a low rated/unrated RESCO. Such a mechanism enables debt financing to:

- (a) RESCOs with established operational track record and adequate financial strength (e.g. investment grade rating), with an off-take arrangement with MSME entities, where payment default risk could arise due to off-taker specific factors
- (b) Low rated /unrated RESCOs, with an off-take arrangement with MSME entities, where payment delay and payment default could arise due to factors specific to both off-takers and the RESCO.

Banks/Financial Institutions typically find credit guarantees of value when introducing new products or when targeting new consumer or business segments - circumstances in which little or no historical performance data may be available to estimate potential losses.

These mechanisms are also considered to be a direct intervention of choice for the SME related credit activities. There are over 2,000 such schemes in over 100 countries that in addition to allowing access to finance, allow for the following major benefits (Honohan, 2009):

- The risk sharing element allows for generation of an independent credit assessment of the borrowers.
- Helps to bridge the information asymmetry by producing a loan - loss curve. This allows for developing a statistically significant risk

¹⁰ Credit rating of BBB- or above

framework, and improve the lending to the sector covered under the facility.

The proposed CGM facility, takes into consideration the lenders' requirement for a credit support to cover losses due to a payment delay and/or payment default arising from factors specific to off-taker or the RESCO itself. CGM facility has an additional benefit of lowering the collateral required against the loan being raised by the RESCO.

3.2 Structure

The proposed CGM structure is as shown in Figure 3.

The key entities/stakeholders in the proposed CGM facility are:

- (a) **Trust**, similar to other credit guarantee structures in India, is an entity that hosts the CGM facility
- (b) **Facility Manager** manages the CGM facility housed under the Trust. The Facility Manager is responsible for screening the lending institutions' portfolio and accordingly extending guarantees under the facility. The Facility Manager also verifies the risk claim submitted by the lending institutions in case of a delay or a default in the loan, and releases funds. The Facility Manager could be an institution like IREDA/SIDBI or any other suitable public sector financial institution.
- (c) **Lending Institutions**, are the participating lenders (Banks/ Financial Institutions) in the risk sharing facility and who have exposure to the RESCOs
- (d) **RESCO**s have off-take arrangement with MSME entities. Lending Institutions have a credit exposure to the RESCOs.

The CGM works as a **bilateral loss-sharing agreement** between the CGM Trust Fund and lending institutions (Banks/ Financial Institutions). Under the proposed structure, the facility will be maintained by Facility Manager under the guidance of the Trustees of the CGM Trust Fund.

The CGM cover is extended to the participating lending institutions by the Facility Manager. The Facility Manager, per the covenants of the CGM, commits to partially reimburse the lending institution's delays and losses incurred on loans extended to the RESCOs. Based on our analysis of various guarantee schemes as detailed in Annexure 6.1, the proposed CGM facility has been designed to cover 50% of the uncovered losses (losses post usage of DSRA) for each loan granted by a lending institution to a RESCO. Under the facility design,

the lending institutions are expected to share the losses to an extent of 50% initially,¹¹ in line with the OECD 2015 guidelines,¹² to avoid the issue of moral hazard. The participating financial institutions are protected against the payment delays through the liquidity backstop pool, and in the event of default, they are protected through the second loss up to the extent of cover. The risk shared via second loss reserve can be considered for reduction in a phased manner. This reduction will be determined based on the performance in the initial operating years of the portfolio.

The CGM Facility initially provides up to 50% coverage on the expected losses, with part of the fund earmarked for first loss support to address payment delay and the balance as a second loss support to address payment default.

In case of a shortfall in debt servicing by the RESCO to the lending institutions, the lending institution would utilize the funds available in the Debt Service Reserve Account. In case of further shortfall in debt servicing, an event of default is declared by the lending institution as per the terms and conditions of the loan agreement between the lending institution and the RESCO. In case the RESCO fails to settle the dues within a certain period of time (typically 90 days), the loan to the RESCO would be classified as a Non-Performing Asset (NPA). Classifying a loan as an NPA would result in an adverse impact on the financials of the lending institution.¹³ To avoid the NPA situation, the lending institution would file a claim with the CGM Facility Manager to utilize the funds to meet the shortfall in debt servicing. A part of the CGM facility is earmarked as "Liquidity backstop pool" (LBP) to provide such support to the lending institution for that loan.

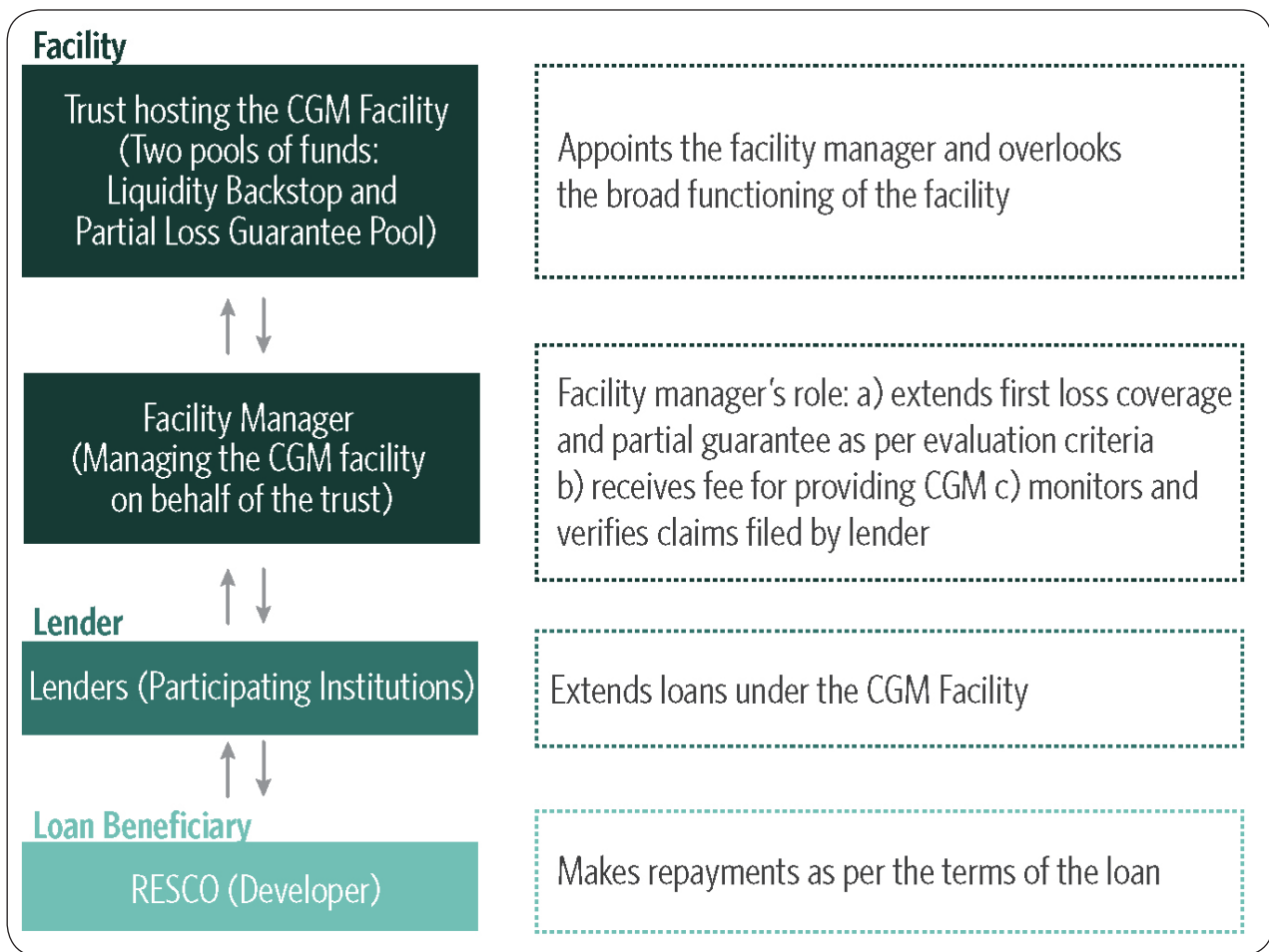
The LBP is designed to cover a shortfall to an extent of 10% of the total coverage under CGM. Considering that a lending institution has a three month cover in the form of Debt Service Reserve, the LBP can be structured to provide an additional three month cover to the lending institution. Thus, the fund required to provide a

¹¹ As per primary survey, 85% of the respondent requested for a guarantee coverage of more than 50% of the losses. However, to avoid moral hazard issue, the coverage has been proposed up to 50% of the losses.

¹² <http://www.oecd.org/global-relations/45324327.pdf>

¹³ https://rbi.org.in/Scripts/BS_ViewMasCirculardetails.aspx?id=9009

Figure 3: Structure of Credit Guarantee Mechanism



guarantee for three month debt obligations works out to approximately 5% of the uncovered losses (i.e. 10% of the 50% of the uncovered losses). Accordingly, the LBP in the CGM fund can be capped at 5%¹⁴ of the uncovered losses.

The remaining CGM fund (45% of the uncovered losses) is provided as “Partial Loss Guarantee Pool” (PLGP) as a second loss support to the lending institution, the usage of which is explained below.

In the event the LBP for a loan is completely utilized by the lending institution to meet shortfalls in debt servicing, and an event of default arises subsequently resulting in an NPA, the lending institution would initiate the recovery proceedings for the uncovered outstanding debt (up to a maximum of 45% of the uncovered losses). The lending institution would also initiate proceedings for the recovery of the uncovered portion of outstanding debt. The Facility Manager would then

evaluate the claim and release funds from the Partial Loss Guarantee Pool (PLGP) under CGM.

The proposed CGM facility, which would provide a cover for 50% of the uncovered losses (losses post usage of DSRA), would therefore include:

- Liquidity Backstop Pool, capped at 5% of the uncovered losses (10% of CGM fund), to support the shortfall in debt servicing
- Partial Loss Guarantee Pool, 45% of the uncovered losses (90% of the CGM fund), to guarantee a portion of the outstanding debt as a second loss support

Considering that the LBP is a support for payment delays, there could be a possibility of the RESCO making up for the delayed payments at a subsequent stage. In case the RESCO makes up for the delayed payments at a subsequent stage, i.e. post utilization of DSRA or LBP, the lending institution, upon receipt of payment from the RESCO, would transfer the amount (to an extent of LBP utilized for that credit facility) to the Facility Manager. This will be used to replenish the LBP pool

¹⁴ As per primary research, lenders have requested for a higher first loss pool within the guarantee coverage. However, to avoid moral hazard issue, the first loss coverage has been restricted to 5% of uncovered losses as explained above.

for that credit facility. The balance amount would be utilized by the lending institution to replenish the DSRA account.

As part of the CGM fund structure, the Liquidity Backstop Pool can be a funded component considering the possibility of a payment delay leading to frequent draws and subsequent replenishments to the pool. The Partial Loss Guarantee Pool, which would be drawn only upon a payment default, can be structured as a non-funded component, wherein the Facility Manager receives a guarantee for this amount from another source, based on which the Facility Manager, in turn, extends multiple guarantees to the lending institutions.

As part of the lending framework between the lending institutions and the RESCOs, a Trust and Retention Account (TRA) is created. All the cash inflows and outflows of the RESCO’s project, to which the lending institution has exposure to, are to be routed through the TRA account. The TRA mechanism ensures the following:

- Monitoring of the fund flow, thereby preventing

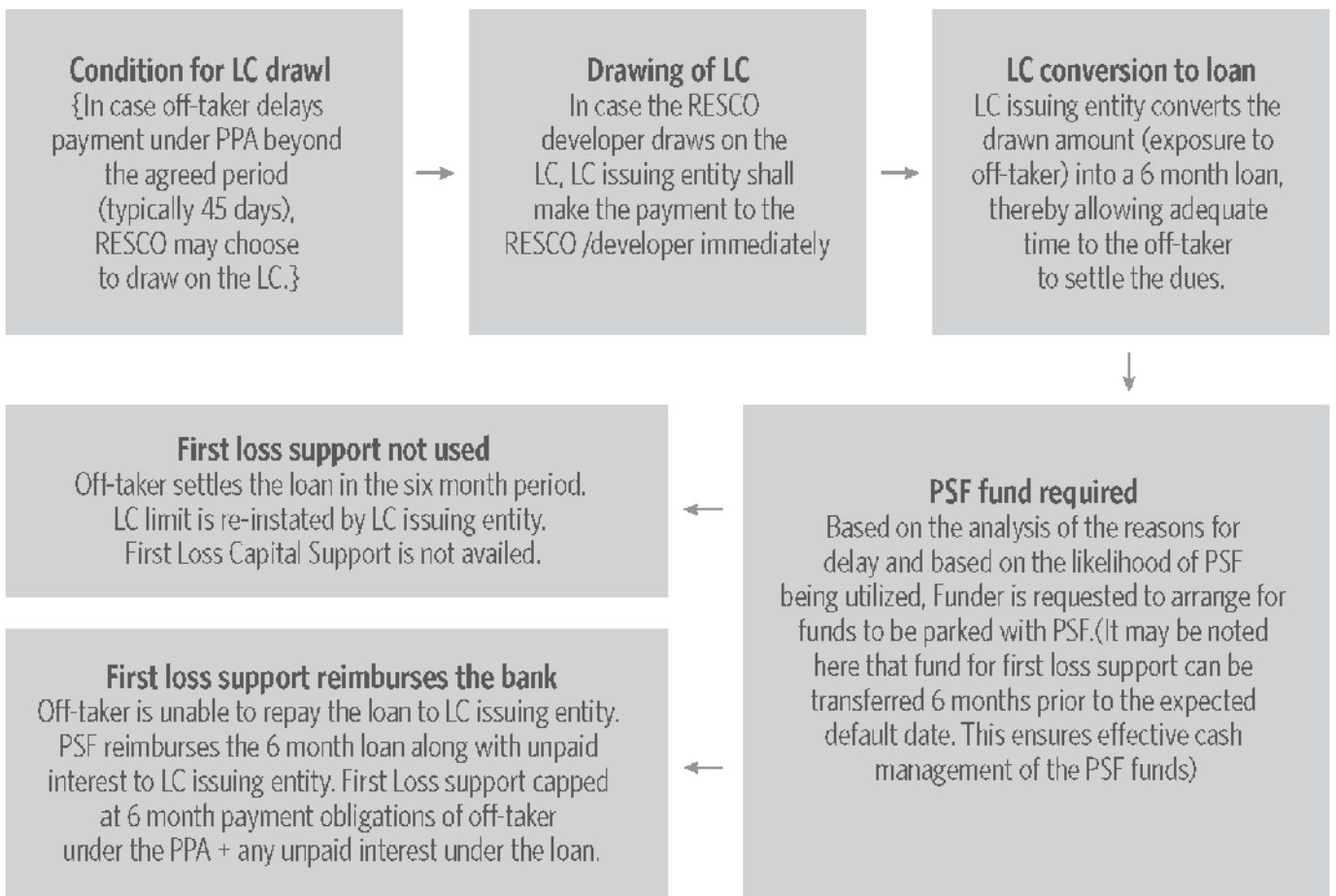
fund mismanagement by the RESCO. Default, if any, shall then arise only due to off-taker’s default and not due to fund mismanagement by RESCO.

- Lending institution can access the funds lying in the TRA first in the event of default by the RESCO. This will ensure that the lending institution has tapped into other sources for debt recovery prior to filing a claim with the Facility Manager under CGM .

For effective implementation and utilization of CGM support, the selection criteria to assess the eligibility of RESCOs and off-takers need to be based on the following key objectives:

1. Given the perceived lack of creditworthiness of MSME segment. RESCOs with a strong implementation track record should be encouraged to sign off-take agreements with the low rated/unrated MSME entities. This would help mitigate construction, technology, and O&M risks. Accordingly, the RESCOs installed capacity may be selected as one of the criteria to assess the implementation track

Figure 4: CGM Implementation Methodology



record.

- As the high rated MSMEs have a higher probability of getting financed, the CGM scheme should be designed to support the low rated or unrated MSME segments. Bank Loan Ratings (BLR) are widely accepted by the banking community as a key credit performance indicator. However, BLR ratings are mandatory for borrowings only more than Rs. 5 crore. Given the size of an MSME, not all entities in the segment will have BLR ratings. Hence, CIBIL Rank for companies may be selected as another selection criteria. Figure 4 shows a typical implementation approach that a CGM would adopt.

3.3 Design

The CGM uses an expected sizing approach that calculates expected loss based on portfolio mix of loans to RESCOs, weighted average probability of default of the loans and the loss given default.

Fund required for the CGM facility is computed as follows (Table 1):

Fund required = 50% of the uncovered losses, where

Uncovered Losses= Overall Expected Losses - Debt Service Reserve Amount

Overall Expected Losses= Exposure at Default (EAD) * Probability of Default (PD)* Loss Given Default (LGD)

Table 1: Parameters for computation of CGM fund

Particular	CGM
EXPOSURE AT DEFAULT (EAD)	Year-wise outstanding loan amount
PROBABILITY OF DEFAULT (PD)	Weighted average across the off-takers in the loan mix One of the major causes for the low availability of bank finance to MSME is the high-risk perception ¹⁵ . The same is reflected in the credit ratings i.e. lending to entities with below investment grade rating (BBB- and lower) is considered to be risky by the lenders. Given that the focus of this report is on low rated/ unrated MSME and general enterprises, a mix of BBB, BB, B & C rated entities have been assumed as off-takers for the purpose of computation of fund. The % mix of BBB, BB, B and C rated off-takers assumed in this structure is in line with the % mix of BBB, BB, B and C rated entities as per CRISIL CDR study for the period 2006-2016 ¹⁶ .
LOSS GIVEN DEFAULT (LGD)	100%. Loss Given Default (LGD) is based on pending/outstanding loan payments at the time of default. Considering that the secondary market for the sale of rooftop solar equipment is not developed currently, the LGD has been assumed as 100%. Moreover, considering that CGM support will result in access to financing without collateral requirement, the LGD has been assumed at 100% on a conservative basis.

¹⁵ <https://www.sidbi.in/files/Risk-Capital-and-MSMEs-in-India.pdf>

¹⁶ <https://crisil.com/pdf/ratings/CRISIL-Default-Study-2016.pdf>

The key assumptions for the calculation of fund size required are (Table 2):

Table 2: Key assumptions for computation of CGM fund

Parameter	Assumption																																				
LOAN DISBURSEMENT AND OFF-TAKER MIX	<table border="1"> <thead> <tr> <th>Year</th> <th>1</th> <th>2</th> <th>3</th> <th>4</th> <th>5</th> </tr> </thead> <tbody> <tr> <td>Loans Year 1</td> <td>10%</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Loans Year 2</td> <td>0</td> <td>15%</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Loans Year 3</td> <td>0</td> <td>0</td> <td>20%</td> <td>0</td> <td>0</td> </tr> <tr> <td>Loans Year 4</td> <td>0</td> <td>0</td> <td>0</td> <td>25%</td> <td>0</td> </tr> <tr> <td>Loans Year 5</td> <td>0</td> <td>0</td> <td>0</td> <td>0</td> <td>30%</td> </tr> </tbody> </table>	Year	1	2	3	4	5	Loans Year 1	10%	0	0	0	0	Loans Year 2	0	15%	0	0	0	Loans Year 3	0	0	20%	0	0	Loans Year 4	0	0	0	25%	0	Loans Year 5	0	0	0	0	30%
	Year	1	2	3	4	5																															
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	<table border="1"> <thead> <tr> <th>Off-taker Credit Rating</th> <th>BBB</th> <th>BB</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>Loans Year 01</td> <td>50%</td> <td>25%</td> <td>25%</td> <td>0%</td> </tr> <tr> <td>Loans Year 02</td> <td>30%</td> <td>40%</td> <td>30%</td> <td>0%</td> </tr> <tr> <td>Loans Year 03</td> <td>30%</td> <td>40%</td> <td>30%</td> <td>0%</td> </tr> <tr> <td>Loans Year 04</td> <td>20%</td> <td>45%</td> <td>30%</td> <td>5%</td> </tr> <tr> <td>Loans Year 05</td> <td>10%</td> <td>35%</td> <td>45%</td> <td>10%</td> </tr> </tbody> </table>	Off-taker Credit Rating	BBB	BB	B	C	Loans Year 01	50%	25%	25%	0%	Loans Year 02	30%	40%	30%	0%	Loans Year 03	30%	40%	30%	0%	Loans Year 04	20%	45%	30%	5%	Loans Year 05	10%	35%	45%	10%						
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Loans Year 05	10%	35%	45%	10%																																	
In view of the facility ramp up time and the initial comfort level of the lenders, the loan disbursement in Year 1 has been assumed at 10%. Thereafter, the loans are expected to gradually increase over the next 4 years.																																					
The off-taker mix is distributed in such a way that the weighted average exposure of the loans over the 5 years period to the entities rated BBB, BB, B and C are in the same proportion as that of the CRISIL default study.																																					
REPAYMENT PROFILE	Amortized over a period of 10 years																																				
1 YEAR DEFAULT RATE OF OFF-TAKERS	<table border="1"> <thead> <tr> <th>Off-taker Credit Rating</th> <th>BBB</th> <th>BB</th> <th>B</th> <th>C</th> </tr> </thead> <tbody> <tr> <td>Default Rate</td> <td>1.01%</td> <td>3.95%</td> <td>8.02%</td> <td>20.92%</td> </tr> </tbody> </table>	Off-taker Credit Rating	BBB	BB	B	C	Default Rate	1.01%	3.95%	8.02%	20.92%																										
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Considering that the Exposure to Default is on the year-wise outstanding portfolio of loans, the one-year probability of default for the off-taker mix has been considered for the computation of CGM fund.																																					
DSRA	3 months Principal + Interest Obligations of the Loans																																				
INTEREST RATE	9.00% p.a.																																				
TENOR OF PCG FACILITY	Validity being co-terminus with the tenor of the loan i.e. 10 years period. With loans being disbursed over 5 years period, the facility would be active for 15 years.																																				
GUARANTEE ISSUANCE COSTS	1% p.a of the outstanding exposure of the Facility Manager to RESCO. The issuance cost is assumed to be borne by the lending institution. The lending institution may choose to recover the cost from the RESCO by way of a higher interest rate.																																				

3.4 Fund Size and Impact

Based on the design parameters as stated above, the CGM fund is calculated as follows:

- For the Loans disbursed in year 1, the Overall Expected Loss for each of the years during the loan tenor is calculated as follows:
Overall Expected Loss = EAD * PD * LGD, where EAD = Outstanding Loan Amount in that year PD = Weighted average of the 1 year default rates of the off-takers and the quantum of loans disbursed to such off-takers.
For example, the PD for the Loans disbursed in year 1 would be 3.50%, which is a weighted average of:

Table 3: Sample calculation of PD

Off-taker Credit Rating	BBB	BB	B	C
Default Rate	1.01%	3.95%	8.02%	20.92%
Loans disbursed	50%	25%	25%	0%
Weighted Average	3.50%			

LGD = 100%, as mentioned earlier

- The Expected Usage of Debt Service Reserve Amount is calculated as a product of Total Debt Service Reserve Amount for that Loan and the PD as calculated in step
- Uncovered Losses = Overall Expected Loss post DSRA usage = (1) - (2)
- First loss support as part of CGM = 5% of Uncovered Losses = 5% of (3)
- Second loss support as part of CGM = 45% of Uncovered Losses = 45% of (3)
- Total CGM Fund required for year is computed= CGM fund= (4) + (5)
- For the balance loan tenor, the year-wise CGM fund for the Loans disbursed in Year 1 is computed accordingly.
- Similarly, the year-wise CGM fund for the Loans disbursed in Years 2 to 5 are also computed.

We find that, under this structure, one million dollars of donor grant capital invested in the Credit Guarantee Mechanism fund enables US\$14 million of capital mobilization and a capacity installation of 18 MW in the rooftop solar sector.

Based on the above, the impact of CGM fund on the capital mobilization and capacity installation is as shown below:

Parameter	Impact
Total CGM pool (a) \$ millions	22.36
Liquidity Backstop Pool	2.24
Partial Loss Guarantee Pool	20.12
Debt facilitated (b)\$ millions	200
Capital facilitated (c) = (b/0.65)*	308
rooftop solar capacity installation (MW)** (c/0.77)	400
Leverage of CGM fund to capital mobilized	13.77
Leverage of CGM fund to debt mobilized(d)= (b/a) times	8.94
Capital free-up for Banks due to CGM support***	14.2

* for debt/equity of 65:35¹⁷

**At US\$0.77 mn per MW

*** Based on capital adequacy requirement of 12%, Risk Weight of 100% for BBB and 150% for BB and below

The above impact in terms of leverage is calculated on a conservative basis. Thus, the leverage could be much higher than the numbers indicated above.

Assuming success of the CGM scheme, it can be leveraged effectively in a phased manner to truly catalyze the solar rooftop market with a potential of 10 GW in the C&I segment. In order to mobilize 10 GW of capacity installation in the rooftop C&I segment, the CGM fund required would be US\$ 412 million.

¹⁷ To avoid moral hazard issues of RESCO's lack of involvement with the project given the high coverage of losses by CGM facility, the Debt to Equity ratio of the eligible projects could be capped at 65:35, as against market benchmarks of up to 75:25

This is based on the hypothesis that coverage under the Partial Loss Guarantee Pool reduces from 45% in Year 1 and Year 2, to 35% in year 3, 30% in Year 4, and 25% in Year 5. The required US\$ 412 million CGM fund will be divided into two parts:

- USD 56 million of Liquidity Backstop Pool
- USD 356 million of Partial Loss Guarantee Pool

As mentioned earlier, as part of the structuring of CGM fund, the Liquidity Backstop Pool can be a funded component as there could be frequent draws and subsequent replenishments to the pool in view of the payment delays. The Partial Loss Guarantee Pool, which would be drawn only upon a payment default, can be structured as a non-funded component, wherein the Facility Manager receives a guarantee for this amount

from another source, based on which the Facility Manager, in turn, extends multiple guarantees to the lending institutions.

CGM provides a comprehensive solution to address the barriers of both, the payment delay and payment default. However, in scenarios where payment delay is seen as a constraint for debt financing and not payment default, an alternative solution called Payment Security Mechanism (PSM) could be implemented. PSM addresses the issue of payment delay from off-takers. **This solution is relevant for those projects where payment delay risk is a concern, i.e. for government entities as off-takers and for entities with businesses prone to cash-flow variability.** The structure, design, and fund requirement for PSM is elaborated in Annexure 6.3 and Annexure 6.4.

4. Recommendations

CGM provides a comprehensive solution for scaling rooftop solar for MSMEs by addressing the barriers of payment delay and default that currently inhibit growth in this sector. This instrument has the potential to expand the market into MSME segment by enabling the flow of debt financing for RESCOs who enter into off-take arrangements with MSME entities.

A CGM structure provides a strong credit support to the lenders as it addresses the payment delay and payment default barriers arising due to factors specific to both the off-taker and RESCO, and shares the risk of default with the lender. Given that a majority of MSME entities are low rated/ unrated, potential for payment default is higher. A CGM would, therefore, address lender's concerns regarding payment default by low or unrated MSME entities as RESCOs and/or off-takers. Moreover, the first loss support as part of CGM would address

Lender's concern on emergence of stressed assets owing to payment delay arising due to factors specific to the RESCO or the off-taker. Considering the quantum of risk coverage, CGM acts as a strong driver to enable debt financing in the rooftop solar segment.

Our recommendation is to launch a comprehensive CGM scheme, while keeping Banks/ NBFCs as the target segment. Further, RESCOs and off-takers could be selected based on the eligibility principles indicated in section 3.1.1.

The CGM scheme could be launched as a funded public intervention by the Ministry of New and Renewable Energy, through suitable host financial institutions, who could manage and administer these credit support facilities to increase deployment of solar roof top projects and improve access to commercial bank financing for third party roof top solar projects.

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