The Lab
India Innovation Lab for Green Finance

Rooftop Solar Private Sector Financing Facility

Lab Instrument Analysis

October 2016

The India Innovation Lab for Green Finance is a public-private initiative in India that brings together experts from government, financial institutions, renewable energy, and infrastructure development to identify, develop, and accelerate innovative investment vehicles for green growth in India.

AUTHORS AND ACKNOWLEDGEMENTS

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Rooftop Solar Private Sector Financing Facility

INSTRUMENT DESIGN AND ANALYSIS

October 2016

DESCRIPTION —

A financing facility that would provide long-term debt financing to developers of rooftop solar PV projects

GOAL —

To provide affordable and accessible long-term debt financing to developers of solar PV rooftop projects and demonstrate the commercial viability of a sustainability-focused asset backed securities (ABS) structure for the Indian rooftop solar sector

SECTOR —

Rooftop solar PV in the commercial and industrial segments

PRIVATE FINANCE TARGET —

Banks, life insurance companies, pension funds, development financial institutions, multilateral agencies, and donors

IMPLEMENTING AGENCY –

International Finance Corporation (IFC) and Azure Power

1. CONTEXT

The low availability and high cost of debt capital, a lack of effective net metering, and concerns over the enforcement of long-term contractual agreements are slowing down growth of rooftop solar power in India.

The Government of India has set a bold target of installing 100GW of solar power by 2022, comprised of 60GW from ground-based solar systems and 40GW from rooftop solar systems. Most systems built to date have been ground based, with 6GW installed as of June 2016 (CEA, 2016). Rooftop systems totaled only ~1GW as of October 2016 (Bridge to India, 2016).

This is despite the potential of rooftop solar PV in India to provide large amounts of low cost power. Thanks to the declining cost of solar PV systems, electricity generation from rooftop solar installation is already economically viable and, in some markets, cheaper than conventional sources of energy. The rooftop solar sector has already achieved grid parity in most states for industrial and commercial consumers.

Aside from pricing, the other key drivers of rooftop solar deployment are increasing reliability of electricity supply, government subsidies, carbon emission reductions, corporate social responsibility (CSR) policies, and compliance with the Renewable Purchase Obligation (RPO) for those entities that have to meet a part of their electricity consumption using electricity from renewable resources.

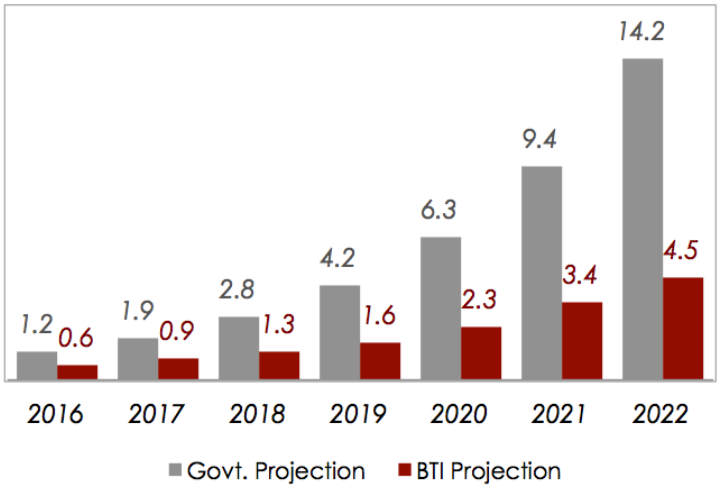
Although the expectation of healthy returns is encouraging expansion of rooftop solar, the lack of effective net metering policy and concerns over enforcement of long-term contractual agreements are slowing down the potential growth of the sector. The low availability of debt finance, the short tenor and high cost of available debt finance, and lengthy credit disbursal period for rooftop solar installations are also major barriers (CPI, 2016).

The Rooftop Solar Private Sector Financing Facility aims to drive investment in the sector by addressing these debt financing barriers. In addition, it aims to reduce transaction costs.

1.1 THE ROOFTOP SOLAR SECTOR IN INDIA

A recent report estimates that the rooftop solar sector will add in the range of 13-14GW of capacity by 2022, significantly less than the Government of India's target of 40GW (Bridge to India, 2016).

Figure 1: *Projected Rooftop Solar Capacity Additions Required to Achieve 14GW by 2022 (GW)*[1]



Source: CPI Analysis, Bridge to India

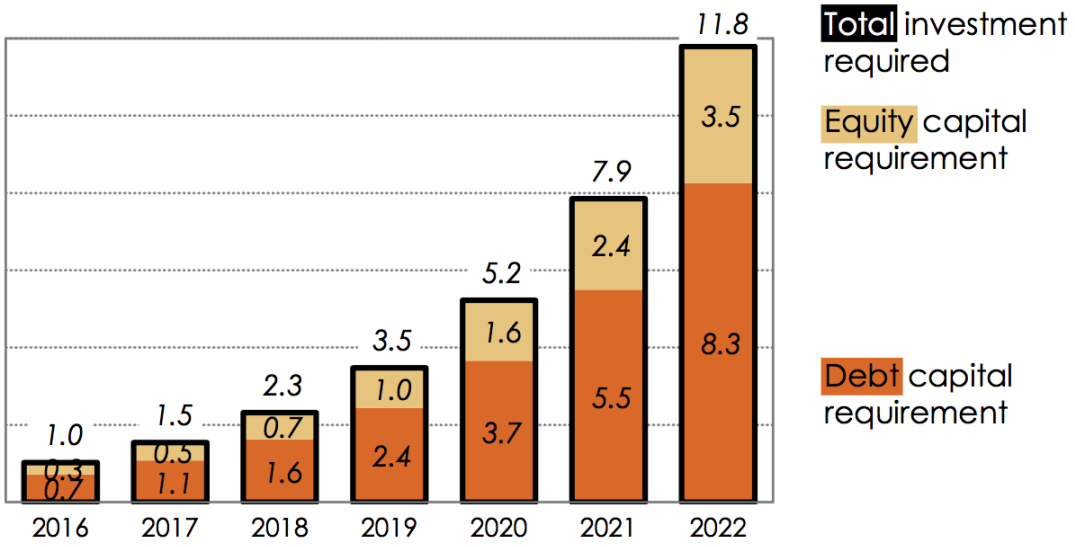
[1] Used CAGR to project each year of capacity addition for Government of India's target

1.2 FINANCING NEEDS OF THE SECTOR

Meeting the Indian government's target to add 40GW (GOI target) of rooftop solar capacity in next six years will require an investment of $34bn.[2] Assuming a debt / equity ratio of 70:30, rooftop solar will need $24bn of debt capital. Even assuming a more realistic deployment scenario of 14GW GW by 2022,[3] the solar rooftop sector would need ~$11.8bn capital over 2016-22, of which $8.3bn would be debt capital.

The rooftop solar sector needs $34bn of capital to achieve the government's target of 40GW of rooftop solar capacity by 2022. The sector needs $11.8bn of capital to meet a more realistic target of 14GW by 2022.

Figure 2: *Investment Requirements in the Rooftop Solar Sector to Achieve 14GW by 2022 ($ bn)*



Source: CPI Analysis, Bridge to India

1.3 BARRIERS TO INVESTMENT AND SOURCES OF CAPITAL

1.3.1 BARRIERS TO INVESTMENT

The uncertain credit quality of rooftop solar systems, their small deal size and high transaction costs, low solar power tariffs, and lack of a track record for the rooftop solar sector are the key barriers to investment.

Currently, two main business models prevail in the rooftop solar sector in India: the Straightforward Sales Model (capex model) and the RESCO Model (opex model).[4] Both models face challenges. Currently, the capex model has an 86% share of total rooftop solar installation (Bridge to India, 2016). However, our primary research suggests that the opex model will

[2] Assuming $850K of capital expenditure (capex) per megawatt of capacity.

[3] A recent report by Bridge to India estimates that the rooftop solar sector would add in the range of 13-14GW of capacity by 2022, significantly lower than the government target of 40GW.

[4] Details are in the Appendix Section 7.3.

capture a higher market share of total rooftop solar installation than the capex model in the next few years. [5]

While the opex model addresses some important barriers faced by the capex model,[6] there are further investment barriers that are slowing down the adoption of the opex model.

Under the opex model, the project developer owns the solar PV systems and therefore needs to invest upfront. However, rooftop solar PV project developers find it difficult to access debt financing particularly at an appropriate cost and tenor for four main reasons:[7]

- Banks are unsure of the credit quality of rooftop solar systems deals and thus reluctant to lend
- Most rooftop solar systems are too small to attract significant institutional investor attention
- Low solar energy tariffs are making bankers and other financiers cautious about funding rooftop solar projects
- Most project developers are small in size and lack a track record (apart from a few that are backed by big corporates), making it difficult to attract capital at a favorable rate.

There are additional areas of concern for potential investors, including: concern about the enforceability of long-term[8] contractual agreements; long-term performance risk associated with the PV systems dissuade banks from financing this sector. Small project developers' lack of collateral security is another key barrier. These developers don't have strong asset bases to meet the demands of banks that often require 100% or more of bank debt in collateral. The lack of collateral also makes banks reluctant to offer non-recourse project financing loans. In addition, a lack of technical standards and standardized power purchase agreements (PPAs) agreements and loan documentation all increase transaction costs and consequently cost of financing.

1.3.2 CURRENT SOURCES OF CAPITAL

Heavy exposure to the power sector and apprehension about the credit quality of the rooftop solar sector are discouraging banks to lend to this sector. Government financial support and multilateral agencies' concessional financing will not be enough to meet the capital needs of the sector.

Indian banks may be limited in their ability to provide more finance. They already have an exposure of INR 5,800bn to power sector (Times of India, 2015), of which ~16% are stressed assets (Business Standard, 2015). Stressed assets are exerting pressure on public sector banks in particular and squeezing credit growth to stressed sectors such as the power sector.

The government has taken steps recently to more provide debt financing to the sector. The Reserve Bank of India identified the rooftop solar sector as a priority sector for lending. The government is also considering including rooftop solar PV systems as a portion of housing or housing improvement loan. In addition, the government is offering subsidized capital (30% capital subsidy for residential and institutional consumers), accelerated depreciation tax benefit (to be phased out in 2017), and tax holidays (Minimum Alternate Tax is applicable).

The multilateral development banks (MDBs) are also scaling up debt financing for rooftop solar. They currently offer subsidized loans totaling ~$2.5bn.[9]

[5] With a leading renewable energy market intelligence company and three developers

[6] Details are in the Appendix Section 7.3.

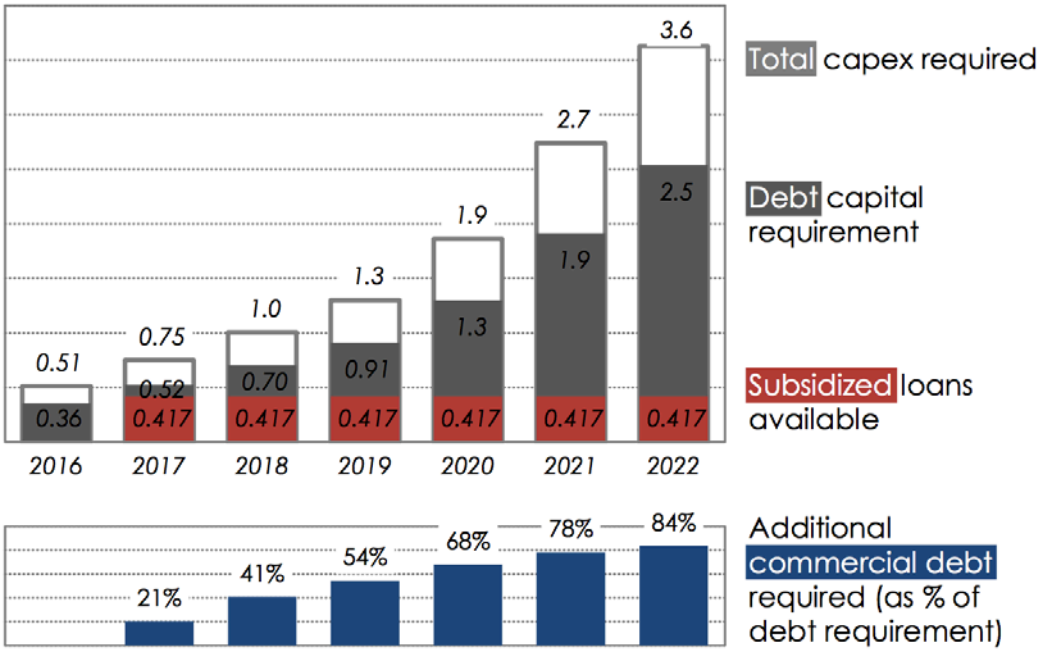
[7] Based on Bridge to India (2016), Climate Policy Initiative (2016), and interviews with three project developers, two banks and three consultants.

[8] The life of a solar PV system is ~25 years.

[9] Although, the Asian Development Bank Facility ($500mn) has not started yet and the Indian Renewable Energy Development Agency (IREDA) Facility ($1.1bn) can be used for renewable projects other than rooftop solar.

However, the total concessional debt capital committed by the government and MDBs is only 10.4% of the total debt capital requirements to meet the government's 2022 target. There are also parts of the rooftop solar market that this public debt is unlikely to reach. **For instance, projects that target commercial and industrial off-takers cannot take advantage of government subsidies targeting the residential sector and are often too small to attract financing on a one-off basis.**

Figure 3: *Subsidized Capital Available for Rooftop Solar through 2022 ($ bn)*



Note: We have assumed subsidized capital would be lent evenly over 2017-2022

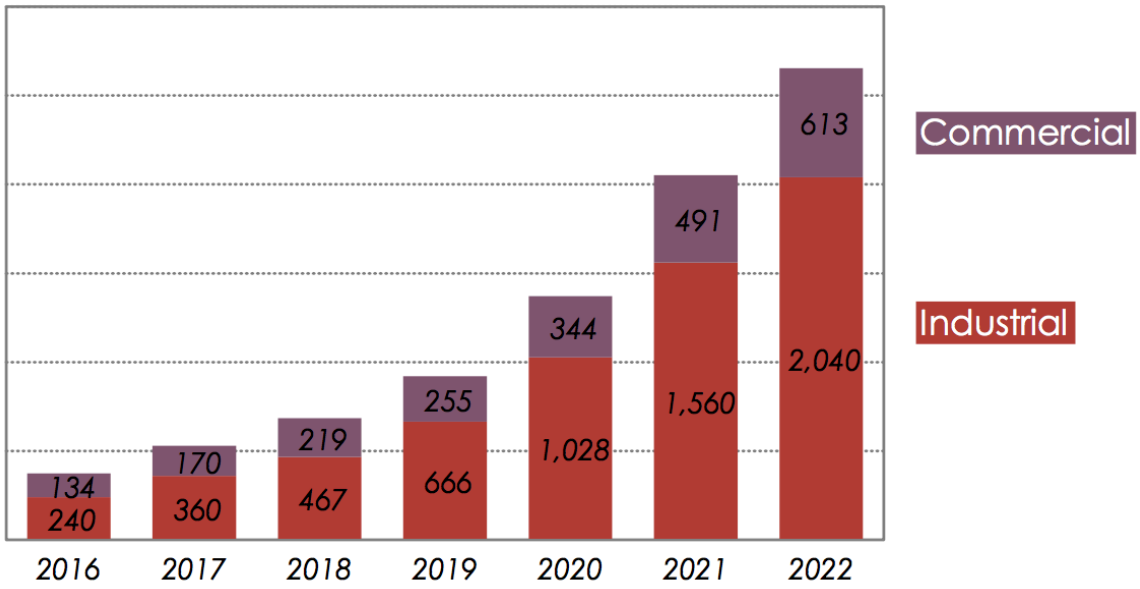
Source: CPI Analysis, Bridge to India (2016)

1.4 MARKETS TO BE COVERED BY THE FACILITY

The Rooftop Solar Private Sector Financing Facility will target the commercial and industrial segments. These two segments are expected to drive the overall growth of the rooftop solar sector as they have already achieved grid parity in many states even without accelerated depreciation tax shield benefits. However, they are not well served by the government's current support regime and neither the government nor MDBs are providing the debt financing they will need.

The growth of the residential sector is likely to lag behind these two segments as residential electricity is highly subsidized. Moreover, the operating and transaction costs (off-taker origination, loan processing, operation and maintenance services, etc.) are higher in the residential sector given the smaller sizes of the deals.

Figure 4: *Projected Rooftop Solar Capacity Addition Projections for the Residential, Industrial and Commercial Sectors (In MW)*



Source: CPI Analysis, Bridge to India (2016)

2. INSTRUMENT MECHANICS

The Rooftop Solar Private Sector Financing Facility (the Facility) addresses the barriers outlined above by bundling a large number of small projects together into one structured investment so that the aggregate deal size is large enough and of sufficient credit quality to attract more attention from investors, particularly institutional investors. Institutional investors can provide capital at lower cost by combining commercial and concessional capital to further reduce the cost of power from rooftop solar.

This Facility would provide long-term[10] debt capital to developers that typically have difficulties accessing loans due to their low size, and lack of balance sheet strength and track record. It would cut down due diligence costs by standardizing PPA agreements and loan documents to reduce negotiation time and related expenses. The key objective of the Facility is to demonstrate the commercial viability of rooftop solar and thereby reduce risk perceptions of the sector. The tenor and cost of the loan depends on the credibility of the off-taker and developer and length of the PPA agreement.

The Rooftop Solar Private Sector Financing Facility will demonstrate the commercial viability of rooftop solar power, and thereby reduce risk perceptions of the sector and attract more commercial capital.

The Facility has two phases: the aggregation (or loan book building) phase and the mobilization (or securitization) phase. The aggregation phase involves building and providing a warehouse line of credit to creditworthy rooftop solar projects. In the second phase – securitization – the Facility would refinance projects by issuing asset-backed bonds to domestic institutional investors, domestic lenders, or international investors (if currency risk can be managed by the implementing agency). The asset-backed bond will be securitized against the loan pool. The refinancing should reduce the loan costs and free up lending from the warehouse line of credit to finance additional projects.

2.1 AGGREGATION PHASE

The aggregation phase involves building a warehouse line of credit that provides loans to creditworthy rooftop solar projects over a period not exceeding 24 months.

It starts with multilateral development banks (MDBs), development financial institutions (DFIs), local banks and possibly donors providing debt to the warehouse line of credit. During this phase, projects will be submitted for financing by approved developers / aggregators. There will be a transparent method to be used to select developers. Each project developer will set up a special purpose vehicle (SPV), which will be a bankruptcy remote entity. Developers will be required to capitalize each SPV with equity. The selected projects will be transferred to the SPV. Thereafter, the warehouse credit line entity will provide a loan to this SPV.

As project owner, the SPV will sign the power purchase agreement (PPA) with the off-taker, and the operation and maintenance (O&M) service agreement. The SPV would also pledge project cash flows, assets and receivables related to the projects to pay back the investors that provided debt to the warehouse line of credit. The project developer would be able to draw dividends from the SPV as long as the SPV meets certain covenants.

Credit enhancement products[11] funded by public money or donors, such as partial credit guarantees, subordinated loan tranches, first loss reserves, and overcollateralization will be incorporated to offer protection to debt investors from default risk.

The warehouse line entity would also appoint a trustee. The trustee's primary responsibilities would be: to conserve and protect the assets for the benefit of the beneficiaries of the

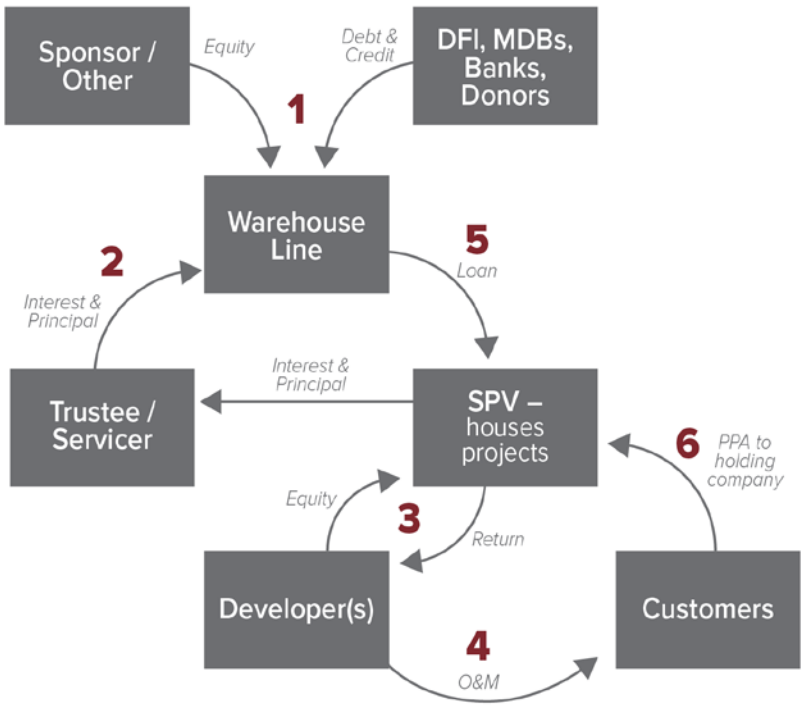
[10] 12-14 years compared to maximum 9 years of loans currently available.

[11] Details of credit enhancement products are in the Appendix 7.4.

warehouse credit line entity, make principal and interest distribution to investors, and make sure investors get paid out effectively in an event of default.

The warehouse credit line entity would also appoint a lender's engineer who would audit prospective projects to identify, mitigate and hedge any associated risks and ensure their viability from a technical stand point.[12] The Facility will also develop a credit assessment process to reduce the disbursal period from the Facility to an initial two months and then down to one.[13]

***Figure 5**: Aggregation Phase Mechanism*



1. The sponsor creates a warehouse line entity with nominal equity capital. The warehouse would be largely funded by financial institutions: Banks, MDBs, donors, etc.

2. Funds from projects are used to service Warehouse investors.

3. The developer creates the SPV to house project and capitalizes the SPV.

4. The developer builds projects and signs O&M service agreement with the customer.

5. The warehouse entity lends the project (SPV).

6. Customers make PPA payments to the SPV. The SPV then makes payments to warehouse to service debt.

2.1.1 Warehouse credit line capital structure

The warehouse line of credit would be largely capitalized by debt financing. The implementing agency would just provide a small amount[14] of equity capital to set up the entity. The possible debt financiers of the Facility are public and private sector banks, financial institutions, MDBs, DFIs and donors. **The implementing agency would need some concessional and long-term financing to make the cost of borrowing cheaper and make the tenor attractive.**

The Facility will blend commercial capital with concessional capital to cut down the cost of funding by 0.5-3.5% points, and thereby reduce the cost of borrowing.

The developers are currently raising long debt capital from banks and other financial institutions at a rate of 10.5-14%. However, the high debt cost of capital (anything above 11.5%) makes many projects unattractive for equity investors, whose minimum internal rate of return (IRR) on equity investments is ~15%.[15] The Facility is aiming to provide debt capital at a rate, which will make the project viable and attractive to equity investors. So, we have targeted a cost of lending for this Facility of not more than 11%.

[12] The role of lending engineer is described in more detail in the Appendix 7.9.

[13] A guideline on the credit disbursal period is mentioned in the Appendix 7.8.

[14] A legal requirement.

[15] Based on CPI financial analysis.

Although bank financing can be cheap, banks cannot fund this kind of financial structure alone because it aims to provide debt capital to solar projects, which are perceived to be risky. The warehouse credit line can attract bank financing by offering banks a reasonable return and adequate protection. Seniority in the capital structure, third party credit guarantees, and other credit enhancement products would offer banks adequate protection. In addition, as rooftop solar sector is recently labeled as a priority sector, banks can finance this Facility to meet the priority sector lending target.

Moreover, the aggregation offered by the Facility would enable banks to consider the risks associated with the loans on a portfolio rather than on an individual project level, reducing the bank's cost of lending to the Facility. Based on primary research and analysis,[16] we have assumed banks would contribute 40% of the financing requirement for the Facility at an interest rate of 10%.

The MDBs and multilateral financial institutions (MFIs) can provide financing to this Facility given their commitments to invest in the renewable energy sector. These institutions may take more risk and/or provide longer tenors. Based on primary research,[17] we have assumed MDBs and MFIs together MDBs would contribute 30% of the financing requirement at an interest rate of 10%.

Donors can take more risks than other lenders and could provide loans at more concessional terms or even act as third party guarantors to enhance the creditworthiness of the Facility. Based on primary research,[18] we assumed that donors would contribute 25% of the financing required at a rate of 8%. The cost of lending would be high if the warehouse credit line entity does not get concessional financing, likely too high for it to be attractive to project developers.

Table 1: *Capital Structure of the Warehouse Credit Line Facility*

Source of Capital	% of total	Cost	Tenor	Rank
Debt	**99%**	**9.3%**		
Senior Sec. Debt (from banks)	40%	10%	6	Senior
Senior Sec. Debt (from MFIs & MDBs)	29%	10%	10	Senior
Subordinated Debt	25%	8%	13	Subordinate
Equity	**1%**			

2.1.2 The role of rooftop solar developers

The developer would organize PPAs with off-takers and provide installation and O&M services. The developer can also choose a third party O&M company to provide O&M services. The developer would set up an operating SPV to house all of its projects, which are to be financed by the Facility's warehouse line of credit. The developer would provide 30% of project capital requirements through an equity injection into the SPV. The operating SPV would pass on the principal and interest payment to the warehouse line entity from proceeds collected from off-takers. The warehouse line entity would include certain debt covenants in the loan agreement, including standard restrictions on distributions of equity before meeting all covenants.

2.1.3 Scenario Analysis – Warehouse line

We have conducted scenario analysis to determine whether the warehouse credit line would be able to meet its debt obligations and debt covenants in the event of the underlying rooftop solar projects underperforming. As the cost and tenor of the debt are constant, the power tariff and default rate will be the two key factors to change the profitability of the warehouse credit line as

[16] In consultation with the proponent who has spoken with several banks.

[17] In consultation with the proponent, who has spoken with MFIs and MDBs.

[18] Our interviews with two leading potential donors. The proponent has also spoken with potential donors.

a whole and consequently affect the risk and return profile for the investor. Our base case scenario suggests that the developer would meet all the debt covenants and generate an equity internal rate of return (IRR) of 14.1%, which is in line with rooftop solar developers' expected equity return. Even in our most extreme downside case, the lenders providing the senior debt holder would still be paid back on schedule. Lenders providing subordinate debt would also be paid back but over a longer time than the scheduled maturity for the loans. The developer would need an additional two years to pay pack the principal amount to the subordinate debt holder. In this scenario, the developer equity IRR would also be significantly adversely affected; the equity IRR would decrease to 5.6% from 14.1% in a base case scenario.[19] We believe that a delay in paying back to the subordinate debt holders would be acceptable as impact investors themselves will be the subordinate debt holders. The developer, as an equity investor, would also be fine with a lower return as they will reap all the benefits of upside returns.

2.1.4 Key Issues

Selection of developers:

The warehouse credit line entity will create a framework to select project developers that are financially and technically strong and have a strong deal pipeline while looking to accommodate new players.

The framework will help the entity to select developers that are financially and technically strong with a strong deal pipeline. The Indian Renewable Energy Development Agency (IREDA) has collaborated with four credit rating agencies (ICRA, CRISIL, India Rating & Research, and CARE) to assess the creditworthiness of solar PV project developers.

The ratings of these developers reflect their performance capability and financial strength. The performance capability is assessed on a project sponsor's track record, technical competence, and adequacy of manpower, quality of supplier and tie ups, customer feedback, and O&M network.

Many solar PV project developers are promoted by big corporates. Ratings of these developers are heavily influenced by the promoting corporate's track record and financial strength and their access to debt and equity financing.

As the rooftop solar sector has only been operating for the last 4/5 years, the companies promoted by new players (financially backed by themselves and/or private equity) may be rated below the players promoted by big corporates. These new players are also more likely to be struggling to raise capital.

For these reasons, the Facility would accommodate new players in some cases. However, as agencies will consider developers' credit ratings to be an important criterion when rating the securitized bond issued by the warehouse credit line entity, developers' ratings should not be so low as to jeopardize the rating of the issued bonds.

The framework for selecting developers takes all of the above factors into account.[20]

Off-taker credit assessment:

The ability and willingness of off-takers to pay for power over the course of a long PPA period is the most critical factor for the success of the Facility but assessing their credit ratings, and therefore likely project default rates, is difficult.

Enforcement of contract is a big challenge in India and means that industrial and commercial off-takers may willfully terminate long-term PPA contracts if there is another service provider ready to offer electricity services at a lower price. While the competitiveness of rooftop solar power mitigates this risk to an extent, the warehouse credit line entity will nonetheless develop

[19] Results of scenario analysis are included in Appendix Section 7.2

[20] Please see Appendix Section 7.5 for project developer selection criteria.

a check-list to assess the creditworthiness of off-takers in proposed projects.[21] Both are part of a broader credit assessment framework designed to ensure the Facility's impact and ongoing financial feasibility.

The Facility will also develop a checklist for selection of off-takers. While credit rating agencies use a number of approaches to evaluate the credit rating of off-taker entities including for India's electricity distribution companies (DISCOMs), there is currently no standardized method to select commercial and industrial off-takers given their limited PPA payment histories in this new sector.

The Facility's checklist will use elements of the credit rating agencies' approach for DISCOMs, off-takers' credit ratings and mortgage payment records, and other qualitative aspects to assess the creditworthiness of the off-taker in proposed projects.

According to our analysis, off-takers with a credit rating below BB would make the project developers' and consequently the Facility's position vulnerable as they are more likely to default on their PPA agreements. Off-taker ratings will also influence the rating of the securitized bonds in the second phase of the Facility. For this reason, the Facility will only lend to projects whose off-taker' rating is BB or above.

Legal entities for establishment of warehouse credit line entity:

The Facility would be best housed in an existing bank or Non-Banking Financial Company (NBFC).

There are four ways in which the Facility can be set up:

- Establishing a new Non-Banking Financial Company (NBFC)
- Establishing a new Alternative Investment Fund (AIF)
- Setting up the Facility within an existing bank
- Setting up the Facility within an existing NBFC

Our analysis suggests that the first two options would not be suitable for this Facility. As the Facility aims to raise debt capital of $100 million, the minimum net worth of a new NBFC would need to be $44 million in order for it to maintain the legally required 15% capital adequacy ratio. As equity capital would need to make up a large portion of the capital structure, it would increase the Facility's cost of funding of the facility and thereby its cost of lending. AIF structures' higher need for equity capital would also increase the cost of funding of the facility.

Our internal research and inputs from a regulatory expert suggests that setting up the Facility inside in an existing bank or NBFC would be more suitable as the stronger balance sheets of existing banks and NBFCs would enable them to keep the cost of lending low. It will also be a simpler structure to establish than a new NBFC or AIF.

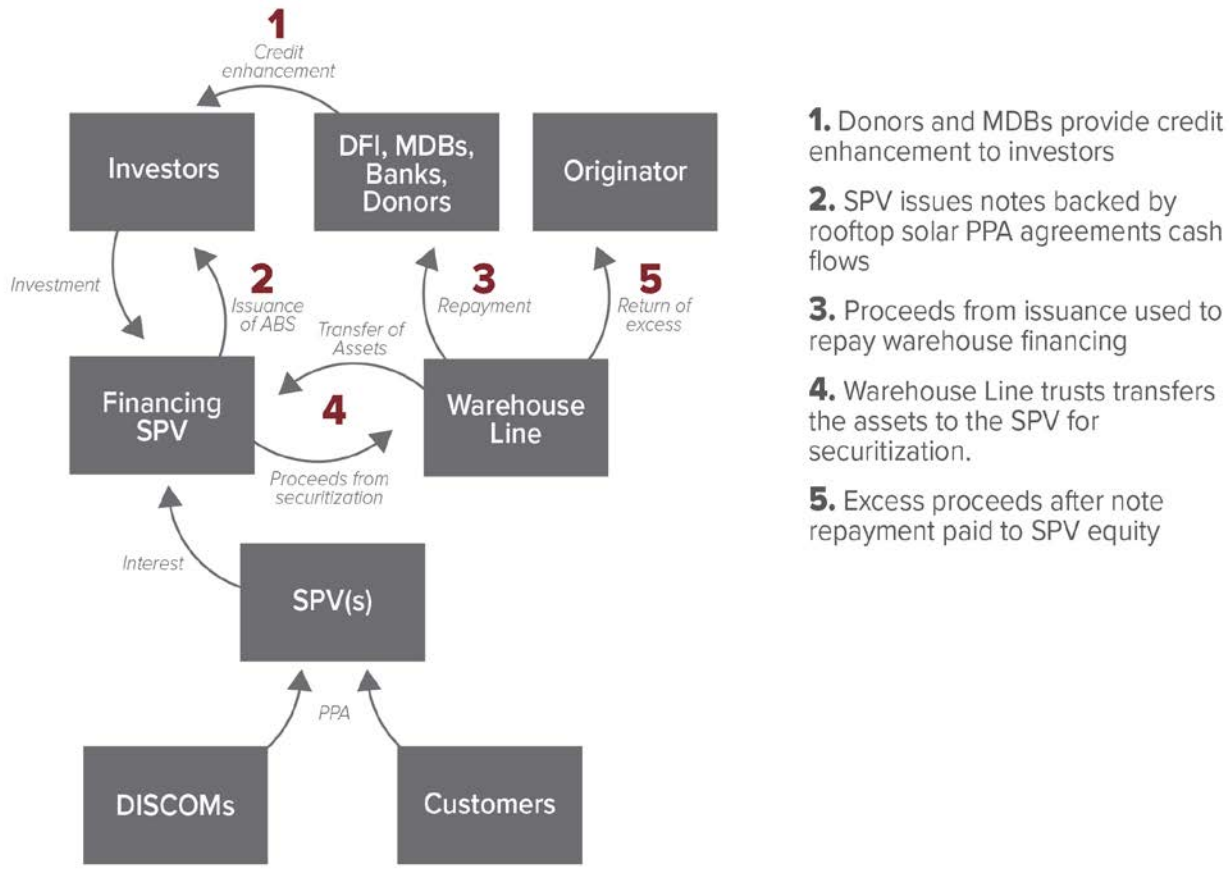
2.2 SECURITIZATION PHASE

The second phase of the Facility – securitization – involves refinancing the warehouse line of credit by issuing asset-backed security[22] bonds to domestic institutional investors, domestic lenders, or international investors (if currency risk can be managed by the implementing agency). The asset-backed security bond will be securitized against the loan pool. **The refinancing should reduce the loan costs and free up capital from the warehouse line of credit to finance additional projects.**

[21] Checklist is available in the Appendix Section 7.6.

[22] Long term PPA payments are the assets of the warehouse line

***Figure 6**: Securitization Phase Mechanism*



The warehouse line entity would package and structure the loan portfolio into a bankruptcy-remote financing Special Purpose Vehicle (SPV) for securitization. The financing SPV would appoint a trustee to monitor the assets lying in the SPV and the SPV would issue asset-backed securities to the capital market. The proceeds from the securitization can be used to pay back investors in the warehouse credit line.

Potential investors in the securitized phase include institutional investors such as pension funds, insurance companies and mutual funds. Bank financing can also be tapped during this phase. Refinancing through securitization should reduce the overall loan cost compared to a traditional financial structure (due to expansion of investor base and matching investors' risk and return), and free up capital from the warehouse line of credit to finance additional projects.

As institutional investors rarely invest in securities with a credit rating below AA due to their regulatory constraints and investment mandates, credit enhancement products can also be deployed to attract institutional investors.[23]

2.2.1 Role of Credit Rating Agencies

Credit rating agencies are critical during securitization phase. Regulatory authorities such as the Securities and Exchange Board of India (SEBI) require a structured bond to be rated. In many instances, bond issuers also want to rate their bonds in order to create investor interest in the offering and to be able to offer the bond at a competitive price.

Agencies' credit ratings indirectly determine bonds' yields. A lower rated bond must offer a higher yield to attract investors while a higher rated bond can offer a lower yield and still attract

[23] Credit enhancement products are covered in more depth in the Appendix Section 7.4.

investment. The ratings of securitized bonds primarily depend on the structure of a deal, the credentials of the parties involved, the economics of the assets, the performance history of the collateral, and the strength of credit enhancement products.

The issuer pays rating fees of 0.1%-0.2% of loan proceeds to the rating agency on an annual or biannual basis. Although it adds to the cost of capital, the credibility of the rating expands the investor base and can reduce the cost of capital.

In rating a structured finance deal for rooftop solar PV assets, an agency would consider multiple factors including the experience and credentials of the project developer and O&M servicing company (including their credit ratings), the credit profile of the off-taker, the economics of using rooftop solar, solar PV tariff trends, and the debt tenor. If no official credit rating is available for an off-taker, a shadow rating is considered. The agency would also take into account risks related to technology obsolescence, rates of panel degradation, and changes in building laws.

In addition to the factors outlined above, a credit rating agency would also take into account the historical performance of the Facility's loan portfolio and the diversification of its solar PV assets. As the Facility is not planning to issue asset-backed security bonds for 3-5 years, it will have some record of historical performance associated with this asset class by the time it goes to market. As it aims to aggregate the assets of different developers, it would also mitigate risks through diversification as well. Finally, the Facility can also share its selection criteria for developers and off-takers with the credit rating agency to address its concerns during the rating process. It is essential for the Facility to choose projects with developers, off-takers and O&M servicing companies, whose credentials and credit ratings are good enough in order to get a good rating on a securitized product.[24] However, setting the threshold for credit ratings too high for the selection of developers and off-takers may jeopardize deal flows.

[24] See Section 2.1.4 for a discussion of the selection criteria.

3. INNOVATION AND RISK MITIGATION

3.1 INNOVATION

Asset backed securities (ABS) have been used to raise capital by corporates in India since early 1991 and had reached a size of $3.7bn by March 2016. The size of this market shows investors familiarity with these instruments and increases the potential of securitizing rooftop solar PPA payments at a larger scale than that envisioned by the Facility.

Currently, the use of these financial instruments in the renewable energy sector is limited. The application of the warehouse line facility in the renewable energy sector and securitization of rooftop solar PPA payments started in 2013 in the US.

This Facility therefore offers an innovative solution that meets the growing debt financing needs of the rooftop solar PV sector in India by providing more, longer-term, lower cost capital. At the same time, the Facility can also demonstrate the commercial viability of the sector and bring in additional investment. Also, this Facility could also choose to issue this asset-backed bond as a green bond, a relatively new way of financing renewable projects that can attract further investors.

3.2 BARRIERS ADDRESSED

The Facility aims to address multiple barriers to investment in the rooftop solar sector, including low availability and high cost of debt capital, non-standardized power purchase agreements, perceived risk in the sector, and credit risk.

A lack of long-term, low cost debt particularly for developers

The key obstacle to growth in the rooftop solar PV sector is a lack of attractive debt financing due to the small size of deals, contract enforceability concerns, and a limited secondary market for solar PV assets.

The Facility aims to address this by providing debt financing solutions for a longer time period at a lower interest rate. By combining concessional and commercial financing, the warehouse line of credit can reduce debt financing costs during the aggregation phase. The securitization of PPA payments during the mobilization phase can attract financing at a lower rate compared to traditional methods of financing, leading to lower costs of loans to developers in the long run.

Smaller, entrepreneurial rooftop solar project developers can find it particularly challenging to raise debt capital as they are not backed by big corporates and are therefore unable to rely on their parent company's balance sheet strength or track record.

This Facility aims to address this by providing debt capital to the more creditworthy developers in this group.

Lack of standardized PPA agreements and loan documents

The lack of standardized PPA agreements and underwriting loan documents increases the transaction costs and consequently availability and cost of capital for the sector. The Facility aims to alleviate the barrier by moving towards a standardized PPA agreement.[25] It will do so by developing guidelines including all of a PPA's essential elements. These will cut down due diligence costs by reducing negotiation time and related expenses, and offer comfort to off-takers about the legality and strength of the contract.

[25] Our primary research suggests that full standardization of rooftop solar PV PPAs is not possible in India currently as it is a supply driven market.

Perceived riskiness of the rooftop solar sector

The lack of a performance record for the rooftop solar PV sector increases the perception of risk, and consequently the cost and availability of financing. The Facility aims to demonstrate the commercial viability of the sector and thereby decrease the risk perception of the sector.

High credit risks for investors

The credit risks involved in rooftop solar projects largely come from off-taker risk and contractual enforceability risk. The pooling of project loans will diversify the asset base thereby reducing risk. The attachment of credit enhancement products to the loans and the selection of developers with good credentials as borrowers will further mitigate credit risk associated with rooftop solar project financing.

3.3 BARRIERS NOT ADDRESSED

Contract enforceability concerns

As the legal enforceability of contracts is not very robust in India, a long term Power Purchase Agreement (PPA) becomes risky. The key contract enforceability concerns for the Facility are that the targeted industrial or commercial off-takers may terminate the contract during a PPA contract period if they find a cheaper source of electricity or that they may prevent access to rooftops to remove the solar PV systems after termination of a PPA contract.

The Facility seeks to mitigate this risk by selecting creditworthy off-takers and securing advance payment from off-takers.

The cost competitiveness of rooftop solar systems compared to alternative power generation sources may also help to reduce this risk. The continuous decline in solar panel prices and consistent progress in the performance of solar panels are making this technology increasingly attractive. However, this also makes it difficult to predict how off-takers will behave. Declining prices and the improving performance of solar panels may encourage targeted off-takers to terminate their PPA contracts and switch to a new technology provider.

High transaction costs and low liquidity due to the small size of securities

The size of the principal amount of an investment product affects its liquidity as investors prefer larger sizes. However, transaction cost (such as credit rating and legal fees) associated with structuring the securitized products are fixed regardless of the size. If the rooftop solar ABS issue is small, it will struggle to create liquidity, making the transaction costs high. For instance, SolarCity spent 5.7% of gross proceeds on transactions in its first securitization in the US (Marathon Capital, 2016).

Limited historical performance data

Credit rating agencies rely heavily on the historical performance of the asset class in order to rate it. As the rooftop solar PV industry has only been around for last 7-8 years and only in developed markets, this makes difficult to assess the power generation performance risk over the lifetime of rooftop solar PV projects. The short historical performance makes it difficult for credit ratings agencies to forecast long-term future cash flows.

Need for credible and geographically diversified O&M service providers

Operating and Maintenance (O&M) service companies are an integral part of the rooftop solar PV business. As solar PV project developers are expected to have a geographically dispersed asset base (for asset diversification purposes) there is a need for O&M service providers with a similar geographical spread as a back-up in case project developers go bankrupt. However, currently the O&M service market is disorganized and large developers have their own O&M teams.

3.5 RISK ALLOCATION

The Facility uses its capital structure to allocate risk among multiple financiers such as developers, banks, DFI, MDBs, and donors to reduce the overall risk and thereby reduce the overall cost of projects.

Existing financial structures in the rooftop solar sector is not properly allocating risk among various stakeholders. As project developers are putting their own capital, they are currently assuming all the financial risks associated with the projects with little incentive to do so. Project equity returns are low when projects are excessively financed by expensive equity capital.

The risk allocation within the Facility's warehouse line of credit is based on risk tolerance and incentives for taking on risk.

As banks' risk tolerance is lower than other investor classes, banks have the seniority over all other financiers in the Facility's capital structure. The banks can mitigate the risks attached to individual projects as its loan would be exposed to multiple projects. In addition, as rooftop solar is a new asset class, banks can diversify their portfolio and mitigate some of the risk associated with their investments in the non-renewable energy sector.

DFIs' and MDBs' risk tolerance level is higher than banks, so they provide debt with longer tenors than banks.

The donors have a higher ability to take on risks than banks, DFIs, and MDBs so they occupy the lowest position in the capital structure.

4. IMPACT

Over 2016 to 2022, the Rooftop Solar Private Sector Financing Facility could bring in approximately $425 million of capital into the rooftop solar sector, lower the cost of debt capital by 0.5%-3.5%, add an additional 500MW of rooftop solar capacity, and create 20,000 additional jobs.

4.1 TRANSFORMATIVE

Solar capacity addition

Our projections suggest that this Facility would add ~168MW of capacity during its pilot stage over 2017-2019 and ~332MW once it scales up over 2019-22 to reach ~500MW in total. We arrive at this estimate by multiplying realistic projections on rooftop solar PV power capacity addition with the 5% market share the Facility is likely to be able to capture.

SolarCity has been able to finance 5% of their capital requirements through securitization. However, other developers in the US have also started preparing themselves to raise capital through securitization (Marathon Capital, 2016). It suggests that the solar securitization market's share of total solar PV financing will increase gradually.

We have assumed this Facility will capture 5% of the target market share. However, we believe our estimate is conservative given the large debt capital requirement of the sector. The target commercial and industrial rooftop solar segments are expected to add ~11GW over 2016-2022 (Bridge to India, 2016) which will require $9.35bn of capital investment

In the long run, this Facility has the potential to raise more capital indirectly by helping rooftop solar developers to grow. Currently, developers' small size and the lack of a historical solar PPA performance record prevent them from securitizing their PPA payments. As these developers reach scale and accumulate a performance record of PPA payments, they will be able to source more capital through securitization.

Greenhouse gas reductions

By installing rooftop 500MW of solar capacity, this Facility would lower CO_2 emissions by ~695mMT (0.93mton of CO_2 per 1MWh power generation (EPA, 2012) per year by 2022 since most of India's energy needs are met by coal-fired generation. It would also reduce SO_X and NO_X emissions by 2,300mMT and 3,217mMT, respectively (EPA, 2012).

Socioeconomic benefits

The deployment of rooftop solar PV has enormous potential for job creation in various fields such as manufacturing, business development, supply chain, logistics, installation and commissioning, and operation and maintenance. The jobs related to operation and maintenance are long-term as solar rooftop PV systems need these services through their lifetime. A recent study suggests that 1GW of rooftop solar installation would create 40,000 additional jobs (Bridge to India, 2014). Since this Facility is aiming for 500MW of capacity addition by 2022, this means this Facility can create additional 20,000 jobs over 2016-22.

4.2 INNOVATIVE

Availability of capital

This Facility would bring an additional ~$425mn of capital into the rooftop solar sector. Assuming a debt/equity ratio of 70:30, we have projected this Facility would bring $297mn of debt capital and $127mn of equity capital.[26]

Terms of capital

During the aggregation phase, this Facility aims to lend at a rate of ~10.5%, which is 0.5-3.5% points lower than the current cost of debt for rooftop solar PV developers. In the securitization phase, the Facility can lend at an interest rate 1-1.5% lower than the cost of borrowing through

[26] We have assumed the rooftop solar developers will invest approximately $850K capex per 1 MW capacity.

traditional sources (New York University, 2000). In total, the solar developer can save ~$7.5-$11.6k (undiscounted) through this Facility for every 1MW generation of rooftop solar power.

4.3 CATALYTIC

At the pilot stage, this Facility can drive investment of ~$70mn of private capital. The debt capital provided through the warehouse line of credit can be recycled when the PPA payments are securitized and reinvested to add more solar PV capacity. Once the Facility demonstrates the commercial viability of rooftop solar sector, **this kind of financial mechanism** can generate significant additional private investment. We estimate that the proposed Facility could bring in more than $297mn of debt capital over the next six years, assuming it can capture 5% of the target market.

Our projections suggest that the leverage will be ~5X at the pilot stage. This is based on the total capital investment of ~$141mn, including ~$30mn of public capital, required to make Facility. Once the demonstration period, the Facility will not need further public capital. Project developers can also use this financial Facility to source capital directly from the market once they reach at a certain size.

4.4 ACTIONABLE

The Facility scores 2.3 (a simple average of the rating of the individual metrics) **on a 3-point scale determining its feasibility and is therefore highly actionable**[27]. On a 3-point scale <1 indicates low feasibility, 1-2 indicates moderate feasibility, and >2 indicates high feasibility.

[27] Please refer to Section 5.4 for details

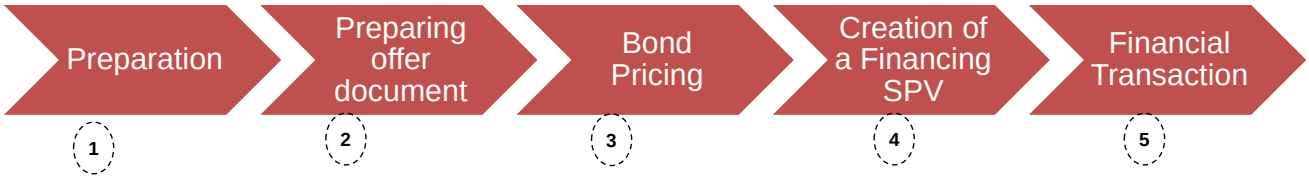
5. IMPLEMENTATION PATHWAY

We believe this instrument is highly feasible, because it can operate smoothly within the institutional framework, in conformity with existing regulations, and it has a strong implementing agency in place.

5.1 IMPLEMENTATION PATHWAY AND TIME LINE: AGGREGATION PHASE

Description	Time Frame (months)	November 16 – August 17									
		1	2	3	4	5	6	7	8	9	10
Identify legal structure	3										
Select warehouse agent(s)	3										
Set up a warehousing structure	3-5										
Finalize warehouse investment terms	2-4										
Identify warehouse investors	6-9										
Finalize developer criteria	2										
Selection of developers	2										
Development of documentation guidelines	4-6										
Develop project credit process	3-5										
Finalize project criteria and documentation	2-4										
Begin financing rooftop solar deals		Can start in August 2017									

5.2 IMPLEMENTATION PATHWAY AND TIMELINE: SECURITIZATION PHASE



1. Selection of underwriter and transaction parties, creation of term sheet, and development of sate and stratification
2. Financial modeling for securitization, effectuating credit rating process, drafting offer document, finalizing transaction structure and offering documents
3. Engage with rating and underwriting agency, Financializing bond pricing and rating, and Launching transaction
4. Transfer the PPA assets to the SPV, Making payment of proceeds of issued securities to initial investors and payment to the SPV and dividend to developer
5. Making payment (interest and principal) to financing providers, and pay excess money given (after meeting debt covenant) to developer and the originator

5.3 IMPLEMENTATION CHALLENGES

Availability of concessional finance for the warehouse line of credit

The warehouse line entity needs concessional finance to lend at a competitive rate and make it commercially viable. There is ~$2.5bn of concessional finance (including commitments from Asian Development Bank and PNB) available for the rooftop solar sector in India. According to our research, the borrowing cost of these loans will be in the range of 9.7%-10.8%. If the entity disbursing the warehouse line of credit is unable to get concessional finance, its lending cost would be north of 10.5%, above the concessional cost of lending in India. Increased lending costs would make many projects unviable and consequently discourage developers. Even if demand for financing exceeds supply, creditworthy project developers would prefer a cheaper source of finance.

Availability of credit enhancement products to attract local commercial-rate finance

Public and private sector banks in India are under Non Performing Asset (NPA) pressure and are currently following a stringent credit disbursing policy. They may be reluctant to lend to an unproven sector. The Facility will need credit enhancement products from donors to attract local financiers.

Asset liability mismatch due to short loan tenors from local banks

The warehouse line of credit's portfolio will include loans with shorter tenors than the lifetime of the asset. Local banks offer a maximum five year tenor, after which the Facility will need to refinance. If it is unable to do so, it would technically default and could need to wind down the operation. Banks, DFIs, MDBs, and donors need to commit capital for the full term of the asset to avoid this situation.

Potential downgrades to the Facility's credit rating

The credit rating of the Facility depends on not only the quality of warehouse line's portfolio but also the rating of project developers, off-takers, O&M players, and credentials of the originator. Although the Facility is targeting developers and off-takers that have at least a BB rating, any downgrade in the credit ratings of these entities could impact the rating of securitized Facility.

Breaking of off-taker contracts could trigger loan defaults

The success of the Facility hinges on credible off-takers' willingness and ability to pay agreed PPA tariffs over the next 15-20 years. As solar tariffs are decreasing year by year, off-takers have incentives to terminate the contract and switch to other developers. Legal contract enforcement is tough in India and a significant level of willful default by off-takers could trigger loan defaults.

5.4 IMPLEMENTATION FEASIBILITY

We determined the feasibility of implementation of the Facility through qualitative analysis. Five criteria impacting feasibility were identified and the Facility was rated on a 3-point scale against each (<1 indicating low feasibility, 1-2 indicating moderate feasibility, and >2 indicating high feasibility).

Criteria	Reason for Rating	Implementation Feasibility Rating[28]
Precedent	There is no precedent for aggregation and securitization of PPA payments in India but securitization of other assets has taken place in India for a long time. Securitization of rooftop solar PV PPA payments has taken place in the US since 2013, but the number of successful securitizations and size of the market is low. There is no precedence of Solar PPA payments securitization in India, but securitization of other assets has been in India for a long time.	2
Institutional Framework	This Facility can operate smoothly within current institutional frameworks.	3
Conformity with existing financial regulations	Regulations for the creation of special purpose vehicles for project financing and infrastructure debt funds already exist in India. There are existing institutions to regulate securities.	3
Dependence on financial markets	The securitized market in India is small. Almost all the asset backed securities are privately placed and it is largely used to meet priority sector lending markets.	2
Implementing agency	The Facility has an implementer in place. The implementer has a target of raising $100mn for the pilot project.	3
Involvement of stakeholders	The success of the Facility depends on a number of different stakeholder groups including different classes of investor, project developers, off-takers, and O&M players.	2
Timelines	This Facility would need 10 to 15 months to implement.	1

[28] The rating is based on CPI's internal analysis (as shown in the table), secondary research, and discussion with experts in the relevant field

6. KEY TAKEAWAYS

The Rooftop Solar Private Sector Financing Facility could address many persistent barriers to the deployment of rooftop solar by providing long-term, low-cost debt to developers and demonstrating the commercial viability of asset-backed securities for the Indian rooftop solar sector.

Over 2017-22, the Facility can bring $338mn of private capital. However, beyond 2022, this Facility has the potential to help raise further capital by supporting rooftop solar PV project developers to grow and demonstrating the commercial viability of the sector. Currently, developers' small size and the lack of a historical record on rooftop solar power purchase agreement (PPA) performance record prevent them from securitizing their PPA payments. As these developers reach scale and accumulate a performance record of PPA payments, they will be able to source more capital through securitization.

Our projections suggest that this Facility would add ~168MW of capacity during its pilot stage over 2017-2019 and a further ~332MW once it scales up over 2019-22 to reach ~500MW in total. This would lower CO_2 emissions by ~695mMT per year by 2022 since most of India's energy needs are met by coal-fired generation. It would also reduce SOX and NOX emissions by 2,300mMT and 3,217mMT, respectively.[29] Importantly, this deployment would also create an additional 20,000 jobs from 2016-22.

The ability of the Facility to bring in local finance from commercial banks and provide the lower-cost, longer-term finance that rooftop solar PV project developers need depends on the willingness of multilateral development banks (MDBs), development finance institutions (DFIs), and international donors to provide concessional finance to its warehouse line of credit. It will also require donors to provide credit enhancement products.

There are some risks that the Facility cannot address. Its success hinges on credible off-takers' willingness and ability to pay agreed PPA tariffs over the next 15-20 years. With solar tariffs are decreasing year by year, off-takers have incentives to terminate PPAs and switch to other developers. Legal contract enforcement is tough in India and a significant level of willful default by off-takers could trigger loan defaults.

[29] 0.93mton of CO_2 per MwH,, 3.09ton of SOX per KwH, and 4.32kg of NOX per KwH power generation (EPA, 2012).

7. APPENDIX

7.1 SOURCES AND USAGE OF CAPITAL IN THE PILOT PROJECT

Source of Finance					Uses of funds		
	Value (In INR mn)	Cost	Maturity (Yrs.)	Contribution (%)		Value (In INR mn)	Capacity Addition (MW)
Warehouse Line Entity							
Senior Sec. Debt	2,653	10.0%	8	28.0%	**Capex**		
Senior Sec. Debt	1,990	10.0%	10	21.0%	Grid	4,950	90
Subordinated Debt	1,923	8.0%	13	20.3%	Retail	4,320	72
Sponsor Equity	66			0.7%	WC	204	
Developer Equity	2,842			30.0%			
Total	**9,474**			100.0%	**Total**	**9,474**	**162**

7.2 WAREHOUSE LINE SCENARIO ANALYSIS

There are numerous factors (variables) which can affect the warehouse facility's ability to service the debt. These factors are the lifespan of the solar PV systems, efficiency (capacity utilization factor), and degradation of the system, operation and maintenance (O&M) expenses (if provided by an outside agency), working capital, tariff, default rate, and cost of interest.

Lifespan of the PV systems: Any decrease in lifespan of the PV systems will decrease power production and consequently decrease revenue. There is limited historical record on the lifespan of the PV systems, and also there is no record of PV systems becoming dysfunctional in less than the promised lifespan. It depends on the quality of the PV systems. Sometimes, the supplier also offers guarantee on the life span of the system.

Efficiency: Any decrease in efficiency of the PV systems will decrease power production, consequently lower revenue.

Degradation of the system: Any increase in more than estimated degradation will decrease power production and consequently decrease revenue.

There is no human behavior involved on above three factors, so these are more unpredictable. So, we have not changed these variables every year, but we are conservative in our assumption on all these three factors.

O&M expenses: In addition to installation of PV systems, the developer will provide O&M services during the contract period. However, the developer could hire an outside O&M service provider to provide O&M services without any contractual agreement on cost of services. So, any increase in cost of O&M services will reduce cash flow generation of the project. Since, the facility will choose customers who have their own O&M service network, so that the facility mitigate this risk. Secondly, O&M expenses constitute ~12.5% of revenue over the project cycle compared to interest expenses of ~32%. In addition, default and lower tariff will have higher impact on revenue and cash flows than change in O&M expenses. Also, O&M expenses are mostly labor charges, which increase in line with inflation. Tariff and default is more unpredictable (because it is a new sector) than inflation. So, we have not changed this variable every year, but we are conservative in our assumption on all these three factors.

Working capital: The facility will choose off-takers who are the ultimate consumer rather than the utilities. Utilities delay the payment, not the consumer. Secondly, the facility will choose good consumers / utility to mitigate this risk. So, this variable will have lesser impact.

Tariff: As solar tariffs are decreasing year by year, off-takers have incentives to terminate the contract or force the developer for a revised tariff plan. Any drastic decrease in tariff can make the project unviable and adversely affect ability of the developer to service the debt.

Default: The success of the Facility hinges on credible off-takers' willingness and ability to pay agreed PPA tariffs. Any default of PPA payment will reduce cash flows and consequently trigger loan defaults by the developer.

Cost of interest (if variable): Any increase in cost of interest will increase debt servicing amount and consequently exert pressure on the developer to service the debt.

Out of above variables, tariff, cost of interest and default rate will have significant impact on the ability of developers to service debt. Cost of interest is fixed. So, we have chosen default rate and tariff as the two key variables in our scenario analysis. However, we are conservative in our assumptions on other variables, so adverse changes in these variables are captured in our modelling.

Variation in Tariff: We have assumed negotiated tariff would be 80% of PPA price in the worst case as we believe that tariff would not decrease that much (significantly lower than 80% of PPA price) to induce off-takers to switch developers. So, tariff would be between 80%-100% of the PPA price in our scenario analysis.

Default Rate: We have estimated default rate by adding US rooftop default rate with spread of average NPA between India and US. We opine that maximum default rate should not be more than 150% of base default rate assumption as off-takers pay the utility bills even they default in their loan payment. However, off-takers will negotiate with developers for a revised price, which we have incorporated in our financial model. We believe that the default rate will be lower in the initial years as the tariff would not decrease enough to induce off-takes to switch developers.

We have only considered downside cases in our scenarios analysis as debt holders will not get any benefits from the upside.

Base Case

Year	1	2	3	4	5	6	7	8	9	10	11	12	13
Tariff													
Grid	5.0	5.1	5.3	5.4	5.6	5.8	5.9	6.1	6.3	6.5	6.7	6.8	7.0
Retail	6.0	6.2	6.3	6.5	6.7	6.9	7.1	7.3	7.5	7.8	8.0	8.2	8.5
Cummulative Default Rate	1.9%	2.0%	2.2%	2.5%	2.9%	3.3%	3.6%	4.0%	4.4%	4.8%	5.2%	5.5%	5.9%
Financial													
DSCR	1.0 x	1.1 x	1.5 x	1.4 x	1.4 x	1.4 x	1.4 x	1.4 x	1.4 x	1.3 x	1.3 x	1.2 x	1.2 x
Over-Collateralization	-48.4%	53.6%	65.4%	73.3%	83.5%	96.7%	113.9%	137.3%	170.5%	228.3%	346.5%	705.0%	NM
Cash Reserve to Gross Debt	0.0 x	0.0 x	0.1 x	0.1 x	0.2 x	0.3 x	0.4 x	0.5 x	0.7 x	1.0 x	1.5 x	3.1 x	5.0 x
Debt servicing ability		No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Equity IRR	**14.1%**												

Scenario 1

Year	1	2	3	4	5	6	7	8	9	10	11	12	13
Tariff													
Grid	4.8	4.9	5.0	5.2	5.3	5.5	5.7	5.8	6.0	6.2	6.4	6.6	6.7
Retail	5.7	5.9	6.0	6.2	6.4	6.6	6.8	7.0	7.2	7.4	7.6	7.9	8.1
Variation from base case (%)	*95%*	*95%*	*95%*	*95%*	*95%*	*95%*	*95%*	*95%*	*95%*	*96%*	*96%*	*96%*	*96%*
Cummulative Default Rate	2.1%	2.3%	2.6%	3.1%	3.7%	4.3%	5.0%	5.6%	6.2%	6.8%	7.5%	8.1%	8.7%
Variation from base case (Tim	*1.1 x*	*1.1 x*	*1.2 x*	*1.2 x*	*1.3 x*	*1.3 x*	*1.4 x*	*1.4 x*	*1.4 x*	*1.4 x*	*1.4 x*	*1.5 x*	*1.5 x*
Financial													
DSCR	0.9 x	1.0 x	1.4 x	1.4 x	1.3 x	1.3 x	1.3 x	1.3 x	1.3 x	1.2 x	1.2 x	1.1 x	1.1 x
Over-Collateralization	-57%	44%	56%	64%	73%	86%	103%	125%	158%	214%	330%	682%	NM
Cash Reserve to Gross Debt	0.0 x	0.0 x	0.0 x	0.1 x	0.1 x	0.2 x	0.3 x	0.4 x	0.5 x	0.7 x	1.1 x	2.2 x	5.0 x
Debt servicing ability		No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Equity IRR	**12.1%**												

Scenario 1 suggests that the equity IRR would decrease to 12.1% from a base case equity IRR of 14.1%. However, the developer can pay back the principal and interest as per the debt schedule.

Scenario 2

Year	1	2	3	4	5	6	7	8	9	10	11	12	13
Tariff													
Grid	4.5	4.6	4.8	4.9	5.0	5.2	5.3	5.5	5.7	5.8	6.0	6.2	6.4
Retail	5.4	5.6	5.7	5.9	6.1	6.2	6.4	6.6	6.8	7.0	7.2	7.4	7.7
Variation from base case (%)	*90%*	*90%*	*90%*	*90%*	*90%*	*90%*	*90%*	*90%*	*90%*	*90%*	*91%*	*91%*	*91%*
Cummulative Default Rate	2.3%	2.5%	2.9%	3.5%	4.3%	5.1%	5.9%	6.7%	7.5%	8.3%	9.1%	9.9%	10.7%
Variation from base case (Tim	*1.2 x*	*1.2 x*	*1.3 x*	*1.4 x*	*1.5 x*	*1.6 x*	*1.6 x*	*1.7 x*	*1.7 x*	*1.7 x*	*1.8 x*	*1.8 x*	*1.8 x*
Financial													
DSCR	0.8 x	1.0 x	1.3 x	1.3 x	1.2 x	1.2 x	1.2 x	1.2 x	1.2 x	1.1 x	1.1 x	1.0 x	1.0 x
Over-Collateralization	-66%	33%	44%	51%	60%	71%	86%	107%	137%	189%	294%	602%	NM
Cash Reserve to Gross Debt	0.0 x	0.0 x	0.0 x	0.1 x	0.1 x	0.1 x	0.2 x	0.3 x	0.3 x	0.5 x	0.7 x	1.3 x	5.0 x
Debt servicing ability		No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Equity IRR	**10.0%**												

Scenario 2 suggests that the equity IRR would decrease to 10.0% from a base case equity IRR of 14.1%. However, the developer can pay back the principal and interest as per the debt schedule.

Scenario 3

Year	1	2	3	4	5	6	7	8	9	10	11	12	13
Tariff													
Grid	4.3	4.4	4.5	4.6	4.8	4.9	5.0	5.2	5.4	5.5	5.7	5.9	6.0
Retail	5.1	5.2	5.4	5.6	5.7	5.9	6.1	6.2	6.4	6.6	6.8	7.0	7.2
Variation from base case (%)	*85%*	*85%*	*85%*	*85%*	*85%*	*85%*	*85%*	*85%*	*85%*	*85%*	*85%*	*86%*	*86%*
Cummulative Default Rate	2.5%	2.7%	3.3%	4.0%	5.0%	6.0%	7.0%	8.0%	9.0%	10.0%	10.9%	11.9%	12.9%
Variation from base case (Tim	*1.3 x*	*1.4 x*	*1.5 x*	*1.6 x*	*1.7 x*	*1.8 x*	*1.9 x*	*2.0 x*	*2.0 x*	*2.1 x*	*2.1 x*	*2.2 x*	*2.2 x*
Financial													
DSCR	0.7 x	1.0 x	1.2 x	1.2 x	1.1 x	1.1 x	1.1 x	1.1 x	1.1 x	1.0 x	1.0 x	1.0 x	1.0 x
Over-Collateralization	-79%	18%	28%	33%	41%	50%	63%	80%	105%	148%	230%	444%	NM
Cash Reserve to Gross Debt	0.0 x	0.0 x	0.0 x	0.1 x	0.1 x	0.1 x	0.1 x	0.2 x	0.2 x	0.3 x	0.4 x	0.6 x	2.6 x
Debt servicing ability		No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Equity IRR	**7.5%**												

Scenario 3 suggests that the equity IRR would decrease to 7.5% from a base case equity IRR of 14.1%. In addition, the developer would not be able to pay back scheduled principal to subordinate debt holders in the first two years of its operation. However, the developer can pay back the principal and interest as per the debt schedule.

Scenario 4

Year	1	2	3	4	5	6	7	8	9	10	11	12	13
Tariff													
Grid	4.0	4.1	4.2	4.4	4.5	4.6	4.7	4.9	5.0	5.2	5.3	5.5	5.7
Retail	4.8	4.9	5.1	5.2	5.4	5.5	5.7	5.9	6.0	6.2	6.4	6.6	6.8
Variation from base case (%)	*80%*	*80%*	*80%*	*80%*	*80%*	*80%*	*80%*	*80%*	*80%*	*80%*	*80%*	*80%*	*80%*
Cummulative Default Rate	2.9%	3.2%	4.0%	5.1%	6.5%	8.0%	9.4%	10.8%	12.2%	13.7%	15.1%	16.5%	17.9%
Variation from base case (Tim	*1.5 x*	*1.6 x*	*1.8 x*	*2.0 x*	*2.3 x*	*2.4 x*	*2.6 x*	*2.7 x*	*2.8 x*	*2.9 x*	*2.9 x*	*3.0 x*	*3.0 x*
Financial													
DSCR	0.6 x	1.0 x	1.1 x	1.1 x	1.0 x	1.0 x	1.0 x	1.0 x	1.0 x	1.0 x	1.0 x	1.0 x	1.0 x
Over-Collateralization	-94%	1%	9%	14%	20%	27%	37%	49%	66%	91%	131%	209%	NM
Cash Reserve to Gross Debt	0.0 x	0.0 x	0.0 x	0.0 x	0.0 x	0.0 x	0.0 x	0.1 x	0.1 x	0.1 x	0.1 x	0.1 x	0.1 x
Debt servicing ability		No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Equity IRR	**5.6%**												

Scenario 4 suggests that the equity IRR would decrease to 5.6% from a base case equity IRR of 14.1%. In addition, the developer would not be able to pay back scheduled principal to subordinate debt holders in the first three years of its operation. There will be two years delay than the scheduled maturity of the subordinate debt.

7.3 BUSINESS MODEL

Straightforward Sales Model (Capex Model)

In the capex model, small consumers buy the solar PV systems encouraged by accelerated tax depreciation benefits. However, if the government phases out accelerated tax depreciation in 2017 as expected, consumers may no longer choose to buy solar PV systems. In addition, the high cost of capital, lack of debt financing, technical performance risk and lack of reliable companies offering operation and maintenance services also discourage consumers from buying solar PV systems.

So far the capex model has been the dominant business model in the rooftop solar sector in India. Currently, it has an 86% share of rooftop installation capacity (Bridge to India, 2016). However, this business model is expected to decline in importance due to reductions in accelerated depreciation tax benefits and the rapid growth of deployment among commercial and industrial consumers, who prefer the opex model.

Renewable Energy Service Company (RESCO) Model

The RESCO model addresses household or commercial and industrial consumers' reluctance to purchase solar PV systems due to technical performance risk, high capital costs and lack of access to debt finance by ensuring that they don't need to pay anything upfront. Instead, the solar developer offering the RESCO requires the consumer to purchase power at a pre-determined price for a certain number of years.

In a variant of the RESCO model called a "Leasing Model", the developer leases a third party's rooftop, installs a PV system on it and sells energy to a distribution company and / or the third party.

Under both versions of the model, the developer enters into long term Power Purchase Agreement (PPA) with a consumer and provides financing, installation, operation and maintenance services. Consumers find this option attractive as they do not have to put in any capital upfront and do not take on any energy generation performance risk.

The key drawback of this business is lack of strong legal enforcement of contracts, consumers' lack of access to some government tax incentives and the bankability of private clients.

7.5 CREDIT ENHANCEMENT PRODUCTS

Credit enhancement products can facilitate investment in rooftop solar power by helping to shift investors' perceptions of the sector from a high-risk to a low-risk investment. Reducing perceived risk among investors would also reduce the cost of capital. The following credit enhancement products can be attached to this Facility to decrease risk perceptions, its required cost of capital, increase capital flows and improve its liquidity.

Credit Tranching (Classes)

The debt financing of the Facility would be divided into senior and subordinate debt. In the case of liquidation during bankruptcy, subordinated debt comes below senior debt holders in the hierarchy of creditors. Ranking the debt in this way offers investors different risk and return options and would consequently expand the investor base. The expansion of investment base would reduce cost of capital and increase the accessibility of capital.

Over-collateralization

Over-collateralization is used extensively to reduce default risk. In this case, it would mean PPA cash flows minus operating and maintenance expenses are is greater than debt obligations. As the developer contributes a substantial portion of the capital requirements (30%) and has the lowest rank in the capital structure, the Facility would have enough over-collateralization to protect debt holders in case some off-takers default.

Excess spread

Excess spread is the difference between borrowing and lending rates, which can act as a first defense against default of loans. The excess spread is usually used to cover trustee expenses, servicing fees, other transaction expenses and generate profit for the originator of the Facility. The excess spread should be large enough to cover the above expenses and absorb a level of ongoing defaults. However, excess spread should not be so large that it increases the cost of lending. We are assuming an excess spread of 100bps.

Third party guarantees

Third party guarantees provide for first-loss protection against losses up to a specified amount, which would improve the creditworthiness of the ABS and consequently decrease their cost of capital. Donors can be the potential third party guarantor of this Facility.

Debt covenants

The loans offered to developers will come with stringent debt covenants to protect debt holders from a potential default. The SPV will not be able to pay any dividend to project developers unless it meets the following targets: A minimum discounted over-collateralization of 50%, a minimum Debt Service Coverage Ratio (DSCR) of 1.1 times, the minimum working cash balance (depending on debt balance), and three months of debt services in hand.

7.6 CHECKLIST FOR DEVELOPER SELECTION

Developer Selection Methodology

We have divided developer selection methodology into two parts: eligibility test and grading of developers. The eligible test determines the eligibility of developers to be shortlisted as a prospective developer and grading of developers determines final selection of the developers and the interest rate would be charged to developers. Some of the parameters are objective in nature while many are subjective. We believe that the subjective parameters are critical to assess developers as the rooftop solar industry is nascent. Also, relying a few years (4-6 years) of data would yield a biased result.

The eligibility test is a combination of multiple parameters; the broad parameters are divided into four parts: performance capability, financial strength, rating of the developer, and others. This is the first step in selection of developer. The developer needs to meet each of the criteria in order to be eligible for funding from the Facility.

Eligibility Test	
Parameter	**Value**
Performance Capability	
Promoter Track Record (including capex projects)	
a) Solar Capacity Installed	Less than 2 MW
b) Promoters' relevant track record	Less than 3 years
c) Quality and depth in management team	Qualitative
d) Corporate Governance	Qualitative
c) Rooftop pipeline	Less than 4 MW
Technical competence and Adequacy of Manpower	
a) Technical competence	Qualitative
b) Adequacy of Manpower	Qualitative
Quality of Supplier and Tie-Ups	
a) Quality of suppliers	Qualitative
b) Supplier feedback	Qualitative
Customer Feedback and O&M Network	
a) Customer Feedback	Qualitative
b) O&M capabilities	Qualitative
Quality of existing customers	
Financial Strength	
Sales	Less than $0.2 million
Financial Leverage (Debt / Total Capital)	More than 80%
Adjusted Days Liquidity on Hand ratio	Less than 2 months
Accounts Receivable Turnover	Less than 6X
Debt Coverage	Less than 1.2X
Net worth (Entity + Promoter)	Less than $1.5 million
Feedback of bankers	Qualitative
Rating	Less than B
Others	Qualitative

Developer Grading Mechanism

In the second step (Developer Grading Mechanism), the facility will give a score on different parameters. The score card will determine the interest to be charged to the developer.

The assessment framework for rating is divided into two parts: Financial and Technical. The financial parameters are Sales (25% weightage), ROCE (20%), Liabilities / Net Worth (20%), Interest coverage (10%) and Net Worth (15%), and others (20%). The technical parameters are promoter's track record (35%), technical expertise (30%), and quality of supplier (15%), adequacy of manpower (30%) and customers and O&M (15%). The promoter's track record will favor established companies, which is not good sign from a developmental financing perspective.

The above parameters and weightages of the parameters are in line with credit rating agencies' criteria to rate rooftop solar developer. However, we think certain combination of the above parameters doesn't make sense for an industry which is growing at a rapid pace. For example, any company which is growing very fast would have a lower ROCE and interest coverage. It means that they would get a lower rating to another company which is growing at a less rate considering all other factors constant. This doesn't make sense at all.

So, we have dropped certain parameters and added some additional parameters. In addition, we have added some of the additional parameters as well to better reflect the true financial health and business prospect of the developer.

Developer Scoring Methodology – Performance Capability	
Performance Capability (Weightage of 50%)[30]	**Weightage**
Promoter Track Record (including capex projects)	**35.0%**
a) Solar Capacity Installed	7.5%
b) Promoters' relevant track record	7.5%
c) Quality and depth in management team	5.0%
d) Corporate Governance	5.0%
c) Rooftop pipeline[31]	10.0%
Technical competence and Adequacy of Manpower	**15.0%**
a) Technical competence	7.5%
b) Adequacy of Manpower	7.5%
Quality of Supplier and Tie-Ups	**12.0%**
a) Quality of suppliers	7.0%
b) Supplier feedback	5.0%
Customer Feedback and O&M Network	**15.0%**
a) Customer Feedback	7.5%
b) O&M capabilities	7.5%
Quality of existing customers	**23.0%**

Scoring Methodology – Performance Capability	
Promoter Track Record	
a) Solar Capacity Installed (In MW)[32]	**Mark Assigned**

[30] The performance capability should more weightage in an industry, which is at its nascent stage. Financial parameters would not reflect the true health company in this industry.

[31] The rooftop pipeline suggests the ability of the developer's to originate deals. The facility have a time frame of 24 months to invest; so the selected developers should have a strong deal pipeline, where the facility can invest.

[32] Any entity added capacity of less than 2MW would be considered to be a very small player when the capacity of the rooftop solar sector is closed to 1,000mw. The capacity addition also includes capex model.

2 to 10 MW	20
10 to 20 MW	40
20 to 40 MW	60
40 to 60 MW	80
Above 60 MW	100
b) Promoters' relevant track record (In years)	
1	20
2	40
3	60
4	80
5 or Above	100
c) Quality of depth in management team	20 to 100
d) Corporate Governance	21 to 100
c) Deal pipeline[33]	
2 to 10 MW	20
10 to 20 MW	40
20 to 30 MW	60
30 to 40 MW	80
Above 40 MW	100
Technical competence and Adequacy of Manpower	20 to 100
a) Technical competence	
b) Adequacy of Manpower	
Quality of Supplier And Tie-Ups	20 to 100
a) Quality of suppliers	
b) Supplier feedback	
Customer And O&M Network	20 to 100
a) Customer Feedback	
b) O&M capabilities	
Quality of existing customers	20 to 100

Developer Scoring Methodology – Financial Strength and others	
Financial Strength (Weightage of 30%)[34]	
Sales	20.0%
Financial Leverage (Debt / Total Capital)	10.0%
Adjusted Days Liquidity on Hand ratio	10.0%
Accounts Receivable Turnover	10.0%
Debt Service Coverage: : (EBIT+D&A- Net WC)/ (Principal + Interest)	15.0%
Net worth (Entity + Promoter)	25.0%
Feedback of bankers on conduct of account and integrity	**10.0%**
Rating (Weightage of 10%)	
Others (Weightage of 10%)	

[33] The industry is expected to add ~900mw and ~1,250mw of capacity in 2017 and 2018. So, the developer must have this much of deal pipeline.

[34] Moody gives 30% weightage on Financial Strength and Liquidity parameter in regulated utility sector, we also have given 30% weightage to financial strength including feedback of bankers, which is not there in Moody's financial strength parameter

Scoring Methodology	
Financial Strength	**Score**
Sales in Million Rupees (INR 8.4 million per mw of capacity)	
16 to 80 ($0.2 -$1.2)	20
82 to 160 ($1.2 - $2.4)	40
160 to 330 ($2.4-$4.8)	60
330 to 500 ($4.8 - 7.2)	80
500 and above (more than $7.2)	100
Financial Leverage (Gross Debt / Net PPE + Net Working Capital including cash and cash equivalents)[35]	
More than 90%	20
75% to 90%	40
60% to 75%	60
45% to 60%	80
Less 45%	100
Adjusted Days Liquidity on Hand ratio	
Less than 30 days	20
30-60 days	40
600-90 days	60
90-150 days	80
More than 150 days	100
Accounts Receivable Turnover	
Less than 6x	20
6x to 7x	40
7x to 8 x	60
8x to 9x	80
9x to 10x	100
Debt Service Coverage	
Less than 1.2	20
Less than 1.5	40
Less than 1.8	60
Less than 2	80
2 or above	100
Net worth (Entity + Promoter) in million rupees - Assuming 70% equity to create capacity	
100 to 500 ($1.5-$7.0)	20
480 to 900 ($7 to $14)	40
900 to 1800 ($14 to $28)	60
1800 to 2700 ($28 to $42)	80
Above 2700 ($42)	100
Feedback of bankers on conduct of account and integrity	

[35] This is in line with Moody's regulated electricity industry criteria

Rating[36]	
More than AA	100
A to AA	80
BBB to A	60
BB to BBB	40
Less than BB	20
Others	

Developer Grade

The developer grade will determine the interest to be charged on the developer.

Developer Grade	
A	75 or more
B	60 to 75
C	50 to 60
D	Below 50

7.7 CHECKLIST FOR OFF-TAKER SELECTION

Parameters	Threshold	Key Considerations
Rating	Minimum BB credit rating	Too high a credit rating would eliminate many new small and medium size companies and consequently would not generate enough deals
Utility Bill	Must not have defaulted in payment of utility bill	If the off-taker is defaulting in his utility bill, he is most likely to default
Payment	No willful default in payment of any contractual obligation	Willful default of contractual payment means the off-taker is likely to default. In addition, there will be numerous legal complications.
CIBIL Score of promoter	Minimum 700	It is difficult to get a loan from banks if the promoter (of a developer or off-taker) CIBIL score is less than 700. Shaky personal finance could jeopardize the future prospect of the company
Minimum Size deal (KW)	50	Low deal size would increase transaction costs. A very high deal size would eliminate many potential deals. A minimum deal size of 50KW would be appropriate for the Facility according to our secondary research
Goodwill (Reputation and Lawsuits)		Must be considered
Net Worth and Cash Flow	Must be positive	Negative net worth and cash flow suggest the off-taker may default on its contractual obligations. Negative net worth and cash flow may also force the promoter to exit the business, which means defaulting on the PPA.

[36] If the company is not rated, this criterion would be ignored. However, that company must have higher score compared to other companies having rating in order to get the same grade

7.8 POWER PURCHASE ELEMENT GUIDELINES

Term: The number of years of the PPA must be clearly defined.

Power Purchase Agreement Payments

- **Tariff:** The tariff structure must be clear in Power Purchase agreement. Tariffs can be fixed for the entire term or variable.
- **Power purchase**: The off-taker is obliged to buy certain amount of energy every month during the PPA term.
- **Payment:** The off-taker must pay a pre-determined tariff rate multiplied by amount of power consumed as measured by the system meter on a monthly basis.
- **Date of payment:** The last date of payment must be at a particular date after the end of the calendar month. The developer may impose a fine for late payment and the fine amount must be pre-determined.
- **Payment security mechanism:** The payment security mechanism must be in place in the form of advance payment and / or a bank guarantee from the off-taker to mitigate delay of payment or default.

Power Purchase Agreement Obligations

- **Maintenance of system, home, and property:** The off-taker must maintain the system, home and property, which can adversely affect energy generation capacity of the PV systems. These include cooperation during repairing, make the system as much as shed free during installation, allow the developer to inspect the system, informing the system when the system appears to be damaged or unsafe, and not create or allow any situation, which can affect the performance of the system. The off-taker must not make any alterations of the systems.
- **Access to the system:** The off-taker must provide access to the system to the developer or the chosen O&M provider for installation, construction, operation, repairs, removal and replacement. Even in the event of default, the off-taker must not create any obstruction to removing the PV system from its roof.
- **System construction and repair:** The developer is obliged to install and construct the system according to pre-determined plans, provide the meter to measure energy generation, repair the system, and create a financing arrangement to cover O&M services in case it goes out of business.

Credit check: The developer must have access to information on the off-taker's credit rating.

Default: Default occurs when there is a breach of contract between developer and off-taker. The off-taker may default due to a failure to make agreed payments, failure to perform the contracted obligations, provision of incorrect information in the initial PPA agreement, and shut-down of the off-taker's business. The developer will be in default if the system does not generate the amount of electricity agreed in the contract or technical default of the system.

Remedies of default: In the case of off-taker default, the developer can terminate the PPA, remove the system, and take appropriate legal measures to enforce the PPA. In case of developer default, the off-taker will not be liable to provide any compensation and the developer will need to remove the system at its own cost. However, the developer can enter into a new PPA agreement.

Termination compensation: The termination of compensation PPA includes a pre-determined exit fee for the cost of removing and installing the system in another location. The exit fee can be calculated on the basis of net present value of net (after O&M expenses) PPA payments over the term of the contract or book value of the system. The discount rate must be agreed upon between the developer and off-taker.

Performance risk guarantee: The developer must give an assurance of minimum power output and pay if the output falls short of this. The payment can be the difference in guaranteed and generated power output multiplied by a PPA tariff.

Transfer of rights and responsibilities: There must be provisions in the agreement which allow the original developer to transfer its rights to another developer if it ceases to be the main developer. The off-taker must allow the new developer to take on all the original developer's roles and responsibilities, thereby maintaining the supply of electricity and providing other necessary operating services.

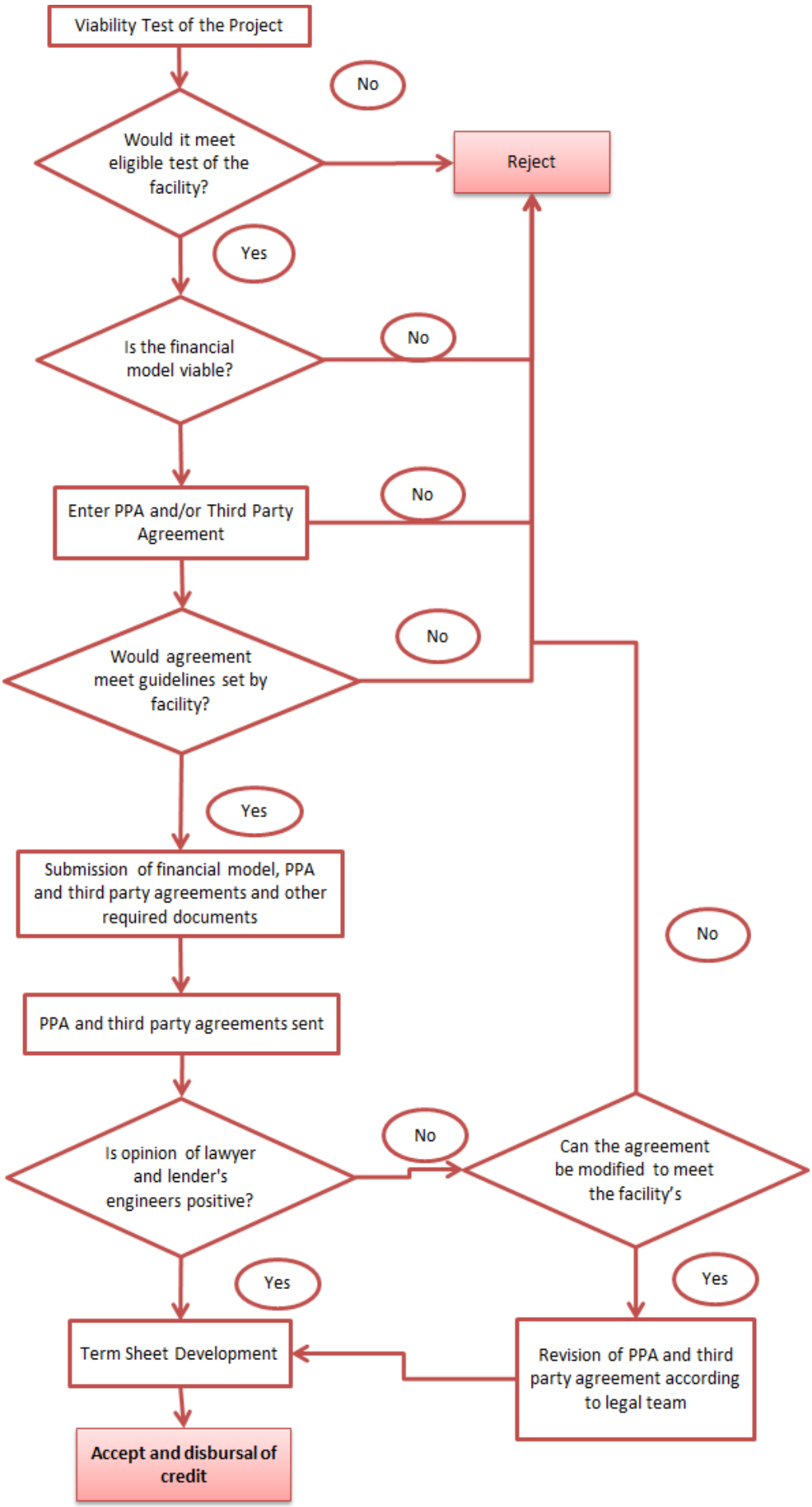
7.9 CREDIT DISBURSAL PROCESS

The Facility sponsor will develop a standardized credit screening model to be completed by project developers for all proposed projects. The Facility will also provide guidelines on drawing up Power Purchase Agreements (PPA) and develop a standardized loan term sheet.

These documents along with the standardized financial model will help developers to test whether the projects would be eligible for funding and ensure that lending decisions are quick. Also, the standardization credit screening model can be used for statistical analysis.

The Facility will appoint dedicated lawyers and a lender engineer to check all PPA agreements in order to quicken the process to a matter of weeks. If minor modifications are required, they can be made quickly. If they feel it is unwise to lend to a particular project, the Facility can deny developers immediately rather than keep them waiting for months. We believe the credit approval process would take two months initially, but can be cut down to 1 month gradually.

Credit Disbursal Process Flow Chart



7.10 ROLE OF LENDING ENGINEER

The lending engineer's activities can be primarily divided into three phases: Initial due diligence, monitoring engineering and construction work, and monitoring operation management.

Initial Due Diligence: In this phase, the lending engineer will analyze the project's technical aspects. Questions answered in this phase include:

1. Is area of the roof available for solar installation?
2. Are the roofs suitable for the proposed design?
3. How is the quality of the roof in terms of inclination, orientation, shadow effect, and ability to bear the load?
4. Are the above conditions are factored into the estimation of energy production?
5. Is there access to the roof?
6. Is there adequate space on the rooftop to set up a solar PV system?
7. Are solar modules, inverters, the mounting structure module, and Direct Current (DC) cables sourced from a credible supplier?
8. Who is the supplier of the solar panel?
9. Is fire safety measure adequately taken?
10. Are the warranty period and coverage of the solar panel adequate?
11. Is the performance generation guarantee adequate?
12. Does the project cost include all the costs?
13. Is the project cost in-line with current market trends?
14. Can the developer complete the project on time?

Monitoring engineering and construction work: The lending engineer will conduct an on-site inspection and assess whether construction progress is in line with the initial schedule.

Monitoring operation management: In this phase, the lending engineer will check the PV system management and maintenance in order to ensure that the system is managed properly. The objective is to ensure the PV system is properly maintained so that it generates the estimated energy production.

7.11 SECURITIZATION

Securitization involves the pooling of various types of contractual debt / obligations such as household mortgages, commercial mortgage, vehicle loans and credit card obligation and selling expected cash flows to investors as securities.

Benefits

- Can lower cost of financing as high cost equity capital is no longer required to support the assets and securitized debt can be structured to attain higher ratings
- Securitization frees up initial capital for other investment opportunities, which allows the Originator to use the proceeds to grow its business
- Reduction in bankruptcy costs, because the SPV is a bankruptcy remote entity
- Lessens control of the sponsoring firm over the assets, which protects the rights of securitized bond holders
- Access to institutional investors as bonds can be tailored according to the risk, return and investment horizon profiles of these investors

Risks

The government, regulators, policy makers, and investors became apprehensive about credibility of securitized products after the financial crisis in 2008 as securitized mortgage products were one of the key reasons for the crash.

- Credit Risk: Originates from performance of the underlying asset pool. In the event of higher payment default rates than expected, the investor is exposed to investment losses.
- Liquidity Risk: Emanates from asset liability mismatch. The delay in receipt of payment causes delay in payment to bond holder.
- Servicer Performance Risk: The service agency fails to perform its service obligation such as the collection agency fails to collect payment at the appropriate time or the trustee fails to oversee whether all the stakeholder adheres the agreements
- Legal Risk: Any change in legislation may invalidate certain clauses of the securitization contract
- Prepayment Risk: Loss due to prepayment of full or partial prepayment of principal amount particularly during low interest rate period

7.12 DEFINITIONS OF KEY TERMS

Developer: The rooftop solar project developer. The developer will also create an SPV for each project.

DISCOM: The electricity distribution company which enters PPA contract with the SPV.

Off-taker: The off-taker which enters PPA contract with the SPV. The off-taker can be a commercial, industrial or institutional entity.

Special purpose vehicle (SPV):

Sponsor: The Company which sets up the warehouse line entity. The sponsor will also provide equity capital to the warehouse line entity.

Trustee: The organization to be appointed by the warehouse line entity, which ultimate role is to protect the rights of bond holders.

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