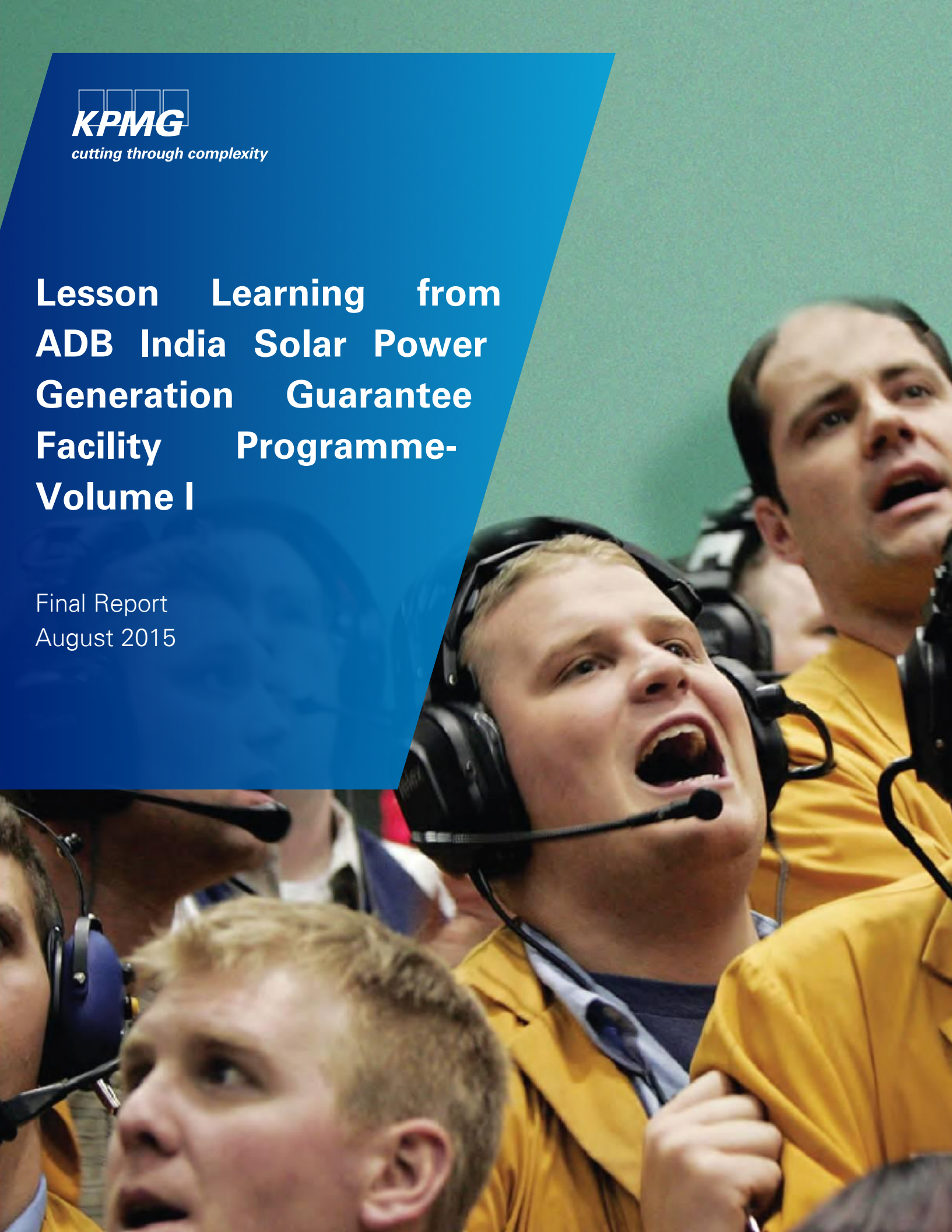




cutting through complexity

Lesson Learning from ADB India Solar Power Generation Guarantee Facility Programme- Volume I

Final Report
August 2015



Disclaimer

This document is being submitted to Department of International Development (DfID) as the Final Report for our engagement on “Lesson Learning from ADB India Solar Power Generation Guarantee Facility Programme” (dated 20th October 2014),

The report contains KPMG’s analysis of secondary sources of published information and incorporates the inputs gathered through interactions with industry sources, which for reasons of confidentiality, cannot be quoted in this document. While information obtained from the public domain has not been verified for authenticity, we have obtained information, as far as possible, from sources generally considered to be reliable.

Our report makes reference to ‘KPMG Analysis’; this indicates only that we have (where specified) undertaken certain analytical activities on the underlying data to arrive at the information presented; we do not accept responsibility for the underlying data.

In performing this engagement and preparing this Report (as per the Letter of engagement), KPMG has:

- used and relied solely on data provided by Client.
- not independently investigated or verified such Information.
- no responsibility for the accuracy and completeness of the Information and will not be held liable for it under any circumstances.
- neither conducted an audit, due diligence, nor validated the financial statements and projections provided by any of the quoted companies.

Collection of data for market assessment has been limited to such information as can be collected from resources on the published public domain and meetings with market participants.

Wherever information was not available in the public domain, suitable assumptions were made to extrapolate values for the same. We must emphasise that the realisation of the prospective financial information set out within our report (based on secondary sources, as well as our internal analysis), is dependent on the continuing validity of the assumptions on which it is based. The assumptions will need to be reviewed and revised to reflect such changes in business trends, cost structures or the direction of the business as further clarity emerges. We accept no responsibility for the realisation of the prospective financial information. Our inferences therefore will not and cannot be directed to provide any assurance about the achievability of the projections. Any advice, opinion and/ or recommendation indicated in this document shall not amount to any form of guarantee that KPMG has determined and/ or predicted future events or circumstances.

Glossary

ADB	Asian Development Bank
APPC	Average Power Pool Cost
ASPIRE	Accelerating Sustainable Private Investment in Renewable Energy
CARE	Credit Analysis And Research Limited
CERC	Central Electricity Regulatory Commission
CSP	Concentrating Solar Power
DECC	Department of Energy And Climate Change
DfID	Department For International Development
DFIs	Development Finance Institution
ECA	Export Credit Agencies
EPC	Engineering, Procurement and Construction
ESMS	Environmental And Social Management System
EXIM	Export Import
Facility	ADB Solar Power Loan Guarantee Facility
GBI	Generation Based Incentive
GEDA	Gujarat Energy Development Agency
GEF	Global Environment Fund
GIL	Green Infra Limited
GoP	Government Of Pakistan
GUVNL	Gujarat Urja Vikas Nigam Limited
HPPL	Hindustan Power Project Private Limited
ICF	International Climate Fund
ICRA	Investment Information & Credit Rating Agency
IDA	International Development Association
IEDCL	IL & FS Energy Development Company Limited
IFI	International Financial Institutions
IREDA	Indian Renewable Development Agency
IRR	Internal Rate Of Return
JNNSM	Jawaharlal Nehru National Solar Mission
MBIL	Moser Baer India Limited
MNRE	Ministry Of New And Renewable Energy
NBFC	Non-Bank Financial Companies
NPA	Non-Performing Assets
NVVN	NTPC Vidyut Vyapar Nigam Limited
OPIC	Overseas Private Investment Corporation
PCBs	Partner Commercial Banks
PCG	Partial Credit Guarantee
PE	Private Equity
PFC	Power Finance Corporation
PPA	Power Purchase Agreement
PRG	Partial Risk Guarantee

PSA	Power Sale Agreement
RBI	Reserve Bank of India
REC^a	Renewable Energy Certificate
REC^b	Rural Electrification Corporation
RESCO	Renewable Energy Service Company
RPO	Renewable Purchase Obligations
SECI	Solar Energy Corporation Of India
SPIA	Solar Park Implementing Agency
SPV	Special Purpose Vehicle
SREP	Scaling Up Renewable Energy Program
SSEF	Shakti Sustainable Energy Foundation
TA	Technical Assistance
VGf	Viability Gap Funding
WAPDA	Water and Power Development Authority

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1 Background, Objective and Approach

1.1 Background

The United Kingdom's International Climate Fund (ICF) was set up to fund the UK's international climate finance commitments and provide £3.87 billion (from April 2011 to March 2015) to the world's poorest people to help them adapt to climate change and promote cleaner, greener growth. It is jointly managed by the Department of Energy and Climate Change (DECC)¹, the Department for International Development (DfID)², Defra, Her Majesty's Treasury, and the Foreign and Commonwealth Office through a Cross-Whitehall Board.

The India Solar Power Generation Guarantee Facility ("The Facility"), a Partial Credit Guarantee offering, was one of the first initiatives funded under the ICF, where DfID and DECC partnered with the Asian Development Bank (ADB), who was the guarantor of the Facility.

It was envisaged that the Facility would be able to play a critical role in successfully financing the first wave of solar power projects in India by:

- Transforming overall market risk perceptions and inducing banks to lend to the sector;
- Over the medium term, developing local capacity and enabling long-term cost reductions for solar power, including for the often overlooked, off-grid consumers.

The ICF grant to this Facility was £6 million. It was provided to buy down a portion of guarantee fees offered by ADB to the Indian and foreign commercial banks under the Facility. It was expected to catalyse up to an estimated £265 million private sector investments into clean energy generation, through approximately 130 MW of solar power capacity and consequently 4.9m tonnes of CO₂e avoided over 25 years (assuming full attribution of emission savings to the UK ICF and full additionality).

The Facility was launched in October 2011, it had an interim review in January 2013 and final review in June 2013, post which it was withdrawn. This was jointly agreed by DECC, DfID and ADB because there was lack of activity and interest in the Facility.

1.2 Objective

Given that through the ICF, DECC and DFID continue to provide financing support in various forms to the solar segment, it is imperative to understand the reasons for the lack of performance of this Facility. KPMG Advisory Services Private Limited (KPMG) has been engaged by DfID to assess the following through stakeholder consultations:

- Reasons for lack of offtake of the Facility;
- Draw learnings for the future in terms of:

¹ DECC is a UK Ministerial Department that works to make sure the UK has secure, clean, affordable energy supplies and promotes international action to mitigate climate change.

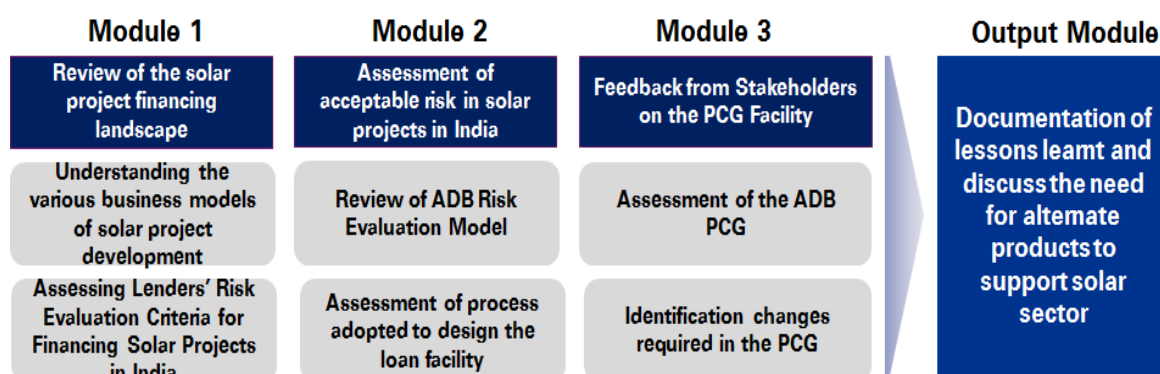
² DfID is the part of the UK government that manages Britain's aid to poor countries and works to get rid of extreme poverty.

- What should be the elements of successful design of the PCG;
- What role can guarantees play in light of the new program of Government of India (both grid and off-grid play) –are guarantees truly relevant and what would encourage offtake;
- Put forth principles of design of future similar programmes in India or other similar markets and adapting on-going programmes where possible.

1.3 Approach

In order to achieve the objectives of the engagement, the approach is depicted below:

Figure 1: Overall Approach



With the aim of adopting a participative approach, the KPMG study team engaged extensively with DECC, DfID and ADB as principals of the Facility. Apart from DfID and ADB, detailed consultations were also held with all stakeholders engaged in solar projects including developers, equipment suppliers, lenders, private equity players, government entities etc.

The components of the three modules outlined in the approach have been divided into the following sections in order to address the objectives of the study (a detailed index of deliverables as per the inception report is provided as **Appendix -1**).

Section 2 provides a brief overview of the need for the Facility in 2010/ 2011 and ADB's experience.

Section 3 highlights methodology for assessment/validation of stakeholder's responses and analyses of feedback gathered during the consultation process.

Section 4 discusses the relevance of PCG in the future context and the possible changes needed in the Facility based on (1) lessons learnt that can be referred to while developing a similar product in India or other similar markets (2) transformational drivers impacting the financing environment in the Indian solar sector.

A Steering Committee meeting consisting of the ADB, DfID, and DECC representatives was conducted in the course of the assignment to present the draft findings of the study. Also, a brainstorming session with key stakeholders was also organized to discuss alternate financial products for supporting the solar sector, apart from briefly discussing stakeholder view points on the Facility. (The report reflects the findings from the Steering Committee meeting. Detailed findings of the brainstorming session on alternate products, along with minutes have been included in Part II to this report).

2 Launch of the Facility and Experience

2.1 Facility Rationale and Design

In early 2011, solar sector in India was at a relatively nascent stage and hence several risks were perceived by both International and domestic lenders pertaining to investments in the sector. Lack of established precedence and experience made lenders wary of lending to solar projects.

Resultantly, commercial banks were primarily lending to the sector against alternate collateral or, if insufficient, against corporate guarantees as opposed to project cash flows (i.e. project financing). Banks were also relying heavily on relationships with existing borrowers to grow their lending business in the sector. This practice made it difficult for new companies or borrowers to obtain financing on reasonable terms.

The Facility was planned in late 2010/ early 2011 by ADB, with the above as the background and aimed to encourage commercial banks to lend to the solar segment by sharing a part of the credit risk. The Facility was also supported by a parallel capacity development technical assistance in early 2012. The Facility had the twin objectives of:

1. Making limited recourse debt financing available on reasonable terms and conditions through incentivizing lenders by risk sharing, and
2. Extending the tenor of loans to solar projects to recoup the high capital costs.

Under the Facility, ADB offered a partial credit guarantee to international and local lenders to address up to 50% of any non-payment by borrowers in the solar segment. The Facility covered default of scheduled repayments of principal as well as accrued interest. Consequence of payment default was shared *pari passu* between the lender and ADB (and not on a “first loss” basis) (Please refer to **Appendix - 2** for details regarding the terms and structure of the PCG).

Initially, as per the ADB Risk Evaluation Model, the guarantee fees to be charged from the lenders was in the range of 3-4%. As per the business case drafted by DECC, it was highlighted that there was a gap between the Facility pricing arrived at as per ADB’s internal risk management policy (for private sector operations) and fee rates that solar developers and banks were willing to bear in India. Hence, a £6 million ICF grant was provided to ADB with the objective of reducing the cost of the guarantee thereby overcoming any potential market failures which could inhibit private sector uptake of the Facility. It was expected that this would catalyse an estimated private investment up to £265 million (130 MW of solar power) in clean energy generation, and result in 4.9m tonnes of CO_{2e} avoided over 25 years.

2.2 Launch of the PCG and ADB experience with the Facility

ADB’s technical assistance (TA) programme supported the Ministry of New and Renewable Energy (MNRE), Government of India, in the formulation and implementation of India’s Jawaharlal Nehru National Solar Mission (JNNSM), announced by the Government of India in January 2010. During TA implementation, ADB staff engaged the MNRE in various discussions on how to encourage private sector investment in and financing of solar projects under the JNNSM program. This included specific assistance in drafting a bankable power purchase agreement (and a subsequent power sales agreement with the

states), transparent eligibility guidelines and selection criteria, and an enhanced regulatory framework for green energy. All parties stressed the importance of long-term financing and the impact of its cost on the levelized cost of solar electricity.

ADB discussed various financing structures and support mechanisms with local and foreign commercial banks. Based on the feedback received from these banks, an immediate window of opportunity was identified for ADB to make a real impact in this nascent but critical sector, by mobilizing available commercial funds into solar projects and building capacity within the local banks on the technical and commercial risks of solar power projects. This iterative consultation process led to the design of the Facility structured to provide long-term financing and share commercial risks between banks for the first wave of solar projects.

Post the launch in October 2011, ADB approved two banks as its Partner Commercial Banks (PCBs) for the Facility – L&T Infrastructure Finance Company Limited and Nord/LB. There were projects for which L&T Infrastructure Finance Company had the approval from ADB. The guarantee agreements for these projects were also negotiated. However, no lending agreements with PCG support from ADB was closed. The first Annual Review of the Facility was completed by January 2013. The review provided detailed information on progress of the Facility; nothing had been spent (there was no offtake of the Facility) till then although the DECC had released £2m to ADB when the Facility began operating in December 2011. In June 2013, DfID and DECC undertook an internal review, which confirmed that no progress had been achieved since the last review in January 2013.

Due to the lack of activity and interest in the Facility, DECC, DFID and ADB, jointly agreed for closure of the Facility.

In the following sections, we have explored the possible reasons for the lack of the offtake of the Facility, by developing a series of hypotheses for the same (through review of background material on the prevailing environment in solar sector at that time) and testing these through extensive stakeholder consultation and quantitative analysis. The key learnings drawn from the stakeholder consultation are used as a feedback loop for recommending changes in the design of future guarantee schemes.

3 Stakeholder Consultation Process and Feedback - ADB Partial Credit Guarantee Facility

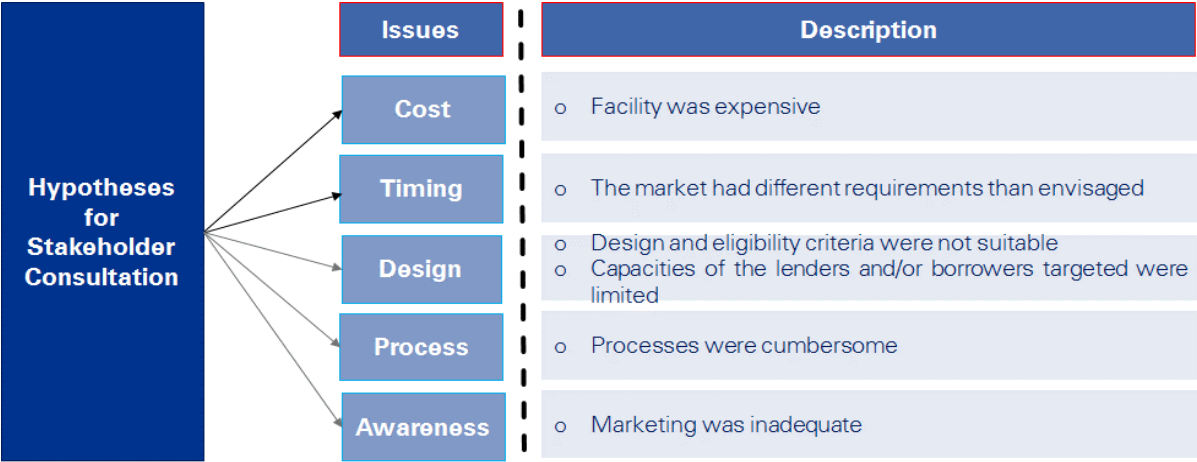
3.1 Methodology for assessment/validation

3.1.1 Preparation of a set of hypotheses

KPMG conducted extensive discussions with DECC, DfID and ADB as principals of the Facility and reviewed the available documentation to understand the terms and conditions of the Facility and the process of its launch. Further, the Indian solar market evolution, during the period that the Facility was operational, was studied in detail. The aim was to review key aspects in terms of policies, regulations, solar power bids, solar financing landscape, acceptable risks, etc. in order to understand the shifting market sentiments since the Facility was designed.

Based on background analysis³, discussions with ADB, DECC and DfID, review of existing literature, a set of hypotheses was developed, the reasons behind lack of offtake of the Facility, for testing through market response.

Figure 2: Hypothesis for evaluation of the stakeholder responses



3.1.2 Identification of stakeholders for consultation

The above hypotheses was tested through the responses that were received through the stakeholder consultation conducted during the course of this study. In order to prove or disprove the hypotheses with minimum bias, it was necessary that the right group of stakeholders were identified. The stakeholders identified covered all categories/strata. The detailed approach for identification of stakeholders has been provided in **Appendix- 3**. The stakeholder categories identified for the study were:

³ Details of the review of the background and the existing literature referred to develop the hypotheses is summarized in Appendix 10

1. Banks and Financial Institutions (Financiers):

- A. Those who were aware about the Facility
- B. Those who were unaware about the Facility

The consultation aimed to cover both local banks, other financial institutions and foreign lenders, especially those who were engaged in discussions with ADB with respect to the Facility. Best efforts were also made to connect with the personnel in these institutions who were a part of the team that were consulted by ADB in 2010/2011 for potential participation. However, despite repeated efforts we have only limited success in connecting with foreign lenders.

2. Project Implementers (Borrowers/Equipment Suppliers/EPC Companies):

The developers consulted were both domestic as well as international companies. These included the following categories:

- A. Large Developers⁴ such as Welspun, SunEdison, Moser Baer etc. Developers of both local and overseas origin were consulted.
- B. Small Developers such as Acme Solar, Jakson solar, selected amongst the bidders who have won projects under the JNNSM or various state bids.
- C. Equipment Suppliers

3. Market Experts (Funding Agencies):

- A. Officials from ADB
- B. Officials from IFC
- C. Officials from other climate funds/non-governmental organizations

4. Government Institutions:

- A. Ministry of New and Renewable Energy (MNRE)
- B. Solar Energy Corporation of India (SECI)

In order to further ensure that all categories of stakeholders and all possible viewpoints are covered a qualitative sample matrix was prepared (table below):

Table 1: Qualitative Sample Matrix

Sample Characteristics	Sample Categories	Intended Samples	Achieved Sample
Financiers	Lenders	5-6	6 (including international lenders)
	International Financial Institutions	2-3	2
	Private Equity/Venture Capital	5-6	6
Project Implementers	Large Developers	5-6	6
	Small Developers	2-3	1
	Equipment Suppliers	2-3	2
Others	Market Experts	1-2	1
	Research Organizations/Think Tanks/Experts/ Government Agency	1-2	3

⁴ Large and small developers are defined based on the MW installed. Details of each of the entity that was consulted has been presented in the Appendix 3.

This list of stakeholders consulted with a brief write up on them and the portion of the market they represent have been provided in **Appendix – 3**. In order to bring in the perspective of the foreign lenders, a two pronged approach has been used. One, discussions were held with foreign lenders such as US Exim to understand their perspective on Indian solar sector and the Facility and two, information was sought from developers (along with others) that got funding support from these institutions. These included players such as First Solar, Acme Solar both of which were supported by the US Exim. The developers were tapped primarily because there was no response from other foreign lenders, despite requests for feedback. Please note that additional stakeholders for all the categories were present in the brainstorming session where the findings of the consultation process on ADB Facility were discussed briefly (list of the participants is included in the minutes of the brainstorming meeting which is appended to Part II of this report).

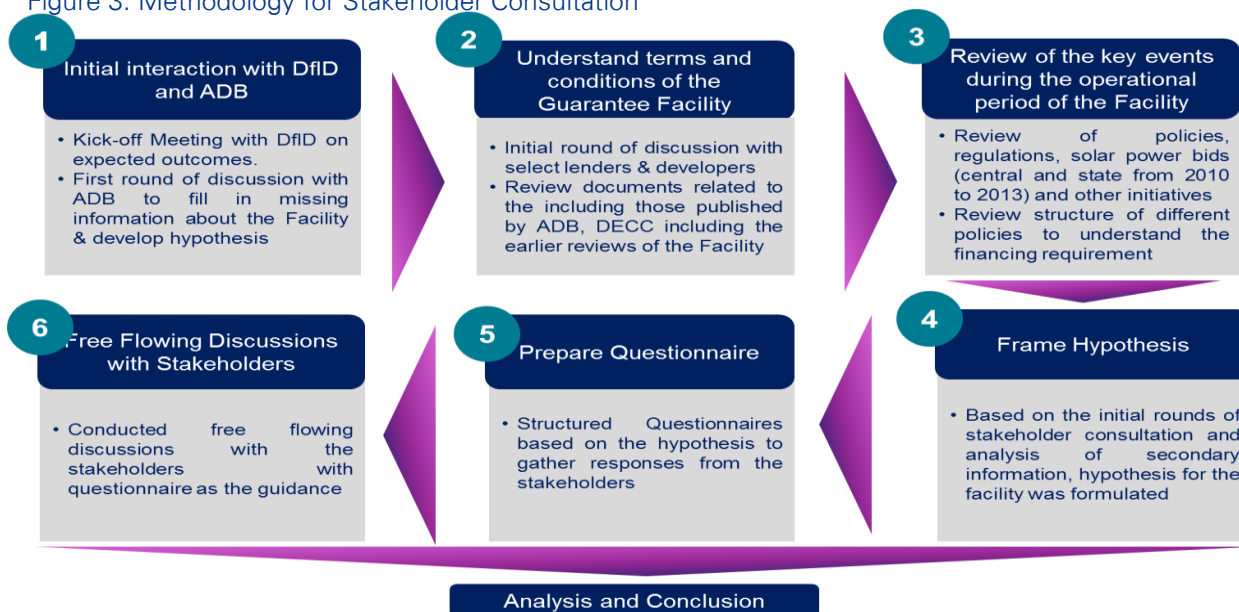
A stakeholder driven approach, while is beneficial in bringing together views of all stakeholders across the board, also entails certain limitations.

- We had limited feedback from small developers; which may be expected to introduce bias in assessments. However, we believe that this bias has been addressed as the large developers that have been consulted, were nascent players at the time of introduction of the Facility. Thus, detailed consultations with representatives of these companies who were a part of the nascent phase of the company’s development provided representation of the views of nascent and small developers in the Indian market. Also, the feedback received from the small developers was similar to that received from large developers.
- Where sample size is not well represented, results obtained may be skewed. The team was well aware of this drawback of the approach and thus made all the efforts that the sample is well-represented.

3.1.3 Approach for consultation

The methodology adopted to undertake the stakeholder consultation is depicted below:

Figure 3: Methodology for Stakeholder Consultation



Through interaction with DECC, DfID and ADB, and review of the documentation, an understanding of the design and terms of the Facility was established. Further, an extensive review of the important events

that took place during the operational period of the Facility, covering policies, regulations, solar power bids and other initiatives was conducted.

Based on the above, questionnaires for stakeholders were developed. Separate questionnaires were developed for each category of stakeholders to better understand their perspectives. The questionnaires developed have been included in Appendix 11. Discussions were held in a free flowing format around the questions listed out and the observations were noted.

3.2 Key Observations on the Facility

Our assessment based on the outputs of the above methodology has been detailed in the following paragraphs.

3.2.1 Shifting market risk perceptions since the project was designed

In late 2010/ early 2011, when the Facility was conceptualized, the solar industry in India was in an early seed phase with projects being executed with Government support, untested technologies in the Indian environment and ecosystem, inexperienced developers, implementation challenges and evolving regulations and policies. Hence, the Facility aimed to cover all aspects of perceived risks with respect to solar investments in India by offering a comprehensive credit guarantee to address any payment default.

However, backed by Government's JNNSM⁵ programme and state run programmes, improving economics with falling solar module cost, interest shown by independent power producers as well as large conglomerates, the solar industry rapidly evolved. As projects were awarded and operationalized, the sector was increasingly demystified, and several risks perceived as high earlier, diminished in importance, over the availability period of the Facility. Thus, by the time the Facility was launched the risk perceptions of the stakeholders had evolved (Figure 5). Stakeholders consulted also resonated this view and **this formed a common denominator in analysing various reasons for failure of the Facility, such as cost, design and timing.**

⁵ The Jawaharlal Nehru National Solar Mission (JNNSM) was launched on the 11th January, 2010 with a target of deploying 20GW of grid connected solar power by 2022 (which is now revised to 100 GW).

Figure 4: Evolution of Risks

Risk Category	At the time of conception of Facility			During the availability period of Facility		
	Foreign Lender	Domestic Lender	Developer	Foreign Lender	Domestic Lender	Developer
Country Risk	High Risk	NA	NA	High Risk	NA	NA
Sponsor Risk	High Risk	High Risk	NA	High Risk	Medium Risk	NA
Construction Period Risk	Medium Risk	Medium Risk	Medium Risk	High Risk	High Risk	Medium Risk
Technology Risk	High Risk	High Risk	High Risk	Low Risk	Low Risk	Low Risk
Generation Risk	High Risk	High Risk	High Risk	High Risk	High Risk	High Risk
Off-taker Risk	High Risk	Medium Risk	High Risk	High Risk	Medium Risk	Medium Risk
Financial closure risk	High Risk	High Risk	High Risk	Medium Risk	Medium Risk	Medium Risk
Foreign Exchange Risk	High Risk	NA	High Risk	High Risk	NA	High Risk

● High Risk ● Medium Risk ● Low Risk

(Source: Responses from Stakeholder Consultation. Risk definitions are provided as Appendix - 4)

Based on the above matrix, the changes in the risk perceptions have been described below:

- **Sponsor Risk:** Given that developer experience was fairly limited in 2010, this was a significant concern for foreign lenders as well domestic lenders. Further, the credit worthiness of the developers, especially small developers was untested. With large corporates entering this space and small developers establishing a track record, the concerns were mostly alleviated by 2012/2013, especially for domestic lenders. However, for foreign lenders, sponsor risk still remained a concern. During the availability period of the Facility, the difference in the risk perception between domestic and foreign lenders remained largely because the domestic lender community gained more experience with the India solar sector and projects sponsors. Also with entry of large players with whom lenders had prior relationships, a lot of these risks perceptions were moderated in importance. On the other hand, foreign lenders had limited exposure to the sector and thus perceived the risks to be higher.
- **Construction Risk:** During 2010, both foreign and domestic lenders were moderately confident that the project developers had competencies to execute the project through well renowned large EPC contractors like LnT, Mahindra, Sterling and Wilson etc. However, in latter years, execution delays and their associated implications emerged as a significant risk. Developers started executing projects through local EPC contractors to contain costs. Any execution delays for the developer stemming from inefficient management, infrastructure bottlenecks, approval/ clearance delays etc. impacted project economics adversely and hence the risk perceived was high.
 For instance, where pre-determined feed-in tariff is availed by a developer, a downward revision to the given tariff is effected as a penalty where the project misses the commissioning deadline. In case of projects awarded through bidding process, delay in project commissioning can result in encashment of performance guarantees submitted by the developers to the state governments.
- **Technology Risk:** There was no historical trend for performance of solar technology (solar photovoltaic) in India; and therefore, it was considered a risk factor during 2010. The comfort with technology increased substantially after projects were successfully operationalized and performance track record

was established for some time duration. It is noteworthy that while the country may not have seen the technology complete its lifecycle (25 years is the life of the modules), this reduction in risk perception is on account of increased capacity being planned and commissioned in the country and initial data of CUF being available on the operating assets.

- **Generation Risk:** During 2010, the power generation from project was identified as a critical parameter for project appraisal as generation estimates were done based on satellite based datasets without on-ground measurement. According to industry sources, the margin of error for irradiation data at specific locations could be as high as 10% and this was a significant risk from a lender's perspective.⁶ This still remains a significant area of concern.
- **Off-taker Risk:** At the inception of the JNNSM, the off-take risk was safeguarded to a reasonable extent by involving a creditworthy off-taker (NVVN⁷). Despite this, the foreign lenders were concerned about the fact that distribution companies, who were the ultimate procurer of solar power may default in payments to NVVN. Even today, the off-take risk continues to remain a concern due to the following reasons:
 - **Risk of contract re-negotiations:** For e.g. GUVNL (Gujarat's trading and power procurement utility) has filed a petition in the Supreme Court to reduce the solar tariff for developers, that have commissioned their project in early 2010 and 2011, due to reduced prices of solar equipment.
 - **Inadequate payment security mechanisms:** Under most of the central as well as state policies, the payment security mechanism is backed by 2-3 months of revolving LC, which is at times lesser than the debtor days with respect to the off-taker.
 - **Poor health of Discoms:** Most of the Indian distribution utilities are financially stressed and thus are hesitant to procure comparatively expensive solar energy. Most Discoms in the country have not met their RPO targets on account of this high cost. Further, the RPO targets set by the SERCs effectively acted as a cap on the ambitions of even the most progressive state Discoms such as those in Gujarat, which have not added any solar capacity after over-achievement of their RPO target.

However, we found that domestic lenders are not as concerned about offtake risks as foreign lenders, since domestic lenders believe that there can be payment delays (which they felt could be addressed by factoring adequate working capital requirement as a part of project costs), but there is no risk of default. The reason attributed to this difference in risk perception between the domestic and foreign lenders is that till date there has been no default by any distribution company in payments made to generators. There have been long delays, at times as long as six to twelve months, however, there have been no defaults. However, based on stakeholder consultations, and discussions with foreign lenders such as the US Exim, we were informed that in case of foreign lenders a long delay is also akin to a default and is not acceptable; and the offtaker risk was the most pertinent risk to be addressed.

- **Financial Closure Risk:** In 2010, solar project financing was negligible and developers had to face challenges to ensure timely financial closure. Most of the projects were funded on recourse basis, which increased financial closure risks for projects where small developers were involved. In the last couple of years, the situation has improved considerably as risk perception has improved with respect to solar projects and there is now a greater availability of project finance.

⁶ Source: *Bankability and Debt Financing for Solar Projects in India – Report by Bridge to India*

⁷ NVVN is the trading arm of one of the largest state owned power generator of the country NTPC Limited.

- **Foreign Exchange Risk:** The cost of debt in dollar terms is definitely cheaper than the rupee loan, however, developers face a huge risk of currency fluctuations which reduces the attractiveness of accessing foreign funding sources. The method for managing the risk is through hedging, which accounts for a signification cost of about 6 to 7 %. Such costs take away the competitiveness of international funds. Foreign exchange risk issue was considered significant in early years of solar development and still remains important. However, this risk was not addressed through the Facility. In fact, this is a significant risk still faced by the developers/ investors sourcing international funds.

Important lessons that emerged from the analysis of risks are as follows:

- There was an evolution in the market perception of risks between the time that the Facility was conceptualized and was made available as a result of which some of the risk perceptions were moderated over time;
- The Facility was designed to cover credit risk or the risk of non-repayment by the developer. Non-repayment can be a consequence of any of the risks listed above some of which were not considered so pertinent by stakeholders. On the other hand, foreign exchange risk, which was considered relevant by the market in 2010 as well as in the later years, was not addressed by the Facility; and
- Risk perceptions differed significantly between various stakeholder categories. For e.g., domestic and foreign lenders indicated differing levels of acceptability with respect to offtake and sponsor risk, which indicated that the Facility should have had the flexibility in terms of pertinent risks coverage only as a comprehensive risk coverage carried a pricing implication.

The above caused a dichotomy on several aspects such as cost of the Facility, timing, design vis-à-vis market requirements, which potentially resulted in a failure by the market to respond to the Facility.

Keeping the above and other analyses in view, the reasons identified for the lack of offtake have been discussed below. These have also been tested extensively through one on one stakeholder consultations as well as stakeholder group brainstorming session.

3.3 Dissecting reasons for failure by testing hypotheses through stakeholder feedback

1. Cost of the Guarantee Facility

As per the risk evaluation model of ADB, the guarantee fees ranged from 3-4% on the guaranteed amount. The actual guarantee fee offered to the lenders, post the concessionary ICF grant, was in the range of ~1.65% - 2.50% (on the guaranteed portion). Guarantee pricing was set in line with international market benchmarks, and varied within a set band based on exposure size and tenor. As per the draft term sheet on the Facility dated November 2011, the Facility fees breakup was as follows:

Table 2: ADB Guarantee Facility Fees Structure

Particulars	Fees	Payment Terms
Guarantee Fee**	0.87 – 1.25% per annum	Payable [semi-annually / quarterly / monthly] in [arrears/advance] by the Guaranteed Lenders to the Guarantor calculated over the Guaranteed Percentage of the amount of outstanding Principal and Interest accrued [semi-annually/quarterly/monthly]

Particulars	Fees	Payment Terms
Commitment Fee**	0.43-0.63% per annum	Payable [semi-annually/quarterly/monthly] in [arrears/advance] by the Guaranteed Lenders to the Guarantor calculated over the Guaranteed Percentage of any undisbursed Principal amounts during the Availability Period.
Stand-By Fee**	0.15-0.40% per annum	Payable [semi-annually/quarterly] in [arrears/advance] by the Guaranteed Lenders to the Guarantor calculated over the Guaranteed Percentage of the amount of outstanding Principal as from the Effective Date of the Facility.
Upfront Fee Rate**	0.20% flat	Calculated over the Guaranteed Percentage of the Guaranteed Loan, payable by the Guaranteed Lenders to the Guarantor within [7] business days of financial close

(Source: Key Terms and Conditions for the India Solar Power Generation Guarantee Facility)

[Note: **Guarantee Fees shown above include benefits from a £6 million grant from the Government of the United Kingdom administered by the ADB]

The Facility fees was calculated assuming that banks will accord high risk rating to solar projects due to lack of lending experience to the sector and no proven developer experience and the same would be reflected in lending margins. The Facility was designed to mitigate project risk, as assessed by the lender, with ADB's AAA credit rating. It was also expected that the Facility could incentivize banks to reduce the cost of debt, provided that the guarantee fees do not consume the savings facilitated by the guarantee's risk sharing structure.

However, in practise the Facility fees was considered extremely unattractive by the lenders resulting in a lack of demand for the Facility. Owing to confidentiality reasons, lenders consulted during the consultation process were reticent about sharing details of margins on solar sector projects. In order to provide a context to the ensuing discussion, some relevant benchmark rates are provided in the Table below.

Table 3: Relevant Interest Rate elements

SBI Base Rate Aug 2011	10%
Interest rate offered for solar projects	13 to 14%
SBI prime lending rate Aug 2011	14.75%
Guarantee Fee charged	1.65 – 2.5 %

(Source: KPMG Analysis, SBI website)

As per RBI guidelines on Base Rate⁸, the actual lending rates charged to borrowers by Banks comprise Base Rate plus margin that includes borrower-specific charges, product-specific operating costs, credit risk premium and tenor premium. A 13-14% lending rate implied a mark-up of 3-4% over base rate being charged for solar sector lending in late 2011, which would include the components of operating costs,

⁸ Base Rate is the minimum rate of interest that a bank is allowed to charge from its customers in India. It includes all elements of lending rates common across all categories/ borrowers. Actual lending rate includes other customer specific charges as considered appropriate. For the solar borrowers, the borrower specific charges were to the tune of 3 to 4 %.

credit risk and tenor premium. Lenders perceived the cost of the guarantee too high in relation to the risk premium built into their margins.

The stakeholders consulted elucidated the following reasons for the conundrum:

- There was possibly a mismatch between the risks sought to be addressed by the Facility and the actual risks perceived by the lenders. As discussed in the previous section, evolution of the solar segment in India, had resulted in moderation of several project related risks. Resultantly, while the Facility was priced keeping in view the entire gamut of risks perceived during conceptualization of the Facility, possibly only a few risks were considered relevant by lenders over the period when the Facility was available. This caused a mismatch between the cost and benefit of the Facility, as perceived by lenders.
- On the other hand, it is also possible that during 2010, due to lack of established experience in the solar sector, lenders were not able to price the risks appropriately and under-priced risk. Table 4 presents a comparison of the different criteria used by different categories of the lender community to evaluate solar projects.

Table 4: Comparison Matrix of Lender’s Criteria for Evaluating Projects⁹

Category	Financial Capability	Technology Quality	Operational Capability	Implementation Experience	Project IRR	DSCR	Overall Ratings ¹⁰	Average Rating for Portfolio ¹¹	% of Portfolio with average rating
NBFCs	2	3	3	3	3	4	18	20	65-70%
Commercial Banks	3	3	2	2	3	4	20	21	75-80%
IFIs	3	4	3	4	2	3	24	24	More than 95%

(Source: Criteria developed based on stakeholder feedback. While this would have varied from lender to lender, this is intended to give a broad overview of the key differences in lending criteria)

The Table highlights that while international lenders were placing higher emphasis on operational and technical aspects of the project, domestic lenders appeared to be giving highest emphasis to a project DSCR. This possibly indicates Indian Lenders did not have adequate experience in assessing the core aspects of the project. This could have been one of the reasons why risks could have been potentially under-priced.

Another reason for the under-pricing could have also been driven by the need to compete with other category of lenders such as international lenders and NBFCs which were offering more competitive terms. **(Refer Appendix-9).**

- Further, the prevalence of recourse funding would have enabled banks to mitigate some of the credit risk thus reducing the need for guarantees especially at the cost at which these were offered.

⁹ The numbers give an indicative rating that a project developer would need in terms of qualifying for a loan. E.g. In case of NBFC, for financial capability, out of 5, minimum rating needed would 2, only then he would qualify for the loan

¹⁰ the overall rating would mean, out of the all the parameters rated above the minimum rating of “X” (for NBFCs-18 is needed) for the project to qualify

¹¹ #average rating for sector portfolio would mean that a weighted average ratings for overall sector exposure should not be less this number.

- The lenders could not have passed on the cost to the project since the lean equity IRRs did not permit a further claim on cash flows. The sensitivity of the Interest Cost as percentage of revenues, Project IRR and Equity IRR to different levels of rate of interest is presented in the Table below.

Table 5: Sensitivity Analysis for various in interest rates¹²

Parameters	Interest Cost							
	12.00%	12.50%	13.00%	13.50%	14.00%	14.5%	15.00%	15.50%
Equity IRR	16.65%	16.29%	15.94%	15.60%	15.26%	14.93%	14.61%	14.30%
Project IRR	14.10%	14.14%	14.17%	14.21%	14.25%	14.28%	14.32%	14.35%
First 3 years Av Interest Cost as % of revenue	45.16%	46.98%	48.81%	50.64%	52.47%	54.29%	56.12%	57.95%

Source: KPMG Analysis

The Box 1 below presents a summary of the stakeholder responses.

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¹² Note: Assuming a project cost of INR 120 mn/MW and a levelized tariff of INR 12.22/Kwh

Box 1: Stakeholder Responses – Cost of Guarantee Facility

Highlights of responses

Stakeholders	Responses
Financiers	<ul style="list-style-type: none"> – International lenders like US Exim were lending at 9.5-10% (inclusive of partial hedging cost). They were also extending high tenor loans of up to 18 years. Therefore, domestic lenders found it difficult to compete with them even without the additional costs posed by guarantee fee. – Cost of guarantees were high for domestic lenders since it would have consumed significantly the margin available to the lenders. Further, if the lending rates were to be increased, the borrower demand would have been lower. – The risk perception of Indian lenders was significantly different than that of ADB thus the risk pricing varied. – As per US EXIM, it was important to have a product which looked at pertinent risks only, such as offtake risk, and the guarantee could be priced accordingly.
Project Implementers (Borrowers)	<ul style="list-style-type: none"> – There was lack of clarity on quantification of benefits for borrowers' vis-à-vis the cost of guarantee. – Guarantee fetched minimal benefits for developers. – Lenders were comfortable with lending based on recourse to corporate balance sheet and personal guarantees. – As per ADB, off-take risk was rated the highest, however Indian lenders considered such risk to be moderate since there is a common belief amongst lenders that "there could delay in payments but there are no defaults as far as power distribution companies of India are concerned". Hence, there could have been a mismatch in risk pricing. – Considering the additional administrative processes and also the foreign exchange risks for borrowers in case of default (discussed subsequently), the lack of commensurate financial benefit to the borrowers was a key impediment.
Others	<ul style="list-style-type: none"> – Indian lenders were not able to price the risk appropriately due to lack of experience.
ADB	<ul style="list-style-type: none"> – ADB believed that they priced the Facility appropriately. The cost of guarantee was decided based on the ADB's Risk Evaluation model considering a mix of critical risks and general risks (our assessment of ADB's risk grading, based on discussions with ADB, is provided as Appendix- 2).

Cost of Guarantee Facility was high

Majority of the stakeholders agreed that the cost of the guarantee was high. Of the 14 Financiers consulted, 12 agreed to this hypothesis and 6 of the 9 project implementers also agreed. All the stakeholders in the 'others' category (3 in total) agreed that cost was a concern with the Facility.

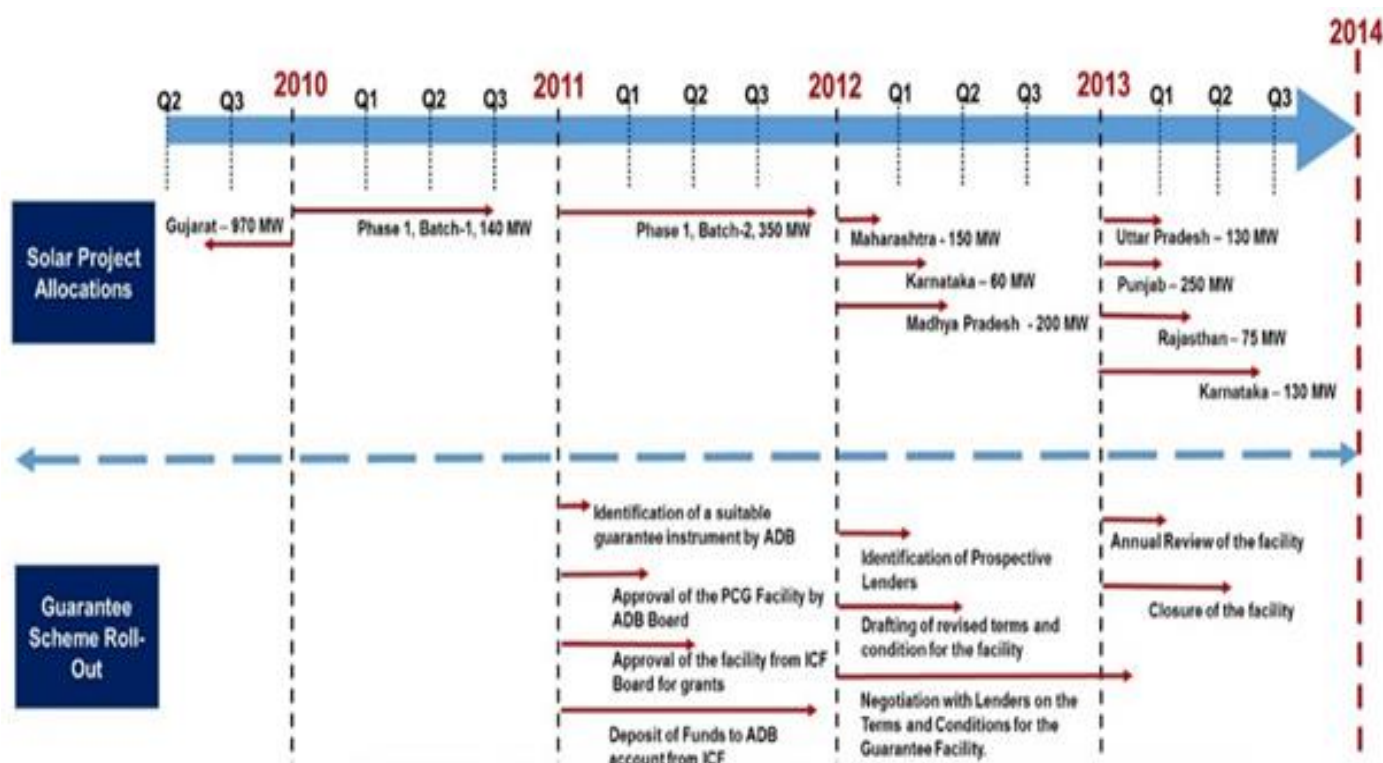
2. Timing of the Guarantee Facility

Appropriate timing of introducing a financing product is essential to ensure that the instrument is used by the targeted segment. The risk profile/assessment of a market may differ significantly as a sector evolves rapidly from a nascent phase as discussed previously. The Figure 5 puts in perspective the level of maturity of market when the Facility was conceptualized and when it was implemented in the market.

It is relevant to note the following:

- The Facility was planned in late 2010/ early 2011, when the Indian Solar Market had just started emerging with projects allotted under the JNNSM and Gujarat Solar Policy. With only 2 MW solar capacity operational then, the Facility was intended to increase the availability of funds for solar projects by incentivizing lenders since they had limited lending experience in the sector.
- The Facility was actually launched in the market by end of 2011. The launch of the Facility got delayed due to regulatory hurdles.
- Further, by the end of 2011, domestic lenders had already achieved certain level of exposure to solar PV technology since a few projects under Gujarat Solar Policy and JNNSM Phase-1, Batch 1 were operational.
- During Batch 2, Phase -1 of JNNSM, the lenders investing in the sector were better positioned with relevant sector experience.
- Most of the project developers winning projects during 2012 had already won projects in other schemes and therefore had prior relationships with the banks.

Figure 5: Timeline for solar market development in India & introduction of the PCG

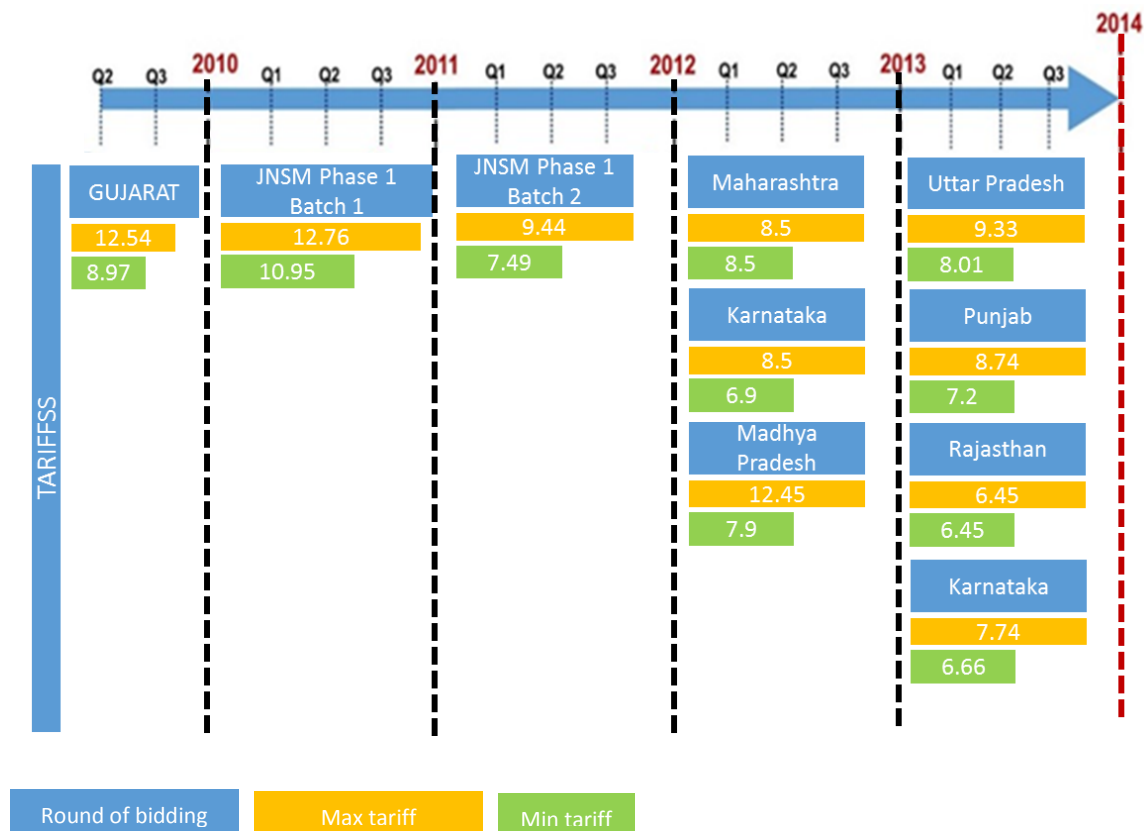


(Source: Industry Reports, ICF Business Case, Annual Review Report-January 2013, KPMG Analysis)

Hence, with experience, some of the risk perceptions of lenders got diminished, increasing their willingness to lend to the sector.

Another development during this time that impacted the financing scenario was the falling tariff rates. In 2010-11, there were only two schemes that were operational in the country to catalyse the solar power development, JNNSM and Gujarat Solar Policy (FIT based scheme). In the time period from 2010-12, the cost of solar power had fallen significantly as shown in below.

Figure 6: Solar Power Tariff under various schemes¹³



(Source: Industry Reports)

With solar prices moving towards grid parity, the confidence of the lenders in the future viability of the resource increased and at the same time some of the other risk perceptions got diminished, increasing the lenders' willingness to lend to the sector.

Hence, whilst the Facility was targeted to increase the availability of funds for developers, over time, availability of funds had ceased to be a big issue. In fact, the market required the Facility (or any such financial product) to act as a cost reducing product, given the lean project and equity returns.

The responses of stakeholders were taken as displayed in Box below.

Box 2: Stakeholder Responses – Timing of Guarantee Facility	
Highlights of responses	
Stakeholders	Responses
Financiers	– Lender community had gained confidence as the projects under Gujarat Solar Policy and JNNSM Phase 1 were financially closed.

¹³ The red line depicts the lowest tariff seen in the solar business over the mentioned bids

	<ul style="list-style-type: none"> – Most lending was on recourse basis to developers with past relationships. – Several financing institutions had started participating in funding solar projects.
Project Implementers (Borrowers)	<ul style="list-style-type: none"> – Availability of funds was not an issue for developers setting up projects. Support was required through access to funds at cheaper rates.
Others	<ul style="list-style-type: none"> – Except US Exim, other foreign lenders had limited project pipeline and therefore were not very keen on availing the Facility. – The market dynamics had changed and the developers were expecting the Facility to act as a cost reducing product. Hence, the guarantee which was designed to increase availability of funds lost its relevance.
ADB	<ul style="list-style-type: none"> – Risk perceptions changed over time and this was also aided by ADB Capacity Building workshops. – Lenders were financing projects based on recourse to corporate balance sheet/ corporate guarantees and hence, availability of loans was not a very significant issue. – Foreign Banks found the Facility to be useful, however did not have enough deals in pipeline to qualify for the Facility.
Timing of Guarantee Facility was delayed	<p>Majority of the stakeholders agreed that the Facility was delayed. Of the 14 Financiers consulted, 9 agreed to this hypothesis and 8 of the 9 project implementers also agreed. All the stakeholders in the 'others' category (3 in total) agreed that timing of the Facility was delayed.</p>

3. Design/Criteria of the Guarantee Facility

The ADB Solar Loan Guarantee Facility was designed based on feedback received during extensive stakeholder consultation covering lenders and developers. However, certain elements related to Facility design impacted the market attractiveness for the Facility. These are discussed below:

Terms of the Guarantee Agreement

Following Table highlights some clauses that impacted the market attractiveness for the Facility and their impact on lenders/ developers.

Table 6: Select Clauses of the ADB Guarantee Facility

Context	Clause	Effect
Counter-indemnity by project borrower	In the event ADB makes a payment to the Guaranteed Lender, ADB will have recourse to the Borrower under a Counterindemnity. The Counterindemnity will contain customary representations and warranties, events of default and covenants. In case ADB makes	<ul style="list-style-type: none"> – The borrower would face the burden of fluctuating exchange rate post default in scheduled payment. This would add an additional cost burden in terms of hedging the currency risk.

Context	Clause	Effect
	<p>payment to the Guaranteed Lenders in US Dollars (whereas the currency of the Guaranteed Loan was in INR), ADB's claim under the Counterindemnity to the Borrower will be converted to US Dollars.</p>	<p>– Conversion of INR to USD denominated loan attracted exchange management issues resulting in regulatory hurdles.</p>
<p>Guarantee Percentage and Demand Proportion</p>	<p>Up to 50% on a present value basis, effectively¹⁴, over the duration of the Guaranteed Loan, but the actual percentage in any given year to be agreed between the Guaranteed Lender(s) and the Guarantor, subject to due diligence acceptable to the Guarantor on each Eligible Solar Power Project.</p>	<p>– The guarantee amount that could be claimed by the lenders <u>was on pari-passu basis and not on "First Loss" basis.</u> Therefore if there were defaults in scheduled payments, the lender even after availing the Facility will face the risk of the loan being declared as a non performing asset. <u>This was considered as a significant design issue by the lenders as it limited the attractiveness of the Facility.</u></p>
<p>Eligibility criteria for projects</p>	<p>Construction of a green field solar power generation plant in India that will be connected to the relevant state electricity grid at a voltage level greater than 11-kV. Projects will utilize either solar photovoltaic (crystalline or thin-film) or concentrated solar thermal technology that has been installed and is operational, for equivalent capacity or <i>greater, for at least 12 months prior to guarantee application date.</i></p>	<p>– Guarantee was available for a greenfield project. Hence the project developers who intended to use the re-financing route for projects under JNNSM Phase-1 Batch 1 and Gujarat Solar Policy could not participate in this scheme.</p>
<p>Acknowledgement Agreement</p>	<p>The Guarantee Agreement required the borrower to execute an acknowledgment to the Guarantee Agreement so that ADB could be subrogated into the loan to recover any amounts post invocation of the guarantee.</p>	<p>– Lenders were not comfortable involving the developer since they did not envisage any benefits of the Facility to the developer through reduction in lending costs. <u>At the developer end, there was ambiguity on the benefit that will accrue to the developer if the Facility was availed.</u></p> <p>– The developers also found it difficult to comply with the ADB loan disbursement criteria of getting all clearances and permits before the first disbursement.</p>

¹⁴ The ratio of the net present value of guaranteed principal and accrued guaranteed interest in any particular period, over the principal amount, shall not exceed 50%.

Context	Clause	Effect
Experience in Power Sector	Sponsor criteria of minimum three years' experience in non-conventional energy sector or conventional power generation sector	– Due to this clause, first time project developers were not eligible to avail of the Guarantee Facility, whereas the intent of the Guarantee Facility was to promote smaller developers in the solar sector.

Criteria for Selection of Lenders:

Prospective partner banks were to be screened and presented to the Investment Committee for approval based on the following factors:

- (i) credit standing (at least BBB– equivalent credit rating by an international rating agency or AA equivalent credit rating by a local rating agency¹⁵);
- (ii) experience and capabilities in limited recourse lending in India and/or Asia;
- (iii) existing portfolio in the power sector;
- (iv) willingness and ability to make financial commitments in renewable energy;
- (v) senior management commitment;
- (vi) staffing, management, and technical capability to implement the Facility; and
- (vii) operating policies, guidelines, and systems in loan origination, credit assessment, and loan administration and enforcement.

Based on the market feedback, we understand that there were limited domestic lenders who could qualify during the screening process even after having significant exposure to power sector, which implied design issues with respect to the Facilities.

Summary of the feedback received from different stakeholders on design issues is presented in box below.

Box 3: Stakeholder Responses – Design of Guarantee Facility	
Highlights of responses	
Stakeholders	Responses
Financiers	<ul style="list-style-type: none"> – Eligibility criteria of the Facility was too stringent excluding some very pertinent lenders. – In case of default, the Facility did not cover the risk of NPAs for the lenders since the guarantee amount could not be claimed on a 'first loss' basis.
Project Implementers (Borrowers)	<ul style="list-style-type: none"> – Lenders lacked the skills for evaluating solar projects as per ADB's due diligence criteria. – Transfer of loan from commercial banks to ADB introduced foreign exchange fluctuation risks for the developer and also attracted exchange management issues under guidelines laid down by RBI. – Only developers with relevant experience could participate in the Facility. New entrants were restricted from participation.
Others	<ul style="list-style-type: none"> – Currency Risk was inherent in case of payment default, which would require the developer to incur hedging cost.

¹⁵ International credit ratings to be from Standard & Poor's (S&P), Moody's, or Fitch Ratings; local credit ratings to be from CRISIL (an S&P company), Investment Information and Credit Rating Agency (ICRA), or Credit Analysis and Research Limited (CARE).

ADB	<ul style="list-style-type: none"> – ADB was of the view point that design was an issue since many domestic lenders did not meet the eligibility criteria. – ADB did not provide for a first loss guarantee since they believed that it was important for lenders to have a ‘skin in the game’. Additionally, such a provision would have significantly increased the cost of the Facility.
Design of the Guarantee Facility was an issue	<p>Majority of the stakeholders agreed that there were design concerns in the Facility. Of the 14 Financiers consulted, 10 agreed to this hypothesis and 6 of the 9 project implementers also agreed. Of the stakeholders in the ‘others’ category, 2 out of the 3 agreed that design of the Facility was a concern.</p>

4. Process for availing the guarantee Facility

While the intent of the Facility was to support and increase availability of funds in the market, the process to avail the Facility was highly time consuming and costly. Specific aspects which created bottlenecks are indicated below:

- ADB had set out parameters for evaluating a project by a PCB. The lenders in India lacked skillsets in following those project appraisal parameters.
- Further, ADBs Safeguard Policy Statement including the establishment and implementation of an environmental and social management system (ESMS) was to be met by the Guaranteed Lenders. This was a long and costly process which was also not acceptable to the lenders.
- The documentation process of ADB was also detailed and cumbersome, hence, financial institutions backed out due to process fatigue.
- Further, there were clarifications sought from the RBI on the currency conversion process, in case of a default by the borrower and the guarantee coming into effect, which further delayed the process.

The summary of responses received from stakeholders with regard to the process is presented in the box below.

Box 4: Stakeholder Responses – Process for availing the Guarantee Facility	
Highlights of responses	
Stakeholders	Responses
Financiers	<ul style="list-style-type: none"> – Lenders needed time to do a legal vetting of the Facility related documents and therefore there were process delays. – The Facility was welcomed conceptually by certain key lenders. However, the administrative procedures and the costs were deterrents.
Project Implementers (Borrowers)	<ul style="list-style-type: none"> – The documentation process was cumbersome and time consuming. In order to meet the criteria as per the ADB guidelines, additional cost and time was required.
ADB	<ul style="list-style-type: none"> – ADB had actually closed the discussion on the guarantee agreement with LnT Finance. However, the requirement to comply with the RBI’s ECB Guidelines,

resulted in a delay in the documentation process. LNT finally decided to bear the risk burden and move ahead with financing the projects.

Process was Cumbersome

Majority of the stakeholders agreed that the process for availing the Facility was cumbersome. Of the 14 Financiers consulted, 13 agreed to this hypothesis and 8 of the 9 project implementers also agreed. Of the stakeholders in the 'others' category, 3 in total, 2 agreed that the process was cumbersome.

5. Awareness of the Facility

While the Financier community was broadly aware of the Facility, a feedback received from the Project implementers was that the Facility was not marketed well. This became an area of concern as the project implementer could have created a market for the guarantee Facility with the lender if the benefits were evident. Following are the responses we received from the stakeholders with regards to the awareness of the Facility:

Box 5: Stakeholder Responses – Awareness about the Guarantee Facility

Highlights of responses

Stakeholders	Responses
Financiers	– Top management and Board members in some financial institutions did not recognize the potential for solar. Hence, it was difficult for loan officers to pitch their investment case or discuss the Facility.
Project Implementers (Borrowers)	– The Facility was not marketed properly in order to create awareness. Further, the banks consulted during the stakeholder consultation conducted by ADB had negative views due to cost. Due to word of mouth this perception spread amongst other lenders as well, reducing their interest in the Facility. – Even though a programmatic approach was intended to be followed by ADB for the Facility, every individual project that signed up for the Facility had to undergo the process of risk assessment and attain separate approvals. This was seen as likely to add to further delays.
ADB	– Major Banks and Financial Institutions in India were aware about the Facility since they participated in the TA undertaken for capacity development of the lender community in India.

Lack of Awareness about the Facility

While the Financier community was aware of the Facility, a feedback received from the Project implementers was that the Facility was not marketed well. The same is also reflected in the sample we consulted. While 9 of the 14 financiers consulted were aware of the Facility, only 4 of the 9 Project implementers were aware of the Facility.

3.4 Summary Analysis

Based on the above analyses, it is evident that there was a dichotomy on several aspects relating to the Facility structure/ processes and market requirements, which limited the attractiveness of the Facility.

The Table below summarizes our findings.

Table 7: Mapping the Facility against the market requirement

Expectation of the market	Provided by the Facility	Required by the Market ¹⁶
Improve availability of funds	Yes	Partially
Extend loan tenor	Yes	Yes
Risk reduction		
• Default risk	Yes	Partially
• First loss coverage	No	Yes
• Foreign Exchange Risk	No	Yes
Cost effectiveness relative to the market	No	Yes – Key parameter considered
Simple process	No	Yes
Adequate awareness in market	May be	Yes

In a nutshell, the difference between the market expectations and characteristics of the PCG led to the limited offtake of the Facility. Market requirements mentioned above are the expectations that the market had from a PCG. The Facility aimed to improve availability of funds (through a comprehensive risk sharing mechanism) and extend loan tenor thereby catalysing a transformation in the Indian solar sector. However, its attributes were not considered attractive by a market that had already evolved considerably since its design and there were several issues around the risks being addressed by the Facility and the coverage expected by the market as discussed below:

- The market did not require the all-encompassing default risk coverage as was provided by the Facility, since this had its associated cost implications. Several risk perceptions had got moderated over time for stakeholders and other were being mitigated by lenders through alternative means (i.e. recourse financing). Had the product only addressed specific risks considered pertinent by stakeholders, perhaps the cost of the Facility could have been further rationalized increasing its attractiveness.
- As per lenders, “first loss” protection was a key requirement for protection against assets being declared as NPAs, which was not provided by the Facility. This reduced the pertinence of the guarantee.
- Another key risk that the Facility failed to address was foreign exchange risks which would have arisen for developers on accessing low cost foreign sources of capital,

While the Facility was found wanting on the above attributes, on the other hand, it introduced new complexities such as 1) exposure to foreign exchange risk to the borrower (i.e., when the rupee denominated loan converted to a dollar denominated payable on default) 2) the requirement to satisfy ECB

¹⁶ Market requirements mentioned above are the expectations that the market had from a PCG

guidelines, which further impacted its offtake. **Moreover, the Facility did not have the flexibility to respond to the changing requirements of the market. Hence, the Facility lost its relevance.**

The market requirement for availing a product like PCG has not changed much since 2012- 13 to now. The market still primarily requires a simple product that would reduce cost of funds and provide extended tenors. In that context, it would be important to analyse, what could be the possible design changes, which could make a product such as PCG attractive in the future. These are examined in the next section.

4 Analysing Relevance of PCG for the future

One of the key questions that need to be answered is whether facilities such as a PCG will still be relevant in future. Following are the major transformational drivers in the solar segment which need to be taken into account while discussing the relevance of a guarantee product for the future:

- **New programme of Gol in the grid and off grid segments and the resultant financing challenge;**
- **Evolution of Risk Perceptions; and**
- **Emerging Development formats**

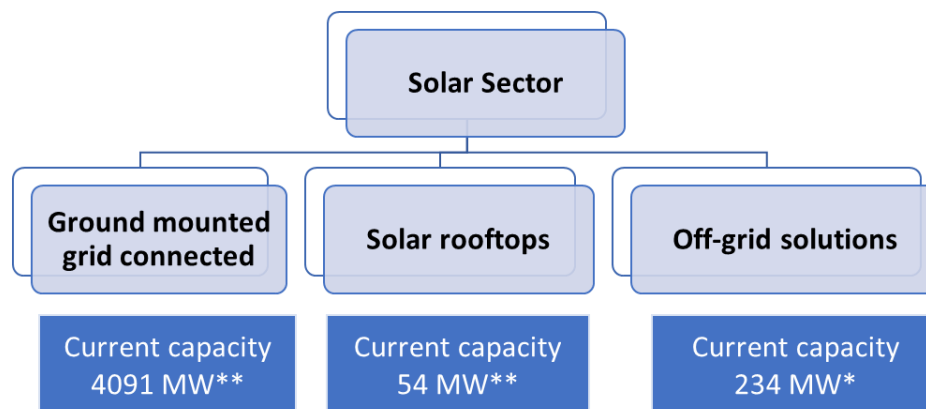
Our attempt in the ensuing paragraphs is to discuss the evolving solar environment in the above context and lay down guidelines that would be relevant in designing guarantee based instruments (if found relevant) to support solar development in India.

4.1 India's Solar Power Roadmap for Future

Recently, the Government of India has increased the target solar capacity fivefold to 100 GW by 2022. While the benefits that will accrue to the country with achievement of the target are well known - improved power supply position, job creation, support to domestic manufacturing capacity and improved energy access; the financing challenges emerging from such ambitious target is significant.

It is expected that the total investment required for the achievement of the 100 GW target is about USD 120 billion (table below) or an annual investment of about USD 17 billion. This is an enormous task, given that in the last four years the solar sector has attracted aggregate investments only worth ~ USD 4.2 billion. The exhibits below shows the current capacities in the solar power sector and the targeted growth.

Figure 7: Current capacities in the Indian Solar Market



Note: * as on 30th June 2015; **as on 15th July 2015

(Source: MNRE)

Table 8: Investment requirements for solar power development

Particulars	Grid Connected Solar Projects	Large solar Projects (UMPPs/Solar Parks)	Rooftop Projects	Total
Targets (GW)¹⁷	40	20	40	100
Investment Requirement (indicative) (Bn \$)¹⁸	46	22	53	120
Equity Funding (Bn \$)¹⁹	13	7	16	36
Debt Funding (Bn \$)²⁰	33	15	37	84

(Source: Gol Solar Targets, KPMG Analysis)

Apart from the above planned investments for the solar sector, assuming that ~2 GW of mini-grid projects are set up in order to provide energy access to rural population, an investment of ~USD 3 billion would be needed. (Considering the project cost of INR 100 million/MW).

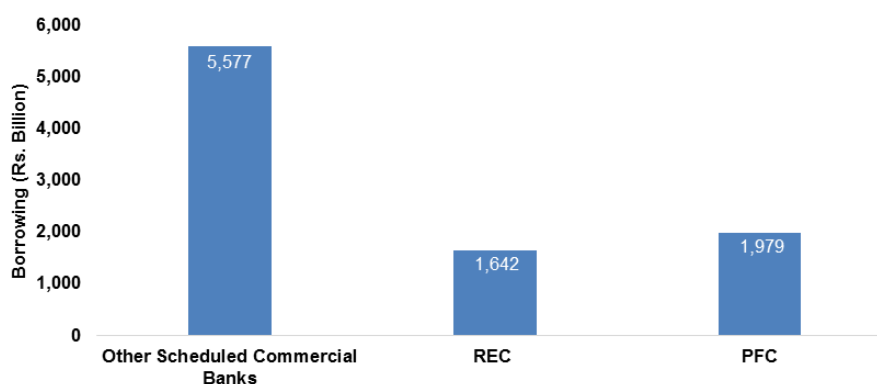
The following section highlights the financing challenges emanating from Gol programme.

4.1.1 Financing challenges – Grid Connected Solar Segment

1. High exposure of lenders to the Power sector (no separate exposure limits for renewable energy)

While Rural Electrification Corporation (REC) and Power Finance Corporation (PFC) account for nearly two third of the total exposure to the power sector, scheduled commercial banks also have a substantial contribution of about 38%. The power sector exposure is thus well spread across the banking sector.

Figure 8: Break – up of power sector exposure for banks for FY 15



(Source: RBI Database, Industry-wise Deployment of Bank Credit as on 20th March 2015, Audited accounts for PFC and REC for FY15)

¹⁷ As announced by targets announced by Gol

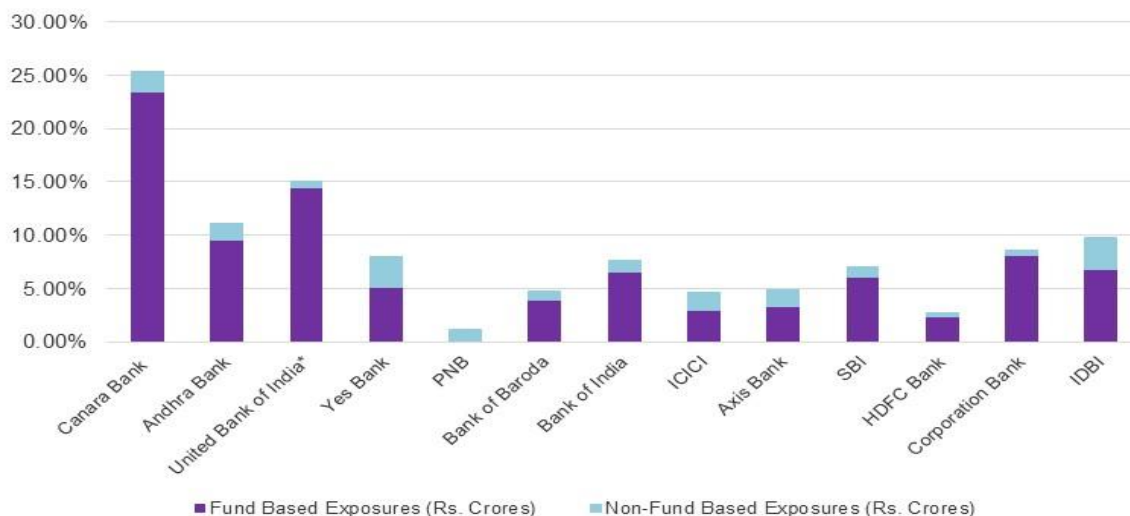
¹⁸ Considering the exchange rate as 1 USD= INR 61 and Capital cost of INR 65 Million for grid connected project and about 80 million for solar rooftops

¹⁹ Considering a Debt-Equity ratio of 70:30

²⁰ Considering a Debt-Equity ratio of 70:30

Further, on an average banks have lent 8-10% of their total loan book to power sector as shown below.

Figure 9: Fund and non-fund based power sector exposure as a percentage of total exposure (as on 31st March 2015)



(Data for entire Power sector including Private players, Sources: Basel-III Disclosures by Banks for FY 15)

The above highlights the limited room that the existing players have in providing investments to the solar sector, which under the current definition is considered as part of the power sector. Renewable energy has been recently identified as a priority sector for lending²¹. The eligible loans would be loans up to Rs 150 million to generators and loans of upto Rs 1 million to individual households. The primary benefit of this move is likely to devolve upon the distributed or the off-grid space where projects are of a smaller scale and which in fact have been struggling with issues in access to finance. However, challenges on financing large projects remain an issue.

2. Tapping domestic conventional debt sources alone may not be sufficient

While the solar sector primarily accesses bank loans for setting up capacities, the magnitude of the debt support required to meet the 100 GW target, indicates that simply looking at conventional domestic bank loans may not be sufficient. Out of the investment requirement of approximately USD 120 billion, at least USD 84 billion will need to be financed by banks as debt. This again is an unprecedented investment requirement. As on March 2015, the total exposure of the banking sector to the power sector was approximately USD 90 billion. The **100 GW solar target implies that the debt requirement for the solar sector itself of USD 84 billion till 2022, is almost equal to the current aggregate exposure of banks to the power sector.** This underlines the imperative for accessing other sources such as domestic bond market and international capital to meet the investment target. Even as subsequent consultations in a brainstorming session have indicated that the availability of domestic funds may not be an insurmountable

²¹ Priority sector refers to those sectors of the economy which may not get timely and adequate credit in the absence of this special dispensation. Renewable is now classified as a priority sector and comes within the overall priority sector lending target of 40% of net credit for banks (which would need to be necessarily met). Eligible categories are bank loans up to a limit of Rs 150 million to borrowers for purposes like solar based power generators, biomass based power generators, wind mills, micro-hydel plants and for non-conventional energy based public utilities Viz. Street lighting systems, and remote village electrification. For individual households, the loan limit is Rs 1 million per borrower.

challenge, the ability to channelize international funds on better terms could indeed provide a substantial impetus to solar project development, especially considering that the financing costs are the principal costs in solar power. This is elaborated upon below.

3. Need to address debt cost and tenor

The present domestic cost of debt for the renewable energy sector is still high at around 12% to 12.5%. Even in the case of foreign capital, the cost of funding increases on account of hedging costs which are typically in the range of 5% to 6%. This needs to be addressed to allow richer IRRs for developers hence enticing investments in the space. Similarly, the existing tenor of loans offered is typically less than 15 years (recently a few aggressive domestic lenders and some international lenders have started offering longer tenors). However, given the long life of solar assets, developers require longer tenor of funds, closer to the life of the project which is 25 years.

4. Limited avenues for raising equity capital

While private equity ("PE") activity has gained pace in the RE segment, the solar segment has still seen very few investments (please refer to **Appendix - 5**, for a snapshot of recent PE deals in the RE space). Further, public markets is still largely untested for even RE stocks with only a couple of RE stocks currently listed on Indian stock exchanges.

The key reasons for the lack of depth on the equity side is the **lack of scale in projects** and also **low equity IRRs**. The IRRs at which solar developers are currently operating are lower than those seen in other infrastructure sectors. Most of the developers are operating at IRRs around 15%-16%.

In the context of these challenges, a PCG could play an important role through enabling access to new capital sources such as domestic bond market, international capital, etc. Through workable risk sharing mechanism, specific risks perceived by the financiers could be sought to be addressed thereby enabling a reduction in the cost of financing and improving loan tenors. Addressing foreign exchange fluctuations risks will be an important challenge in accessing international capital and efforts have to be made to combine mitigation strategies for this risk with any instrument that seeks capital from overseas. Specific recommendations in the design of the PCG are discussed later in this section.

4.1.2 Financing challenges – Distributed Segment

The distributed segment has evolved differently from the grid connected solar segment owing to unique aspects such as small size, sponsor profile, infrastructure availability, operational challenges, regulatory and policy issues, etc. which impact the bankability of these projects. Key financing challenges that the segment faces are described below:

1. High Upfront Investment Requirement

The high investment requirement to setup an off grid system coupled with poor availability of low cost debt financing limits large scale investments in off-grid applications. Moreover, most of the off-grid projects are set up by infusing 100% equity capital and then availing debt post commissioning. This results in stagnation of investments in the sector. Due to the limited scale of operation the risks attributed to the sponsors backing such projects is also high.

2. Uncertainty in Revenues

Low creditworthiness of consumers in rural regions along with thefts is also a major concern with developers. There is a lack of proper infrastructure and workforce to take care of O&M in rural areas, which results in reduced performance of the system.

3. Lack of availability of funds on both the debt and equity front

Off-grid sector is struggling with the challenge of access to finance both on debt as well as equity side. Domestic Commercial Banks want limited exposure as risks are high (including sponsor risks) and because of the uncertainty of revenues over the long-run term. Private equity investors are also reluctant to invest because of scale issues.

Distributed solutions present cost-competitive solution for providing power to areas which currently depend on alternate and costlier solutions, such as diesel genset. This is also an extremely fast growing segment offering tremendous potential both from a social impact perspective as well as avenues of finding investment opportunities that offer returnable capital.

DFIs can play a substantial role to play in scaling up the distributed generation segment through addressing the financing challenges identified above. However, this would entail a different approach as compared to that adopted for grid connected. The key reasons for a different approach are:

- Financiers will need to be sensitized on how the financing challenges and risks faced in this segment differ from grid connected installations. At present there is disconnect in the ground realities and the perceptions of the lenders.
- Support is required to establish a replicable and scalable business model for undertaking distribution generation. Though there are a number of players in the segment currently, such as Simpa Networks and Gram power, there is no single established business model for the segment and these face individual challenges. Identification of the business model and support in their development (through technical assistance or equity involvement in partnership with an agency), will be paramount for bringing scale in this segment.
- Third, there is a need to change the financing approach to this segment. The approach needs to evolve from project financing. This is relevant for the both the solar rooftop space and the retail solar application space. This is the key from where alternate and innovative financing options such as channel funding and business models such as solar lease (under franchisee network), can emerge (this is further discussed in Part II of this report).

Given the unique needs of this emerging segment wherein financiers possibly need to be incentivized to extend finance to this segment, a risk sharing mechanism can play an extremely important role over here. DFIs can design and implement financing products such as a suitably designed PCG product/ insurance products or quasi- equity products to support establishment of scalable and replicable business models. This can help in crowding in financing for projects/assets/channels and business models that do not today have adequate appreciation.

4.2 Evolution of Risk Perceptions

It has to be recognized that the solar landscape is likely to change in the medium to long term with the push from the Government towards distributed segment apart from the utility scale grid connected, ground mounted segment. This would necessitate a detailed analysis of the risk perception of stakeholders with respect to both the grid and the distributed segments since this would hold relevance in redesigning PCG in the future.

On the grid connected solar solutions, risk perceptions continue to moderate further as more and more experiences are available, for e.g., risk perception regarding generation is becoming more moderate with projects being set up in states with demonstrated irradiance and generation data. Similarly, construction risks can be managed through hiring reputed EPC players and through contractual protections and hence moderating in impact. However, offtake risk continues to be of significance especially for foreign lenders. Other risk perceptions are largely the same as the time that the Facility was withdrawn.

On the other hand, the risks perceived for the distributed segment are high owing to sponsor profile, customer profile, lack of established business model, scale, etc. For instance, the offtaker risk is fairly substantial in this segment due to low credit worthiness of rural consumers. Given that there is limited experience in terms of sustainable business models in the off-grid sector, the sponsor risk as well as the financial closure risks are perceived to be higher.

Further, in case grid integrated solar installations, the technology risk as perceived by the lenders has been mitigated over time with increase in solar installed capacity. However, in case of solar rooftop and distributed segment, while the technology related to solar modules is well established, the associated technologies related to net meters, storage etc. including the whole balance of system are not yet tested to high degree.

Hence, the design of the PCG would need to take into account the divergent risk perceptions for the segments for which the support is intended. Further, an extensive dialogue needs to be initiated with lenders to understand the risks considered pertinent by them which they would like to mitigate through guarantee products.

4.3 Emerging Development Formats

Suitability of PCG as a relevant financial intervention product also requires to be evaluated keeping in context emerging development formats in each of the relevant segments, grid connected ground mounted solar projects, solar rooftops, solar parks, and off grid solution segments.

Given that the challenges associated with each segment differ, a *'one size fits all'* approach cannot be adopted for the solar sector. Each segment in itself is possibly a subject matter of individual study and financing interventions will need to be elucidated with the backdrop of aspects such as market maturity, development models, tariff models, financing needs, risks inherent in the model, etc.

The product will need to be flexible to cater to divergent requirements of the sector as well as changing risk perceptions.

We have in Part II of the report, briefly touched upon some of the emerging areas and attempted to provide a flavour of the nuances involved in determining financial interventions based on the risks and financing needs pertinent to each segment²².

²² This is a preliminary and broad analysis and needs to be supported by a more detailed study which explores the feasibility, regulatory and fiscal implications, etc. of every structure

4.4 Re-designing PCG to meet the future requirements

Facilities such as a PCG would always hold relevance for any sector as a transformational catalyst. This especially holds true for smaller developing countries, where the domestic financial ecosystem may not be large or strong enough to respond to the market requirements.

Such products are also relevant for India which is in a rapid growth phase, where, financing challenges are constantly thrown up with evolving design of solar programmes (revenue models, development modes (solar parks, roof top, off grid, etc.), changing incentive schemes and risk sharing arrangements, etc. Further, projects have increased in scale from ~5 MW in 2011 to 150 MW (single largest operational installation), and ultra-mega power projects of 750 MW are planned. Such factors emphasize the relevance of guarantee products to assist lenders in managing risks and to lend on a non-recourse basis.

Lessons learnt from the experience with the Facility, can facilitate in designing a more effective guarantee product (or similar instruments) aimed to address the above mentioned financing challenges both in the context of India or any other emerging market. In this section we present some principles that can be considered while formulating a PCG.

■ **Flexibility**

It is important that the product is flexible and the design includes the ability to address transformational change in the sector and its associated impact on market requirements. During the design phase itself, interim review check points need to be created to ensure re-orientation of the product to address changing market dynamics. Flexibility is also important to address the diverse requirements of various target solar segments (solar rooftop, large ground mounted installations such as solar parks, off grid segment, etc.).

■ **Improve availability of funds and enable access to new sources of capital**

- The 100 GW solar target brings back the original objective of the earlier Facility emphatically, which was to improve availability of funds. However, with the stretched domestic conventional lending market, it is important that the PCG facilitates access to new, large, cheaper and long tenor capital sources such as domestic bond market and international capital sources.
- In case of the distributed segment, it would be important for a PCG to address the unique risks perceived for this segment, and address the availability of funds for this sector, juxtaposed with innovative financing avenues such as channel financing, solar lease, etc.

■ **Appropriate Risk Coverage** Important lesson emerging from the analyses of the evolution of risks, is that the design of a partial credit guarantee needs to consider the following.

- It is imperative to gain an understanding of the evolving risks and design the PCG in a manner which ensures that only pertinent risks are covered and priced accordingly. For e.g., the guarantee facility could cover risks which are perceived high, such as generation risk, currency risk, off-take risk, etc. (**Appendix – 6** highlights the structure of a Partial Risk Guarantee designed in case of solar rooftop programme in Maldives to specifically address offtake risks).
- The design of the PCG would also need to take into account the divergent risk perceptions for the segment (grid/ distributed) for which the support is intended.

Appropriate risk coverage could rationalize the costs of the PCG and at the same provide clarity on the benefits that are expected to accrue consequent to the Facility being availed. However, there is a trade-off between pricing of PCG addressing pertinent risk and the administrative costs of

identifying the risk, structuring and administering the PCG. This trade-off will need to be considered while determining the risk coverage of a PCG.

■ **Pricing of the Guarantee Facility**

- Cost will remain as a critical factor in determining the uptake of any guarantee facility. A deeper understanding needs to be developed regarding the extent of guarantee fees that lenders would be willing to bear so that adequate margins are left on the table. To undertake such an analysis, a risk appetite assessment of the lenders, how they price risks, current exposure levels, etc. would need to be analysed. This analysis would need to be done at the country level before introducing a guarantee facility at the design stage.
- Guarantee can be designed to cover specific risks to reduce costs. Here it also important to ensure capacity strengthening of lenders so that they have capability to price risks adequately, especially in nascent markets.

■ **Tenor**

- 4.4.1.1 The tenor of the partial credit guarantee needs to be closely tied with the risk it aims to address. For instance, if the facility is covering credit risk during the construction phase; then the expected duration of the facility has to be concomitant to the risk time period.

■ **First loss provision**

It is important to incorporate a 'first loss' provision in any PCG to increase its attractiveness, especially for the Indian lender community. However, we understand that while first loss provision is necessary for lenders to safeguard the risk of NPA, it would also come with a reasonably higher cost, which would further cut down the margins for the lenders. Hence, this aspect would need to be evaluated in detail while designing the PCG, possibly in consultation with lenders. Further, there can be flexibility built-in while designing PCGs, wherein, lenders have an option of a 'first loss' provision and the PCG can be priced accordingly if the option is availed.

■ **Simplified Process & Eligibility Criteria**

The eligibility criteria should be simplified to enable higher participation in the facility. The number of procedures to avail the facility and the time required to complete these procedure should be kept to the minimum. A programmatic approach for implementing such a facility shall be one step in simplifying the process. Alternatively, guarantors should consider co-engaging with developers. They can create a platform, which enables developers to be pre-approved, who can then avail low cost loan on the basis of guarantor support. This would cut down the time frame as well as transaction costs.

■ **Transparent Documentation**

In most of the international case studies examined, there is an agreement between guarantor, the lender and the beneficiary. The agreement lays down the cost and benefit sharing framework between the three parties. It is recognized that tripartite agreement is a complex document and needs to be framed carefully, it is also an essential document to ensure transparency between the engaging parties and binds them together. Such a document is also imperative for credit enhancement since amongst other things, the loan needs to devolve upon the guarantor on default and hence cannot be dispensed with. However, potential terms could be discussed with stakeholders during design stage itself and terms considered onerous should be reviewed and alternatives considered.

■ Exchange Management Issues

Prior clarifications/ approval should be sought from the central bank²³, at the time of design of the facility for the exchange management issues arising from the conversion of the defaulted portion of loan into foreign currency loan, on default. Alternatively, avenues should be explored to make funds available on default from a pre-funded facility or consider alternate avenues of credit enhancement (discussed in Part II to the report).

■ Need to effectively market the product

In case of any innovative financing structure, it is important that a wider spectrum of stakeholders covering lenders and end user community should be targeted. Small and medium scale banks should also be allowed to participate in the facility. This would enhance the probability of making the facility/product successful.

■ Time to market and increasing reach

Given the rapidly evolving nature of the solar sector, the time to market for any product needs to be shortened considerably. Further, any product designed should aim to follow the market in terms of market requirements and not lead the market.

In order to increase participation in a planned guarantee scheme, interventions are required at two levels (a) increasing the number of sectors to be covered in the scheme and (b) planning eligibility criteria of the scheme in such a way that most financial institutions are included in it. Based on an international review of guarantee schemes it has been seen that schemes with a wider scope in terms of sector coverage helps increase footprint of the scheme. For instance some of the successful credit guarantee schemes in Latin America covers all three aspects of clean energy – renewable energy, energy efficiency and biofuels. Within the renewable energy space all technologies are covered solar thermal and photovoltaic, wind, small hydro, cogeneration etc. Increasing participation of the financial institutions is a call that would need to be taken based on the objectives of the guarantee product. Also an active pre- planning exercise, road shows with the lender community would help in designing suitable eligibility criteria. These measures will ensure that there is wider participation from both borrowers and lender community without having adverse implication on costs of the facility.

■ Participative Approach

A credit guarantee scheme is a product aimed for risk transfer and diversification. Thus, it is essential that a participative approach is adopted by the guarantor and lender while designing the product. There needs to be an agreement on risk that is being covered by the scheme and the extent of the coverage.

While guarantee instruments are relevant and can act as important transformational drivers by improving access to funds especially in other developing countries where the strength of the financial sector may not be sufficient to meet the evolving requirements. **It is evident that even a redesigned PCG could throw up some critical challenges in case of India and other developing countries such as first loss guarantee and exchange management issues, which would need to be suitably evaluated during the process of redesign of PCG by entering into dialogues with the concerned parties.**

Alternatively, if these continue to pose a challenge, we may need to look beyond the PCG in its current format which supports availability of funds through traditional lending channels and look at:

²³ Reserve Bank of India in case of India

- 1) Alternative sources of capital such as international funds or the USD 1 trillion deep domestic bond market;
- 2) Innovative financing strategies that obviate the necessity of involving guarantees with its associated procedural and regulatory complexities. For e.g., Bonds could be floated which are credit enhanced through alternate means such as tranching of securities whereby senior/ subordinate securities are created;
- 3) Providing support on the equity side through instruments such as quasi equity²⁴ to provide a flexible capital option to infrastructure developers and improve equity returns. Alternatively, funds such as International Climate Fund (ICF) could support creation of large investment platforms that invest in solar assets such as Yield Cos²⁵.
- 4) For the distributed segment which offers immense potential, suitably designed guarantee or insurance or equity products would need to be evaluated for attracting financing for this segment. Further, instead of traditional project financing, other avenues such as solar lease/channel financing may need to be evaluated.

²⁴ One of the alternative sources for infusing equity into the capital structure is through Quasi Equity (e.g., subordinated debt, mezzanine finance). Quasi equity is a category of debt taken on by a company that has some traits of equity, such as having flexible repayment options or being unsecured/ ranking after senior debt.

²⁵ YieldCo is a dividend oriented public company, created by a parent company with invested operating assets in renewable energy sector in order to generate predictable cash flows. As the entity is for only operating assets, such a structure helps to de-risk the operating assets from the risks of under construction assets (please refer to Part II of the report for a detailed discussion on YieldCos)

5 Conclusion & Next Steps

From the above it emerges that guarantee instruments are relevant and can act as important transformational drivers by improving access to funds especially in other developing countries where the strength of the financial sector may not be sufficient to meet the evolving requirements. PCG can also play an important enabling role in India where the sector is again at the cusp of facing fresh financing challenges with new Gol targets, large scale projects and emerging development formats. However, the ask from such a product would be both in terms of increasing the availability of funds through access to both conventional and new capital sources as well as decreasing cost of funds. Key aspects that need to be kept in view while designing suitable products for the future are as follows:

- 1** A programmatic as well as participative approach needs to be adopted to simplify processes and obtain inputs on design
- 2** A flexible bouquet of options should be provided (eg, first loss coverage, flexible risk coverage, ability to provide guarantees to new sources of capital, ability to cater to diverse requirements of various target solar segments, etc)
- 3** If exchange management issues remain unaddressed, identify alternate means for provide credit enhancement alongwith risk mitigation strategies such as a state risk ranking index and investing in select states only
- 4** Cost effectiveness should be thoroughly tested
- 5** The solar market is now entering a growth phase from a seed phase. The market is likely to keep evolving at a fast pace. Hence, it is important to create check points to enable re-orientation to changing market needs and shorten the time to market

As next steps, ICF needs to prioritize the solar segments which need to be studied further, based on the transformational impact of interventions in those areas. There are options of returnable investment structures present across the segments and based on the identified areas. While large scale and mega projects are important target areas, emerging segments such as distributed segment could offer avenue for highest social impact along with means of investing on a returnable capital basis. Suitably designed products could improve access to capital for a sector that today does not have adequate appreciation. ICF can conduct detailed study to arrive at the design of pertinent instruments for providing financial support to the solar segment in India.

Appendix 1 Mapping of Deliverables

Table 9: Mapping of relevant sections of the report with the specified deliverables

S.No	Inception Report	Relevant Sections
1	KPMG will assess the various business models and identify developer's issues in achieving financial closure.	Refer Appendix - 8
2	KPMG would prepare a comparative matrix as shown in the figure below for multiple lenders to identify the criterion of financing a solar project.	Refer Appendix – 9 and Table 4
3	KPMG would undertake primary research as well as secondary research covering stakeholder's consultation	Refer Section – 3.2 of the main report and Appendix 10
4	KPMG, would carry out a process of one to one discussions with the ADB officials to understand how the risk evaluation framework was developed and the basis for identification of risks. Further, would understand the basis on which ADB Guarantee fee was determined and would assess whether the guarantee fees and commitments fees defined at that moment was higher/lower/adequately priced.	Refer Section – 3.2 of the main report
5	KPMG would identify potential opportunities for guarantee based instruments to support promotion of solar technology	Refer Section – 4.4 of the main report.
6	KPMG would review the project documents and understand the process of designing the framework and rationale for guarantee scheme for India	Refer Appendix – 2
7	KPMG would prepare a gap matrix to identify the potential bottlenecks that would have obstructed the Facility to take off.	Refer Section – 3.4 of the main report
8	KPMG is supporting the Government of Maldives for structuring the SREP transaction, experiences of this project would also be brought forth to prepare a structure to streamline the process of potential solar deals in India.	Refer Appendix – 6
9	KPMG would take perspective of various lender's communities to understand the risk identification and mitigation strategy for funding various solar projects.	Refer Table 4

Appendix 2 Structure of the Guarantee Facility

Overview of the Facility

In this section a brief of the Facility covering the implementation structure of the Facility, is provided. The key terms of reference for the Facility have also been touched upon.

Implementation period and duration of the PCG

The Facility was to be made available over a 3-year period following approval from the ADB's Board of Directors. PCGs tenure was limited to a maximum of 15 years. Any exceptions or changes required a prior approval of the Investment Committee at ADB. While the board approval was received in early 2011, the Facility was launched in 2012.

a. Structure of Guarantee Facility

i. Eligible Project Borrowers and Sponsors

The projects to be supported under the Facility were to be financed through special purpose vehicles (SPVs), established by project sponsors to build, own, and operate the assets as a stand-alone independent power producer incorporated in India. It was envisaged that the SPVs will be sponsored by a mix of local and foreign investors with either experience as power sector operators in India or joint venture consortia of financial investors and companies with solar power experience outside of India. The Facility was only available for lenders of those SPVs in which 50% or more of the shares are owned by private sector companies and sponsored by investors with acceptable experience and credit quality.

ii. Selection and Approval of Partner Commercial Banks

Local and/or foreign partner banks were to be selected at ADB's sole discretion. Initially, no more than five PCBs were to be selected. ADB required that each prospective lender submit all documentation and information as outlined in the due diligence checklist of ADB. Prospective PCBs were screened and due diligence results were to be presented to the Investment Committee for approval based on the following factors:

- a. Credit standing (at least BBB– equivalent credit rating by an international rating agency or AA equivalent credit rating by a local rating agency);
- b. Experience and capabilities in limited recourse lending in India and/or Asia;
- c. Existing portfolio in the power sector;
- d. Willingness and ability to make financial commitments in renewable energy required under the Facility;
- e. Senior management commitment;
- f. Staffing, management, and technical capability to implement the Facility; and
- g. Operating policies, guidelines, and systems in loan origination, credit assessment, and loan administration and enforcement. Not more than 40% of the total Facility value could be issued to a single/same partner bank as PCGs.

iii. Selection and Approval of Projects

Projects were to be identified and selected by PCBs based on eligibility criteria testing on project preparation, financial and commercial viability, sponsor credentials and creditworthiness, and overall project risk mitigations. Projects were then screened against eligibility criteria, and banks needed to submit a due diligence report to ADB that the project met all the requirements, including compliance with ADB's policies

on anticorruption, safeguards, integrity, and procurement. Projects were required to have signed a long-term power purchase agreement either with the NTPC Vidyut Vyapar Nigam Limited (NVVN) (under the JNNSM framework) or in compliance with an approved state solar power policy. Individual state policies were to be reviewed on a case-by-case basis before PCGs were issued. Guarantees to multiple projects of same sponsor or parent company were to be limited to no more than five projects or an aggregate of 30 MW, whichever limit was reached first.

iv. Report and Monitoring

ADB was to also monitor the credit quality of PCBs (through existing credit rating reports), and conduct a review for any PCBs that are placed on negative credit watch by major credit rating agencies or whose credit rating is downgraded. ADB was to carry out an annual performance review of the Facility to assess the average risk rating of the portfolio and monitor the performance of the Facility against indicators in the design and monitoring framework.

v. Key Terms and Conditions of the Guarantee Facility

1. **The Facility had a tripartite agreement to be entered into between the guarantor (ADB), guaranteed lender (Commercial Bank etc.) and the project developer.** ADB documentation required the end borrower to acknowledge that the lender was receiving a guarantee from ADB. This was to enable the supersession of the guarantee agreement over the loan agreement in the event of the guarantee being called.
2. **Proportion of Guarantee:** The Facility covered 50% of the disbursed loan amount. This was **not** a “first loss” guarantee, that is, ADB would bear 50% of the loss on **every** payment scheduled instead of bearing the **first 50%** of the loss; thus the banks will incur losses alongside any ADB claims paid.
3. **Cost of Guarantee:** Guarantee fee consisted of up-front fees, standby fees, and annual guarantee fees. These were determined on a case to case basis subject to ADB approvals and in accordance with ADB policies. Following are the components of the fee:
 - a. *Guarantee Fee:* The Guarantee Fee ranged from 0.87 – 1.25% per annum. The rate of interest was determined based on the size of the project.
 - b. *Commitment Fee:* 0.43-0.63% per annum
 - c. *Stand-By Fee:* 0.15-0.40% per annum
 - d. *Upfront Fee:* 0.2% flat calculated over the Guaranteed Percentage of the Guaranteed Loan.

The above fees include benefits from a £6 million grant from the Government of the United Kingdom administered by the ADB.
4. **Term of Guarantee:** Up to 15 years (door-to-door) from the date of the loan agreement and an amortization schedule that provides for an average loan life of no more than 10 years.
5. **Guaranteed Risk Event:** Non-payment by the Borrower of all or any portion of one or more Scheduled Payments under the Guaranteed Loan which lasts even post the Waiting Period of 45 days from due date.
6. **Trigger Mechanism & After Effect:**
 - o **Step 1:** The guarantee Facility can be claimed/availed by the lender only and only if there is a payment default by the borrower for 45 days from the scheduled due date of the installment.

- **Step 2:** Lenders would demand up to 50% of the guaranteed loans on a present value basis, effectively²⁶ from ADB within 120 days of the scheduled due date for payment of installment by the borrower, over the duration of the Guaranteed Loan.
- **Step 3:** ADB would identify the reasons for the payment default from the borrower.
- **Step 4:** ADB would validate the guarantee risk event and prepare a report on the same.
- **Step 5:** The payment of claimed guarantee amount will be done to the lender upto the extent of 50% of the net present value of the outstanding amount of the principal and interest.
- **Step 6:** ADB would retain 50% of the lender's rights on the total loan amount.
- **Step 7:** In the event ADB makes a payment to the Guaranteed Lender, ADB will have recourse to the Borrower under a Counterindemnity. The Counterindemnity will contain customary representations and warranties, events of default and covenants. In order to enter into this agreement, the borrower should be aware about the guarantee Facility upfront and the conditions of the agreement should be acceptable to the borrower as well along with the PCBs.
- **Step 8:** In case ADB makes payment to the Guaranteed Lender in US Dollars (whereas the currency of the Guaranteed Loan was in INR), ADB's claim under the Counterindemnity to the Borrower will be converted to US Dollars. This would have to be done as per the RBI guidelines of foreign currency debt.

Process adopted by ADB in the design of PCG

ADB's Risk Perception

ADB designed the PCG based on its risk pricing model, which accorded different levels of weightages to the risk identified. The details of the model used by ADB were not shared on account of confidentiality.

As per the Report on Recommendation of the President to the Board of Directors published in April 2011 by the ADB, the identified risks and mitigation framework was adequately comprehensive to protect the interest of the bank. During 2010, the product was planned by ADB taking into consideration the risk perceptions as mentioned below (The risk grading provided in the table is our interpretation of the ADB risk perception, based on our discussions with the ADB professionals).

Table 2: ADB Risk Perceptions during 2010

Risk Category	ADB's Perception
Country Risk (High)	<ul style="list-style-type: none"> ○ In 2010, the country had minimal experience as well history in terms of solar power. This was one of the important factor that would have forced the lenders to curb funding to the solar project developers. Accordingly, the risk premium that would be charged was high.
Counter Party Risk (Medium)	<ul style="list-style-type: none"> ○ Limited entities had experience in managing a power plant, ability to infuse equity and manage cost overruns/delays in case there is no EPC player engaged. ○ It was difficult to judge the sufficiency of performance guarantees and performance bonds provided by equipment supplier.

²⁶ The ratio of the net present value of guaranteed principal and accrued guaranteed interest in any particular period, over the principal amount, shall not exceed 50%.

Risk Category	ADB's Perception
Construction Risk (Medium)	<ul style="list-style-type: none"> ○ Difficulty in getting a true EPC player; smaller firms act as installers/integrators ○ Smaller firms with weaker credit; inability to provide guarantees, cover liquidated damages to the owner. ○ Limited (and unrated) suppliers of collection field equipment – can lead to significant construction delays.
Technology Risk (High)	<ul style="list-style-type: none"> ○ Lenders rely on opinions of experienced independent technical advisors to assess the level of risk and quantify downside performance scenarios. However, there was lack of familiarity with the technology even for the domestic technical advisors. ○ Inadequate proven instances for both the solar PV and CSP technology in the country. ○ Faster rate of degradation and inadequate transmission infrastructure
Generation Risk (High)	<ul style="list-style-type: none"> ○ Lack of irradiance data for the country was considered to be an important parameter while conducting technical appraisal of the project. ○ Negligible operational experience & ability to meet the liabilities among the domestic O&M contractor, access to spares, general security (theft of equipment) etc. were areas of concerns.
Off-taker Risk (High)	<ul style="list-style-type: none"> ○ Poor health of the discoms leading to a possibility of default or delay in payments was considered to be the highest rated risk. ○ The probability of dishonoring the PPAs by the discoms due to high cost of solar power was considered to be very high.

(Source: Risk Assessment of Solar Power Generation Projects, Presentation by Don Purka)

Key Elements of the PCG Facility

As per the MNRE guidelines for JNNSM phase 1 the focus was on relatively small (2 MW–25 MW), and mostly solar photovoltaic projects. Based on cost estimates in 2010 (about \$3,000–\$3,300 per kilowatt of installed capacity), the total cost of such projects were likely to be too small for direct ADB lending. The challenge thus became to support financing of multiple “small” solar projects.

ADB discussed various financing structures and support mechanisms with local and foreign commercial banks. Based on the feedback received from these banks, there was an immediate window of opportunity for ADB to make a real impact in the nascent but critical sector, by mobilizing available commercial funds into solar projects and building capacity within the local banks for assessing the technical and commercial risks of solar power projects.

Cost of Guarantee Facility

- The cost of guarantee was decided based on the ADB's Risk Evaluation model considering a mix of critical risks and general risks. The model gave a guarantee cost estimate of 3-4%, which included the risk premium assessed by ADB for investments in India.
- The consultations made ADB aware that the costs of the Facility was high and hence they approached DfID to provide grants for concessionary guarantee fees.

Eligibility for Availing the Guarantee

- ADB's Risk Team had set a minimum eligibility criteria for developers as well as lenders to avail the Facility as mentioned in foregoing sections.

Design of Guarantee Facility

- ADB introduced the guarantee product with following as the background:
 - Solar projects in India were still at a nascent stage, with little development or operating history
 - Limited experience among the lenders to evaluate projects
 - Discomfort in the lending community vis-a-vis the risk associated with solar projects
- ADB sought feedback/ inputs from Ministry of New and Renewable Energy, key developers and lenders for designing the product.
- Inputs were sought from domestic and foreign banks for various risk mitigation strategies before designing the Facility.
- ADB found that the risk perceptions of foreign banks were different from those of domestic lenders
 - Creditworthiness of the Indian developers was the most important risk considered by foreign lenders.
 - Offtake/ counter party risk was another key risk identified by the foreign lenders, especially while dealing with state utilities.
 - Domestic lenders accorded highest risk to technology.

Appendix 3 Approach for Identification of Stakeholders

- In order to cover diversified sample to gather feedback from the stakeholders, a comprehensive list of stakeholders was prepared based on their profiles and market presence.
- Within the project implementer's category or the developer category, the cumulative capacity held by developers is ~605 MW out of ~3000 MW of the total installed capacity, which is ~20% of the market share. The developers identified are amongst the top developers in the country and have diverse experience across various regions of India.
- Within the financier community, some of the largest commercial banks and largest NBFC in the renewable energy space along with major banks lending to the solar sector were covered. The capacity funded by the identified stakeholders is ~900 MW of the ~3000 MW which is ~30% of the overall market share. Further, PE investors having interest in the solar space, aside from a few which have actually invested were identified.
- Apart from the above stakeholders, other agencies such as Solar Energy Corporation India Limited (SECI), Gujarat Energy Development Agency (GEDA) and Shakti Sustainable Energy Foundation (SSEF) were consulted. These stakeholder have played a prominent role in developing the solar sector in India.
- At the time of the inception of the project, DfID provided us with a list of entities that were consulted while designing the Facility. These included financiers as well as large developers. Best efforts were made to connect with these, which included – Nord LB, L&T Infrastructure Finance, SunEdison and Azure Power. While Nord LB and Azure Power remained non-responsive; SunEdison and L&T Infrastructure Finance contributed their points of view through the brainstorming session organized under the study.
- While the target of the Facility was small developers, the eligibility criteria was such that large developers became eligible. Small developer we consulted admitted that there was a lack of awareness about the Facility. Our consultations were hence centred primarily around the large developers. Details of each of the developers consulted have been provided in the subsequent section.
- In terms of the stakeholders that were consulted the following table presents summary of their awareness of the Facility

Name of Stakeholder	Type of Stakeholder	Aware of the Facility
Asian Development Bank (ADB)	International Financial Institution	Yes
International Finance Corporation (IFC)	International Financial Institution	Yes
Rural Electrification Corporation (REC)	Domestic Lender	Yes
Yes Bank	Domestic Lender	Yes
SBI Caps	Domestic Lender	Yes
IREDA	Domestic Lender	Yes
IDFC	Domestic Lender	Yes
US EXIM Bank	International Lender	No
Kotak PE	Private Equity/ Venture Capital	No
Barings PE	Private Equity/ Venture Capital	No

Name of Stakeholder	Type of Stakeholder	Aware of the Facility
Macquarie	Private Equity/ Venture Capital	No
Nereus Capital	Private Equity/ Venture Capital	Yes
GEF	Private Equity/ Venture Capital	No
IDFC PE	Private Equity/ Venture Capital	Yes
Green Infra	Indian Developer	No
Jakson Power Solutions ²⁷	Indian Developer	Yes
CLP India	International Developer	No
SunEdison	International Developer	Yes
IL&FS Energy Development Company	Indian Developer	No
Hindustan Power Projects Private Limited	Indian Developer	No
Solar Arise	International Developer	Yes
Simpa Networks	EPC (distributed generation)	No
First Solar	Equipment Supplier/ EPC/ Manufacturer/ International Developer	Yes
Gujarat Energy Development Agency	Government Agency	Yes
Solar Energy Corporation of India	Government Agency	Yes
Shakti Sustainable Energy Foundation	Think Tank/ Foundation	Yes

*Please note that even in the cases that the entities were not aware about the Facility, they have contributed their view points to what could have been the reasons for lack of offtake, after understanding the details regarding the Facility. Their feedback has been incorporated in our analyses.

²⁷ The person consulted is currently working with Jakson Power Solutions, however, at the time when the Facility was available he was working with Acme Solar and shared his views based on that.

The brief profiles of above stakeholders have been shown in the figure below:

Category: Financiers

Sub Category: Lenders

<p>Rural Electrification Corporation (REC)</p>	<p>Rural Electrification Corporation Limited (REC) is a leading public Infrastructure Finance Company in India's power sector. REC also offers loan products for financing RE projects. The company has tied up a line of credit for € 100M with KfW under Indo-German Development Cooperation for financing RE power projects at concessional rates. Eligible projects include solar, wind, small hydro, biomass power, and cogeneration power & hybrid projects. Currently the company has an exposure of 180 MW in solar sector.</p>
<p>Indian Renewable Energy Development Agency (IREDA)</p>	<p>Indian Renewable Energy Development Agency (IREDA) is a Public Limited Government Company established in 1987, under the administrative control of MNRE to promote, develop and extend financial assistance for renewable energy and energy efficiency/conservation projects. The company has currently disbursed loans for ~300 MW of solar projects and ~7200 MW of renewable energy projects. The company recently signed an agreement for a line of credit from US-Exim for \$1 Bn.</p>
<p>Yes Bank</p>	<p>Yes Bank is one of the largest banking house in India with portfolio spread across all the sectors. Yes Bank currently has ~110 MW of solar projects under its funding portfolio. Yes Bank has recently committed \$500 Mn for funding renewable energy sector in the 1st RE-Invest 2015 held at New Delhi. Yes Bank has further raised ~\$160 Mn by issuance of Green Bond in the International Market.</p>
<p>SBI Caps</p>	<p>SBICAP is a wholly owned subsidiary and the Investment Banking arm of State Bank of India (SBI). SBI is an Indian multinational, public sector banking financial services company. The bank currently has ~1700 crores of investment in the solar projects of ~310 MW.</p>
<p>IDFC</p>	<p>IDFC Limited is India's leading integrated infrastructure finance player providing end to end infrastructure financing and project implementation services. IDFC has an exposure of ~\$820 Mn in the Infrastructure space. The company currently has financed solar capacity of ~115 MW .</p>
<p>US EXIM</p>	<p>The Export-Import Bank of the United States (US Exim) is the official export credit agency of the United States. Supporting the renewable energy sector is one of the priority areas for the bank. Annual renewable-energy authorizations during the 2009 and 2013 were \$257 million in FY 2013, \$355.5 million in FY 2012, \$721.4 million in FY 2011, \$332 million in FY 2010 and \$101 million in FY 2009. In 2008, the total authorization for the renewable energy sector was only \$ 30.4 million. It has been one of key foreign lenders operating in providing funds for investments in Indian solar sector. The largest solar thermal power project in the country has also been financed by the bank. A number of projects under the JNNSM were financed through the Bank</p>

Category: Financiers

Sub Category: PE Firms.

Nereus Capital	Nereus finances alternative energy infrastructure in India. Nereus currently has exposure in 2 solar projects located in Andhra Pradesh each of 25 MW capacity. Nereus' invests across capital structures and return profiles to align interests and to provide companies with needed versatility.
Barings PE	Baring Private Equity Partners (India) Ltd. is a private equity firm specializing in financial restructuring, expansion capital, and middle market transactions. Baring Private Equity Partners (India) Ltd, which has invested in Chennai-based Auro Mira Energy, which has interest in wind, small-hydel and biomass projects.
IDFC PE	IDFC Alternatives is a part of the IDFC PE. IDFC Alternatives currently has investments in Moser Baer, Emergent Ventures and Green Infra Limited (GIL). The cumulative portfolio of RE projects held by Moser Baer and Green Infra is ~250 MW.
Kotak PE	Kotak Mahindra Group has been associated with private equity investments since 1997, to bring a sharper focus to the group's Alternate Assets strategy. Kotak PE is a part of the larger Kotak Mahindra Group and within the solar sector has invested in NSL Power and Solar Arise.
Macquarie	Macquarie Group Limited is a global investment banking and diversified financial services group, providing banking, financial advisory and investment and funds management services to institutional, corporate and retail clients and counterparties around the world. Macquarie has a Infrastructure specific fund which currently has a solar specific investment in only in Moser Baer Projects.
Global Environment Fund	Global Environment Fund (GEF) is a global alternative asset manager with approximately \$1 billion in assets under management. Established in 1990, GEF has grown into one of the world's most successful investment firms dedicated to the energy, environmental, and natural resources sectors. GEF currently has investments in a renewable energy platform- Renew Power.

Category: Project Implementers

Sub Category: Developers

Green Infra Limited	Green Infra is a public limited company that operates a diverse portfolio of renewable energy activities including Hydro, Wind, Solar, Biomass and Energy Efficiency. SembCorp acquired 60% stake in Green Infra Limited in February 2015 from IDFC. In total, Green Infra Limited supplies about 406 MW of clean energy to India's power grid. Of which currently, they have ~50 MW of solar projects operational.
SunEdison India	SunEdison is a global solar energy company headquartered in the U.S. It develops, builds, owns and operates solar power plants. SunEdison also manufactures solar panels, silicon ingots and wafers, solar energy systems and module racking systems. SunEdison is listed on the New York Stock Exchange. Currently, the company has ~200 MW of solar projects and ~150 MW under construction in the Indian Territory. SunEdison operates in various segments covering grid connected solar projects, solar rooftops and micro-grids.
IL&FS	IL&FS started its energy business in 2008 through its subsidiary IL&FS Energy Development Company Limited (IEDCL) to develop, own and operate power generation and power transmission assets in India and abroad. IL&FS currently has 1000 MW of generation capacity operational, 10,000 MW of capacity in project development phases and 3000 MW in various other stages of development. IL & FS currently has ~50 MW of solar project operational more than 80 MW of solar project under construction.
TATA Power Solar	TATA Power Solar is India's largest integrated solar company. TPS deals in manufacturing crystalline modules, system integration services and solar project development. The company has a module manufacturing capacity of 200 MW per year and has commissioned over 175 MW of solar power projects in India. TPS is also active in the rooftop solar sector and has commissioned about 43 MW of rooftop solar projects till date.
Hindustan Power Projects Private Ltd.	Hindustan Power Projects Private Ltd. (HPPPL) is a private limited company founded in 2011. It was a part of Moser Baer India Limited (MBIL) till 2011. Moser Baer solar was started in 2007 as an EPC and module manufacturing company. The total acme manufacturing capacity of MBIL is 250 MW. MBIL has provided EPC services for about 300 MW of solar projects till date and currently holds an operational portfolio of ~180 MW in India.
CLP India	CLP India is the largest renewable energy generator in India with an operational capacity of ~700 MW. CLP is about to enter the solar power market in the current year. The company has power projects in all areas including coal, gas, wind etc. Currently, in India CLP plans to add ~500 MW in next 5 years.
Jakson Power Solutions	Jakson Power Solutions is a diversified group with multiple business interests in power generation, solar and power distribution, EPC and solar power generation. Jakson has developed its first solar power project at Bap, Jodhpur District, Rajasthan. The 20-MW solar power plant in Rajasthan has been set up with an investment of Rs 200 crore under government's JNNSM Phase 1 Batch 2.

Category: Project Implementers

Sub Category: Equipment Suppliers

Simpa Networks

Simpa Networks, a venture-backed technology company, launched an innovative product in Karnataka, India in 2011. Backed by a cutting-edge business model, the product supports their mission to mediate access to affordable and clean energy within emerging markets. The company sells energy based on a "Progressive Purchase" basis in the rural offgrid space. Through this pricing model, consumer prepay for their energy service. Simpa has established operations in 8 districts of Uttar Pradesh, India.

First Solar

First Solar is one of the largest integrated solar photovoltaic solution providers globally. First Solar sees India amongst the fastest growing markets for solar PV installations and expects to sustain a market share of over 20-25 per cent. The company has been associated with more than 500 MW of solar PV units set up in the country supplying modules and expect to continue this growth momentum.

Category: Others

Sub Category: Government Agencies

Gujarat Energy Development Agency

GEDA is the state nodal agency for development of renewable energy technology in Gujarat. GEDA has been responsible in monitoring the development of Charankha Solar Park (500 MW) in Gujarat. Further, the agency has monitored project development and commissioning of ~980 MW of solar capacity in the state.

Solar Energy Corporation of India

SECI was set up as a not-for-profit company under Section-25 of the Companies Act 1956 as an implementation and facilitation institution dedicated to solar energy sector, under the reins of MNRE. The objectives of the company are to develop Ultra Mega and large scale solar plants including Solar Parks; own, operate, develop & manage both grid connected & off grid solar installations including Rooftops; take up energy access programs for rural and remote areas; test new technologies in Solar through pilot projects leading to commercialisation; exchange, distribute & trade power in furtherance of JNNSM goals and promote integrated power generation projects of Solar with conventional & renewable sources

Category: Others

Sub Category: Think Tank

Shakti Sustainable Energy Foundation

Shakti Sustainable Energy Foundation (Shakti) is a not-for-profit, section 25 company with its focus on supporting India's developmental and energy security objectives. encourage energy efficiency as well as the increased generation of renewable energy.

Appendix 4 Definition of Risks

Table 10: Risk Definitions

Risk Category	Definition	Specific Risk / Events
Country Risk	Political risk arising from operating in a foreign country including <ul style="list-style-type: none"> - Transfer Risk - Sovereign Risk - Political Risk - Exchange Rates - Inflation 	<ul style="list-style-type: none"> - Increase in taxes levied on the project - Import / Export duties - Change in regulation
		Foreign exchange rate changes due to devaluation, convertibility or transfer restrictions
Sponsor Risk	Commitment, competence and credit worthiness of investors.	Credit Risk
		Large level of investment/ long tenor of return
		Additional equity required later
Construction Risk	Timing, cost and performance of the project	Cost overruns
		Completion delay/ Abandonment/ Non-completion
		Project Specifications / Quality
		Force Majeure: <ul style="list-style-type: none"> - Sponsor changes order - Natural disasters - Political risk
		Land Availability
Technical risk	Cost, availability, environmental impact	Equipment Defect
Generation Risk	Power generation	Unsatisfactory plant performance
Off-taker Risk	Volume, price and demand of output, risk of non-payment	<ul style="list-style-type: none"> - Demand for power - Price of electricity (risk of nonpayment)
Financing risk	Risk of projects not achieving financial closure	

Appendix 5 Private Equity Deals in the RE space

Company	Investor	Segment	Value, Stake	Date	Rationale
Continuum Wind Energy	SunEdison Exit for Morgan Stanley	Wind	USD 600 mn	June 2015	Acquisition to increase the RE base in India.
Solar Arise	Core Infra (Kotak PE), Global Energy Efficiency and Renewable Energy Fund	Solar	USD 33 mn	Oct 2014	Growth, 1st Round
Atria Power	GE	Wind	USD 30-40	Jul 2014	Growth, 2 nd Round
Welspun Renewables	ADB, GE Energy	Solar	USD 24 Mn	April 2014	Investment in the operational Neemuch project
ReNew Power	GEF, ADB and Goldman	Wind	USD 140 Mn	July 2014	Growth
ReNew Power	Goldman Sachs	Wind	USD 135 Mn.	Jun.'13	Growth, 2 nd Round
Greenko	GIC	RE	USD 151 Mn, 19.5%	Mar.'13	Growth
BLP	DFJ others	Wind	USD 38 Mn, 34%	Oct.'12	Venture
Continuum	Morgan Stanley	Wind	USD 210 Mn. 51%	Jun.'12	Venture
ReNew Power	Goldman Sachs	Wind	USD 204 Mn	Sep.'11	Venture

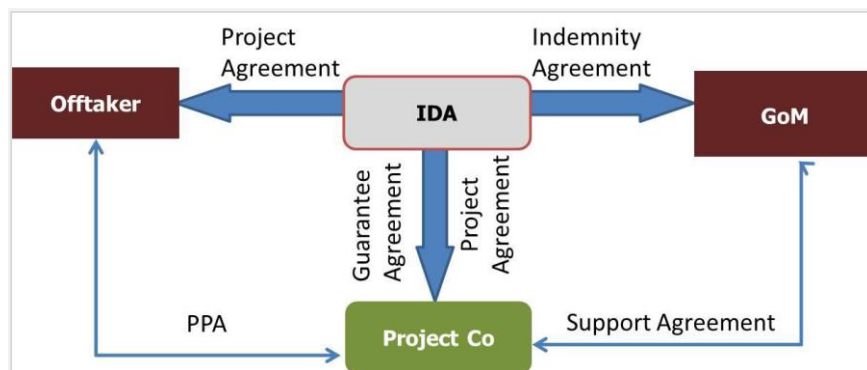
Appendix 6 World Bank Guarantee Facility in Maldives for the Solar Rooftop Programme

- Maldives SREP Investment Plan (2013-17) was adopted by Govt. Of Maldives in October 2012, as a critical plan to meet the policy priorities.
- ASPIRE (Accelerating Sustainable Private Investment in Renewable Energy) Program under the SREP aims to scale up from the present ~1.5 MW to over 35-40 MW of solar PV in the next 5 years.
- Key focus of this program is to create a project structure conducive for private sector participation, **which includes design of an appropriate project framework and agreements that result in making the project bankable and attractive to private sector.**

Security Structure

Security Structures	Description
SREP Escrow	<ul style="list-style-type: none"> ○ To secure project developer on payment default against monthly invoice. ○ Escrow account funded in advance to create standing payment security of 6 months' invoice payment. ○ To potentially provide cover on currency convertibility, if required.
IDA Guarantee	<ul style="list-style-type: none"> ○ To provide partial risk guarantee for Offtaker default or political Force Majeure termination. ○ Acts as a comfort for investors. Historically the projects partial risk guarantee instrument have rarely witnessed termination. ○ However, no cover for termination on investor default.

Structure and Features of IDA Guarantee



Features of the PRG

- Partial Risk Guarantee provides for guarantee of partial payment on termination, commensurate with the structured obligation rating profile.
- Currently structured to ensure IDA supported, pre-agreed USD based project IRR at any point of time.

- The PRG automatically falls off after tariff revenue provides for pre-agreed, IDA supported, pre-agreed project IRR, irrespective of PPA still being in force.

Appendix 7 Comparison of ADB & World Bank Guarantee Scheme

Context	ADB Loan Guarantee Facility	IDA Partial Credit Guarantee – Dasu Hydropower Project (Pakistan)
Indemnity by for the guarantee scheme	In the event where ADB makes a payment to the Guaranteed Lender, ADB will have recourse to the Borrower under a Counterindemnity. The Counterindemnity will contain customary representations and warranties, events of default and covenants. In case ADB makes payment to the Guaranteed Lenders in US Dollars (whereas the currency of the Guaranteed Loan was in INR), ADB's claim under the Counterindemnity to the Borrower will be converted to US Dollars.	The indemnity agreement was signed between Government of Pakistan (GoP) and the World Bank to cover the claim of the guarantee amount in case of default by the Pakistan Water and Power Development Authority (WAPDA). As the indemnity was with the sovereign government, there was minimal requirement of a counterindemnity. Any default in terms of payments will be covered by GoP in US dollars.
Guarantee Percentage and Demand Proportion	Up to 50% on a present value basis, effectively ²⁸ , over the duration of the Guaranteed Loan, but the actual percentage in any given year to be agreed between the Guaranteed Lender(s) and the Guarantor, subject to due diligence acceptable to the Guarantor on each Eligible Solar Power Project.	The guarantee amount was 25% of the total loan amount. This was not a first loss guarantee. WAPDA to pay IDA a Guarantee Fee of 0.75% on an annual basis on the present value of the Maximum IDA liability payable. Term is up to 20 years. The structure was covering annuity payments (principal amortization and interest) on a rolling "non-reinstable" basis to mitigate liquidity concerns of lenders.
Eligibility criteria for projects	Construction of a green field solar power generation plant in India that will be connected to the relevant state electricity grid at a voltage greater than 11-kV. Projects will utilize either solar photovoltaic (crystalline or thin-film) or concentrated solar thermal technology that has been installed and operational of equivalent capacity of <i>greater for at least 12 months prior to guarantee application date</i> .	It was not a program based PCG but a specific project level PCG, thus did not require an eligibility criteria for the beneficiary. Any lender funding the project was eligible for availing the guarantee facility since it was a prior arrangement done by the Government of Pakistan for WAPDA.

²⁸ The ratio of the net present value of guaranteed principal and accrued guaranteed interest in any particular period, over the principal amount, shall not exceed 50%.

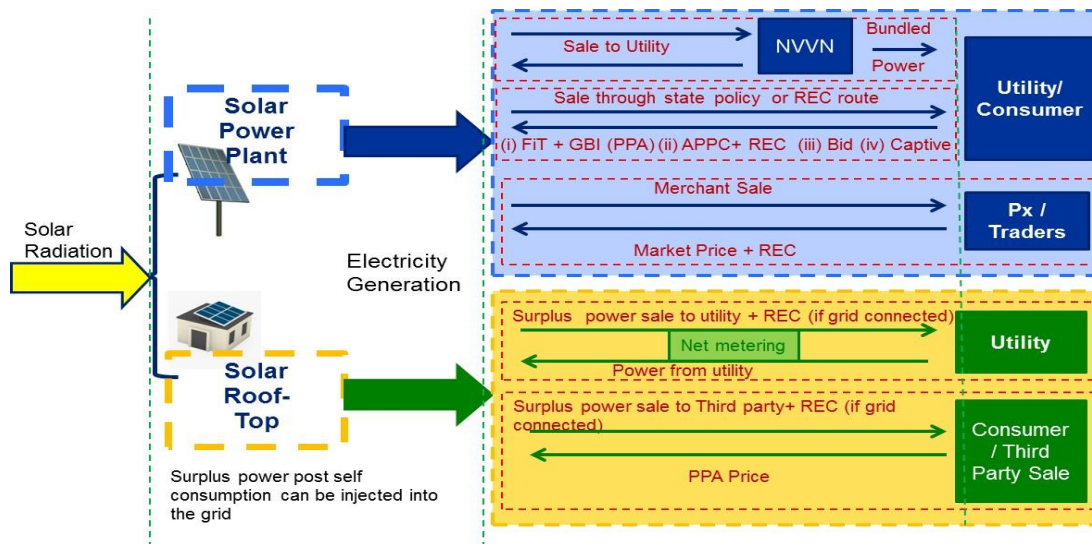
Context	ADB Loan Guarantee Facility	IDA Partial Credit Guarantee – Dasu Hydropower Project (Pakistan)
Acknowledgement Agreement	An acknowledgement agreement was to be signed between the developer, lender and the ADB in order to cover the counterindemnity by the project borrower.	An agreement was signed between implementer WAPDA, the World Bank and the lender.
Experience in Power Sector	Sponsor criteria of minimum three years' experience in non-conventional energy sector or conventional power generation sector	Sponsor criteria of minimum fifteen years' experience in non-conventional energy sector or conventional power generation sector

Appendix 8 Key Business Models and Current Financing Environment in the Indian Solar Market

Key Business Models

Various solar business models that exist currently in India are presented below.

Figure 1. Solar Power Business Models



Currently, project developers have set up projects under one of the above mentioned business models. All the above models have varying levels of risk v/s return matrix. The projects under the JNNSM itself have multiple models including the bundling of solar power with conventional power to be sold to the state distribution licensees, Generation Based Incentives (GBI) scheme where an incentive of ~INR 12/kWh was provided by IREDA, and Viability Gap Funding (VGF) where an upfront subsidy is provided to successful bidders. On the other hand, under the Gujarat Solar Policy, FiT based solar project have been set up where again the off-taker, GUVNL, has signed long term contracts at reasonably high tariffs. All these business models having long terms PPAs at pre-defined tariffs and have been more successful because they have long term revenue visibility.

The projects under various other policies such as Uttar Pradesh Solar Policy, Odisha Solar Plan and Punjab Solar Policy are stressed to achieve financial closure due to reasons such as poor health of distribution licensees, lack of solar radiation data, high project costs etc. However, the projects that have struggled the most in the current solar power market are the Renewable Energy Certificates (REC) and Open Access Contract based projects. The major hurdles that these projects face is the lack of price visibility and demand for high priced solar power. Many developers have burnt their hands post adoption of these (REC and Open Access) business models. In the following section, each of these business model is discussed in detail.

NVNV bundled power model

This model is employed in India's flagship JNNSM, under which bids were invited on a reverse bid basis. The reverse bids were to be at a discount to benchmark tariff as determined by CERC. Upon selection of developers based on reverse bidding, PPAs are signed between the developers and NVVN (off-taker). The off-taker further bundles the solar power with coal generated power from the unallocated quota of Ministry

of Power and sells it to various state DISCOMS. The solar power thus purchased goes towards fulfilling the Renewable Purchase Obligations (RPO) of the respective DISCOM.

An alternate within this model, is where NRVN has tied up with select states to undertake similar bids for those states. The capacity expected to come up under such arrangement is to be invested in the development of solar parks in the state. One of the key concern of the lenders in this alternate is towards credibility of Solar Park Implementing Agency (SPIA) that is expected to manage the land allotment and connectivity in the given time frame.

Viability Gap Funding Model

This mechanism was adopted for allotting projects in JNNSM Phase II, Batch I. Viability Gap Funding is a capital subsidy that bridges the gap between the project cost benchmarked by the regulator and the cost quoted by a developer. The tariff to be paid to the developer was fixed at INR 5.45 per unit for a project period of 25 years. VGF would be given on reverse bidding basis, wherein the developer had to quote the lowest VGF requirement. The upper limit for VGF is 30% of the project cost or INR 2.5 Crores/MW/ project, whichever is lower. The disbursements will be released by SECI based on milestone linked tranches. The challenges faced in the model are as follows:

- Since the complete VGF gets disbursed in first 5 years, lenders were quite skeptical of the long term performance of the project post 5 years of operations.
- The focus on cost reduction may disincentive the developers from using the best quality material for developing the project.
- Since PPA was signed between SECI and the developer at a fixed tariff of INR. 5.45/kWh and SECI in turn signed a Power Sale Agreement (PSA) with the states, lenders were wary of financing the projects, given the poor financial health of the DISCOMs.

Feed in Tariff

Under this scheme, the developers are offered a fixed FiT in the tariff for the duration of the PPA. Challenges in this business model are:

- The fixed FiT being offered, though provides long term financial clarity, there is a perceived risk wrt willingness to honor PPAs. For example, GUVNL had made representations requesting for re-determination of the feed-in tariffs on account of fall in the capital costs for solar projects. This was specifically for projects that got commissioned after March 2012.

Notwithstanding the above, the Feed-in tariff is a preferred model for developers as it provides long term visibility of the expected tariff. Recently, Telangana has asked developers to set up solar projects in the State at feed-in tariff of INR 6.54/kWh. Further, Tamil Nadu is also offering a tariff of Rs. 7.01/Kwh fixed by TNERC for projects to be set up under the feed-in tariff regime.

REC Mechanism

Under the REC mechanism there is a split in the green and electric component of the renewable energy generated. The green component of the energy generated can be procured by the obligated entities through Renewable Energy Certificates. These RECs are sold on the power exchanges. The electricity component is sold at average power pool cost (APPC), which is determined by the state regulators. While the model is well established internationally, it has not taken off in India. Following are listed the major hurdles in this business model:

- The floor and forbearance prices fixed by the CERC for the RECs were higher than the prices discovered through other models including reverse bidding. This limited the offtake of the RECs by the DISCOMs.
- Lack of enforcement of the RPOs has limited the incentive of the obligated entities to purchase green power. There is an oversupply of RECs on the exchange consequent to lack of interest from the procurers.
- The REC mechanism was recently modified and the floor price has been revised downwards. For the older RECs a vintage multiplier has been introduced. However, the impact of the changes needs to be seen.

Reverse bidding without bundling

Various states in India have released their respective state solar policies under which the developers are invited to participate in a reverse bidding based on a benchmark tariff. While this process is similar to JNNSM, there is no bundling of conventional power under these schemes. Key challenges in this business model is:

- Bankability of PPAs
- Challenges in obtaining of Debt Finance: For state like Uttar Pradesh, Bihar etc. due to perceived high off-taker risk, the developers face challenge in achieving financial closure.

SECI Rooftop Model

The SECI has been undertaking installation of rooftop PV in various states across the country over multiple phases. In the most recent phase of bidding, there were two models that were allowed for bidding:

Model A: Owner/CAPEX model

- Under this model the bidder is to bid on the expected capital cost investment for each state with a cap of INR 90/ Watt. SECI would provide a subsidy of 30% of the quoted project cost to the successful bidder. The capacity allocated is not limited to a single city in the state and can be split across the available capacity in various cities in the state. However, bidders can apply for only 50% of the capacity available in each state

Model B: RESCO model

- Under the RESCO model, a fixed subsidy of INR 2.7 crores per MW is provided and bidders are to provide year on year tariff for 25 years. Tariff quoted is then levelized with a discounting factor of 11% based on which the bidder is selected.
- The maximum allowed tariff is INR. 6.75 per kWh with tariff for the first 3 years not exceed INR. 6.00 per kWh and the tariff in successive years shall be equal or greater than the tariff of the previous year.

Under this model the key challenges faced are as follows:

- The rooftop space is not mature in the Indian context. The lenders are wary of funding rooftop projects upfront during the construction phase due to risk of roof structures, lease, quality of construction etc. Therefore, at times, the developer has to feed in 100% upfront equity for the same.
- Further, due to delay in subsidy disbursement, the cash-flows of the developers get impacted in the initial years.
- The interconnection point is located on the local DISCOM's network. There is a risk of loss of generation in case of an outage.

Net-metering based for solar rooftop

Under this model, electricity generated can be used for self-consumption and the excess power can be supplied to the grid. The key challenges in this model are:

- Due to lack of generation experience in rooftop projects and other associated risks such as availability of roof, off-taker risk, the banks would normally fund the project post commissioning implying 100% upfront equity investment during the construction phase.

Off-grid models

Off-grid is a fairly nascent segment in the solar space. There are no well-established business models in this segment. However, there are a number of models that are being tested for this segment. The 'pay as you go' model implemented by Simpa networks and Gram Power where consumers pay on pre-paid basis is one of the models being implemented in select districts in the country. Engagement of the community for operations and maintenance, rental model for solar appliances are other models that are being tried to enhance energy access in remote areas.

From the above, it can be seen that the Indian solar market offers multiple models to the developers to setup projects. Based on the risk and return perception of the developer, most suitable model can be selected.

Financing Environment

Grid Connected solar

Financing for grid connected solar segment in India is gradually maturing as lenders and investors have tested various business models and witnessed successfully operating projects. Further, the comfort is also increasing as projects are increasing in scale. However, most solar projects still continue to be financed through conventional capital structures, typically with 70 percent of project cost funded through term loans and balance through equity.

Debt

- Rupee based loans are typically raised from Domestic banks and Non-Banking Finance Companies. The tenure ranges from 8-12 years and interest rates are typically around 12-13%.
- Foreign currency loans are provided by development banks, export-import (EXIM) banks and international banks. While the interest rate offered is low, hedging costs increase the funding costs substantially.
- Structured finance is not widely used, however, there have been sporadic instances where quasi equity instruments have been used for raising funds by developers, especially from international sources.
- While project finance is increasingly becoming available, a significant part of debt financing is still on the basis of recourse to parent balance sheet or sponsor guarantees.

Equity

Equity has primarily been invested in projects by project sponsors. While, the private equity investment community is increasingly gaining interest in the solar segment, the challenge is to meet the investment hurdle rates. Given that equity IRRs are lean (approximately around 15-16%), the investment may not

meet the return criterion of most PE investors. Further, lack of scale is also a serious deterrent since investment ticket size reduces considerably and also exits from the investment could become a challenge.

Financing Off-Grid Solutions

On the off grid side, the lack of replicable and scalable business models and high perceived risks have limited the flow of commercial finance. These initiatives are usually self-funded or are supported by international financial institutions. There are some social venture capitalists/ impact investors which have supported off grid applications on account of the development contribution of such initiatives.

Key States Experience in Solar Sector Development

Andhra Pradesh

Targeted Capacity under state policy (MW)	5000 MW				
Installed Capacity (MW)	247.46 MW (as on 31.5.2015) [Source: MNRE]				
Break down of Installed Capacity (MW)	JNNSM	State Solar Policy	REC	Rooftops	CPSU
	85	115.01	37.7	0.52	10

Andhra Pradesh had a lukewarm start in adding solar capacities with the first tender for 1000 MW capacity receiving bids for only 350 MW. This was primarily due to the L1 bidding process introduced in this tender, in which all bidders had to match the lowest tariff quoted which stood at INR 6.49/kWh post the bidding process. In 2014 however, APTRANSCO invited bids for 500 MW of capacity which got an enthusiastic response from developers and led to an overbidding of 1291 MW capacity. The state came out with a new solar policy in February 2015 which has specific provisions and targets for capacity addition in solar parks, mandates for net/gross metering and deemed conversion of land to non-agricultural use for solar projects. The state has already initiated setting up of its first solar park and land for about 750 MW capacity has been identified. With an exhaustive policy in place, containing well defined targets and detailed modalities and with activity visible for solar park development, it is safe to assume that Andhra Pradesh will be one of the leading states in India in terms of solar capacity additions.

Karnataka

Targeted Capacity under state policy (MW)	2000 MW by 2021					
Installed Capacity (MW)	78 MW (as on 31.5.2015) [Source: MNRE]					
Break down of Installed Capacity (MW)	JNNSM	State Solar Policy	REC		Captive/Open Access	Feed-in Tariff Mechanism
	5	54.22	0		0	19
Year-on-Year Capacity Addition	2010-11	2011-12	2012-13	2013-14	2014-15	
	3	0	16	17	25	

Karnataka's first tender for 130 MW saw tariff bids of INR 5.5/kWh, the lowest ever seen in bidding under state/central solar policies. Following this Karnataka Renewable Energy development Limited (KREDL) did not sign the PPAs as it considered the bid not suitable. Another tender for 500 MW of capacity was announced in 2014 and the bid was oversubscribed with bid capacity equal to 1412 MW. The winning bid tariffs were in the range INR 6.71 – 7.12/unit. The projects are expected to be commissioned by the end of 2015. The new policy launched in 2014 provisions for waiving open access charges and provides government support for land identification and power evacuation. This will be a relief for some of the project development challenges that consume time in the project development lifecycle.

Gujarat

Targeted capacity under state policy (MW)	500 MW					
Installed Capacity (MW)	1000.05 (as on 31.5.2015) [Source: MNRE]					
Break down of Installed Capacity (MW)	JNNSM	State Solar Policy	Solar REC	Captive/Open Access	Feed-in Mechanism	Tariff
	20	974.05	6	0	0	
Year-on-Year Capacity Addition (MW)	2010-11	2011-12	2012-13	2013-14	2014-15	
	30	631.63	207.56	31.95	0	

Gujarat led the way in India for utility scale solar power. Even before the launch of JNNSM, Gujarat had a dedicated solar power policy in place by 2009. The policy targeted 500 MW of capacity and GEDA provided support in terms of land identification by building a land bank while power evacuation was provided by GETCO. Open Access charges have not been waived except cross-subsidy surcharge. Gujarat also saw building of India's first group of solar parks, amongst them Charanka solar park, second largest PV installation in the world. The total solar capacity in Gujarat stood a bit shy of 1 GW, at 901.14 MW by March 2013. This is the highest installed solar capacity amongst all states in India. Although Gujarat was expected to come out with a new policy in 2014, it appears that this has been delayed and the state is not expected to be active in new capacity additions in the coming months.

5.1.1 Rajasthan

Target (MW)	25000 MW capacity in next 10 years					
Installed Capacity (MW)	1047.1 (as on 31.5.2015) [Source: MNRE]					
Break down of Installed Capacity (MW)	JNNSM	State Solar Policy	Solar REC	Captive/Open Access	Feed-in Mechanism	Tariff
	789.1	25	193	40	1	
Year-on-Year Capacity Addition (MW)	2010-11	2011-12	2012-13	2013-14	2014-15	
	5	193.5	354.25	172.75	12.6	

Blessed with excellent irradiation and plenty of wasteland, Rajasthan is second only to Gujarat in terms of solar installed capacity. Rajasthan was the preferred destination for most of the developers during the JNNSM Phase 1. Although the Rajasthan utilities have been in poor fiscal health, concerns over bankability

of PPAs was allayed when in 2012 it was announced that RRECL would be the off-taker and also provide a Letter of Credit to developers. To further strengthen the PPAs, an escrow arrangement was setup in favour of the developer which would give the developer a part of the revenue of the utilities in case of default of Letter of Credit or non-renewal of LoC for the year. Rajasthan provides a single window clearance mechanism, which is followed in a time bound manner. Land acquisition process however, is a hurdle in Rajasthan as it is in other states of India, often consuming anywhere from 2 to 6 months of time. Another concern is related to lack of availability of land close to State Transmission Utility's substations. Despite these challenges, Rajasthan has been identified as one of the major states for development of solar parks and capacity addition under the solar park scheme is expected in the next 1-2 years.

Madhya Pradesh

Targeted capacity under state policy (MW)	No specific target mentioned					
Installed Capacity (MW)	563.58 (as on 31.5.2015) [Source: MNRE]					
Break down of Installed Capacity (MW)	JNNSM	State Solar Policy	REC Projects (Captive + OA included)	Non - REC (Captive/Open Access included)	Feed-in Mechanism	Tariff
	185.25	297.55	80.78	0	0	
Year-on-Year Capacity Addition	2010-11	2011-12	2012-13	2013-14	2014-15	
	0.1	2	34.9	310.2	6.38	

Madhya Pradesh has increasingly gained momentum for setting up solar plants. Madhya Pradesh was initially the host for projects under JNNSM Phase 2 Batch 1. In 2014 however, MP came out with a tender for 100 MW capacity which was oversubscribed to 676 MW and saw the lowest bid tariff of INR 6.47/kWh. Currently, NTPC is developing a 750 MW Solar Ultra Mega Power Plant (UMPP) where developers will be allowed to bid in blocks of 250 MW. 50% of the cost of this UMPP is being debt financed by IFC and the remaining 50% will be paid by the developers. The FiT offered will be INR 5/unit, the lowest in the country. The projects is likely to be commissioned by 2017. More state tenders for capacity are expected in this year.

5.1.2 Uttar Pradesh

Targeted capacity under state policy (MW)	500 MW by 2017					
Installed Capacity (MW)	72 MW (as on 31.5.2015) [Source: MNRE]					
Break down of Installed Capacity (MW)	JNNSM	State Solar Policy	REC	Captive/Open Access	Rooftop	
	12	59.26	0	0	0.61	

Uttar Pradesh kept modest targets in its solar policy of 2013 of about 500 MW by 2013. UP released a tender for 200 MW in 2013 out of which PPAs were signed for 110 MW. The exceptional aspect in this

bid was the PPA duration of 10 years, the lowest ever seen in the Indian solar context. The tender allowed for sale of power at APPC after the duration of ten years. This was preferred by most developers as 10 years is usually the tenor of their debt and a developer requires a steady cash flow during that time. Moreover, 25 years duration of a standard PPA is a relatively long and uncertain time from the developer's point of view. UP released another tender in 2014 for the remaining 300 MW of the 500 MW targeted capacity. The PPAs have yet to be signed. Although the government has provisioned for single window clearance and support in land acquisition, UP is still an untested ground and it is yet to be seen if it could become one of the more solar active states of India.

Tamil Nadu

Targeted capacity under state policy (MW)	3000 MW by 2015			
Installed Capacity (MW)	147.98 MW (as on 31.5.2015) [Source: MNRE]			
Break down of Installed Capacity (MW)	JNNSM	State Solar Policy	REC	Rooftop
	16	33.82	96.02	2.14

Tamil Nadu has had limited success in tapping into its high solar potential. This is primarily due to lack of policy clarity. The mandate of Solar Purchase Obligations on obligated entities was met with great resistance from several HT consumers as the SPOs would increase their electricity bills. This litigation has set back the implementation of the state's solar policy. The State Transmission Utility released a tender for 1 GW that had limited takers as it proposed L1 bidding with extremely short commissioning timelines and there were issues around developing power evacuation capacity. Currently, no new tenders are expected in the State.

Punjab

Targeted capacity under solar policy (MW)	3000 MW by 2022			
Installed Capacity (MW)	195.27 MW (as on 31.5.2015) [Source: MNRE]			
Break down of Installed Capacity (MW)	JNNSM	State Solar Policy	REC	Rooftop
	10.5	177	7.52	0.25

Punjab released a tender for 300 MW capacity addition in 2013. PPAs were signed for 250 MW of projects. About 50% of the developers who had signed PPAs were unable to acquire land for the projects citing exorbitant land prices. Land prices in Punjab have been an issue that have kept solar project development limited in the state. State government of Punjab has been trying to provision for leasing out vacant Panchayat land to solar project developers. Another tender for 250 MW has been issued in January 2015 which provides a major relief to developers in terms of exempting all fees related to change of land use. The RfP also exempts payment of any fee or stamp duty towards registration/ lease deed charges. The tender document also provides a list of agricultural lands where projects may be setup. These measures are shot in the arm for the developers and may create an active solar project development atmosphere in the state. The results and response of developers to these measures is yet to be assessed.

Appendix 9 Interest rates and other financing terms across different categories of lenders at the time of introduction of the Facility

Category	Prominent banks	Interest rates (with hedging costs where applicable)	Debt-equity ratio	Loan tenure (years)	DSCR expectation	Timeline for processing
Export Credit Agency	US EXIM	10.7% - 11.2%	Up to 80% based on value of imports	9 – 16	Approx. 1.45	5-6 months
Development Finance Institutions (DFIs)	OPIC	11.5-12%	25:75	9 – 16	Approx. 1.45	6-7 months
	ADB, IFC, DEG	10.7% - 11.2%	25:75	9 – 16	Approx. 1.45	6-7 months
NBFCs	L&T Infrastructure Finance Company, PFC, SBICAPS, IL&FS Financial Services, Mahindra Finance	12.25-13.00%	30:70	9 – 15	Approx. 1.35	2-3 months
Banks	SBI, ICICI Bank, Axis Bank, Yes Bank, IDBI Bank	13-14.5%	30:70	9 – 12	Approx. 1.40	3 months

(Source: Bankability and Debt Financing for Solar Projects in India, Bridge to India)

Please note: These are indicative terms available during the Phase I, Batch 2 of JNNSM

Appendix 10 Details of Background and Literature review referred to develop Hypotheses

In order to develop the hypotheses for the study, the KPMG team undertook background research, with the primary objective to understand (a) drivers for introduction of the Facility and (b) structure of the Facility. Literature was also reviewed to examine the environment in which the Facility was introduced. Environment refers to the financing, policy and regulatory environment that existed in the Indian solar sector at the time of introduction of the Facility. This was important to examine to understand the requirements/ needs of the market at the time the Facility was available.

The following documents were referred to understand the Facility:

- a) **Intervention Summary: UK-ADB Private Sector Guarantee partnership** – A DECC document, this presented the business case for UK Government to invest in to the Facility. The document also mentioned the eligibility criteria for loans to access the grant funding and the Facility
- b) **Report and Recommendation of the President to the Board of Directors: Proposed Guarantee Facility Solar Power Generation (India)** – ADB publication that presented the business case of ADB for introduction of the Facility
- c) **Annual Review for IND Solar Power Generation Guarantee Facility (January 2013)** – The document presented the initial findings of the reasons for lack of offtake of the Facility during the period of October 2011 to January 2013. This was one of the key documents referred that helped us develop the hypotheses.
- d) **Key Terms and Conditions for the India Solar Power Generation Guarantee Facility (Guarantee Facility)** – This was the term sheet prepared to facilitate the discussion of terms and conditions between ADB and commercial banks for the Facility. This document was important to understand the entire structure of the Facility, including the process of availing of the Facility.

Apart from the above the following publications were reviewed to understand the environment under which the Facility performed:

- a) **Enabling Low-cost Financing for Renewable Energy in India** - A study carried out by CRISIL Risk and Infrastructure Solutions Limited and supported by Shakti Sustainable Energy Foundation (2014)
- b) **Reenergizing India's Solar Energy Market through Financing** – A study done by Council on Energy, Environment and Water and Natural Resources Defense Council (August 2014)
- c) **Risk Assessment of Solar Power Generation Projects** – presentation by Mr Don Purka, Private Sector Operations Department, Asian Development Bank at the 2nd Asia Solar Energy Forum, Tokyo on 1-2 December 2010
- d) **Paving the Way for a Transformational Future : Lessons from Jawaharlal Nehru National Solar Mission Phase I** – An ESMAP and the World Bank publication (2013)
- e) **Bankability and Debt: Financing for Solar Projects in India** – Bridge to India (2013)

Appendix 11 Questionnaires referred during Consultations

Questionnaire for ADB

1. Concept

- a. What were the drivers that led to the concept of Solar Generation Guarantee Loan for India?
- b. Were the available financing options to the potential project borrowers analysed?

2. Consultation & Research

- a. What category of stakeholders' were consulted prior to the design of the scheme?
- b. When was the consultation process undertaken?
- c. Who were the stakeholders consulted during the consultation process?
- d. Who were the lenders who agreed to participate in the scheme?
- e. Who were the lenders who did not agree to participate in the scheme? What were the reasons quoted for not accepting participation in the scheme?
- f. Can the minutes of meetings for various stakeholders be shared?

3. Design & Structure

- a. When was the concept mooted?
- b. How much time was taken in designing the guarantee scheme for Indian Solar Market? When the design was completed (Date)?
- c. What were the risks that were identified to be addressed by the guarantee mechanism?
- d. How much time for taken for the approval of the design? When was it approved (Date)?
- e. Who would undertake the project appraisal to assess the eligibility of Guarantee?
- f. What was the risk assessment criteria for individual projects?
- g. Was an assessment of the Foreign Currency norms in India undertaken? What were the norms that were assessed?
- h. What were the basis for deciding the guarantee fees?
- i. How much concession was available on the overall fees (Guarantee Fees+ Commitment Fees+ Standby Fees+ Upfront Fees)?
- j. Why was the guarantee fees different for various capacity range in terms of MW?
- k. Since only 50% of the loan amount was guaranteed by ADB, in case of non-payment of instalments by the borrowers, post the waiting period the guarantees got triggered. In such a

case, how was the split of lender's rights being done to the related portion of the loan? Were there separate agreements prepared for split of rights?

- l. In case of Counterindemnity, ADB's claim to the Borrower gets converted to US Dollars. This would result into refinancing. Was an assessment of the Foreign Currency norms in India carried? Please provide us a copy of the assessment done.
- m. What was the process for termination of loan guarantee voluntarily by the lenders?
- n. Were there any separate agreements to be signed between the guarantor and the borrower?

4. Review

- a. What was the review process adopted by ADB for post-implementation assessment?
- b. Where there any adjustments done in the scheme post the January 2013 assessment?
- c. What were the outcomes of the review process undertaken in June 2013?
- d. What for the final terms and conditions that were discussed with L&TIF and Nord/LB? Please provide a term sheet for the same.
- e. How flexible was ADB to undertake changes/modify the scheme with changing market conditions?
- f. Why was the review process not undertaken more frequently with shorter time intervals between the two? These would have helped in assessing the market situation realistically.

5. Implementation Approach

- a. When were the final term sheets for negotiations approved?
- b. What were the terms not acceptable to the lenders?
- c. Was there any delay in signing the agreements? If yes, please provide the reason?
- d. How much would it normally take for a due-diligence process undertaken by ADB?

Questionnaire for Lenders (Domestic & Foreign)

1. How many solar PV projects have you evaluated during 2010-2013 for funding?

5 Projects 5-8 projects 8-15 projects more than 15 projects

2. How many of the above projects were sanctioned by you?

5 Projects 5-8 projects 8-15 projects more than 15 projects

3. Do you think there were enough solar deals available for you to finance during the 2010-2013?

Yes/No

4. What is your total portfolio capacity of solar project financed?

25 MW 25-40 MW 40-100 MW more 100 MW

5. What were the typical interest rates offered to developers by you during 2010-2013?

Less than 10% 10-11.5% 11.5-13% more than 13%

6. A. Was there a scope of reducing interest rates through concessionary financing instruments like risk guarantees?

Yes/No

B. How much reduction could have been offered?

Less than 0.5% 0.5-1% 1-1.5% more than 1.5%

7. How did you undertake the risk assessment for solar projects during 2010-2013 when there was limited experience in the solar power sector?

8. How would rate the degree of following risks for solar projects under JNNSM Phase 1, Batch – 1?

(Rate on the scale of 1 to 4, where 4 indicates high risk and 1 indicates low risk)

Technology Risk Political Risk Commercial/Contractual Risk Regulatory Risk Offtaker Risk Entity Risk

9. What are your views on the Solar Loan Guarantee Programme for India and its suitability for addressing the pricing risks perceived? Were you aware about the structure of the guarantee loan?

How have you funded the solar projects during 2010-2013?

Recourse Basis Non-Recourse Basis Both Recourse & Non-recourse

If non-recourse basis, how much capacity? _____

If recourse basis, How much capacity? _____

For those who were approached by ADB during consultation

10. When were you approached for consultation on the risk guarantee scheme planned by ADB?

11. Did you have a positive opinion about the ADB Guarantee Scheme for solar projects in 2010?

Yes/No

If yes, did you participate in the scheme?

If no, what were the key factors for resistance?

12. Were the terms and conditions for the guarantee mechanism discussed with you during the first round of consultation?

13. What were the terms and conditions that were not acceptable to you under the guarantee mechanism?

14. A. Were the cost of guarantee scheme too high for you to participate?

Yes/No

B. What should have been ideal cost of guarantees (Guarantee Fee + Commitment Fee + Upfront Fees + Stand by Fees) that would have been acceptable to you?

Less than 0.5% 0.5%-1% 1-1.5% 1.5-2%

C. What would have been the ideal interest rate that you would have offered with respect to the guarantee fees?

Guarantee Fees Reduction in % Interest Rates

< 0.5%

0.5%-1%

1-1.5%

1.5-2%

16. What were the warranties required from a lender under the Guarantee agreement to be signed with ADB?

17. How much time was taken for finalization of guarantee agreements after expressing intent for participation?

2 months 2-3 months 3-4 months 4-5 months

18. What were the major reasons for non-conclusion of signing the guarantee agreement?

19. Was the guarantee trigger period of 45 days post default in repayment acceptable?

Yes/No

20. Were the compliance requirement of ADB an issues in the delay of signing the guarantee agreement?

Yes/No

21. Was the paperwork involved in the complete process a reason for delay?

Yes/No

22. Was the process for termination of loan guarantee very complex for the lenders?

Yes/No

23. A. Were the project appraisal criteria of ADB timing consuming?

Yes/No

B. What should have been the ideal time for the same?

24. Was there enough time for the developers to wait for the guarantee agreements to be signed between the guarantor, lender and the borrower?

Yes/No

25. Was the process for demand of guarantee complex and time taking?

Yes/No

If yes, why do you think was if complex? _____

26. Were the changing market conditions and risk profile hampering the demand for guarantees?

Yes/No

What factors according to you were decisive? (Reducing prices, more financing options, better experience etc.?)

27. How flexible was ADB to undertake changes/modify the scheme with changing market conditions?

28. How much would average time was take for a due-diligence process undertaken by you during the initial Phases of JNNSM and Gujarat Solar Policy?

1 month 1-2 months 2-3 months more than 3 months

29. What is your assessment of the existing solar sector in India?

30. Do you have reservations in providing funding to solar sector?

Questionnaire for Developers (Domestic & internationals)

1. Would a loan guarantee for the solar sector incentivize developers in availing concessionary financing and investing in the solar sector?

Yes/No

a. During JNNSM Phase I, how would you rate the financing environment in India?

b. What were the key risks that impacted access to finance for Developers?

c. What would have the typical interest rates that would have been favourable to you during JNNSM Phase 1?

d. Were you aware about the ADB India Solar Power Generation Guarantee Facility programme available in the market during JNNSM Phase 1?

Yes/No

If yes,

a. Did you evaluate the Guarantee scheme against other available options while preparing for financial closure?

Yes/No

b. What all were the options that you had evaluated for financing your solar projects during 2011-12?

2. What was the minimal interest rate were offered by lenders for your solar projects during JNNSM Phase -1 and other state policy?

Less than 9% 9-10% 10-12% More than 10%

3. What are the most suitable options for you in terms of financing the solar project?

- Foreign Debt from Export Credit Agency (US Exim)
- Development Finance Institutions (DFIs)
- NBFCs (PFC, REC, SBICAPS etc.)
- Commercial Banks (SBI, Axis, ICICI, IDBI etc.)
- Others (Please specify _____)

4. How much capacity have you tied up through local debt and foreign debt?

Local Debt	Foreign Debt
<input type="checkbox"/> <25 MW	<input type="checkbox"/> <25 MW
<input type="checkbox"/> 25-50 MW	<input type="checkbox"/> 25-50 MW

- 50-100 MW 50-100 MW
- More than 100 MW More than 100 MW

5. A. How much time does a typical financial closure process take?

- 1 month 1-2 months 2-3 months greater than 3 months

B. How has it changed from 2010 to 2014?

6. Who were the lenders that have financed projects during JNNSM Phase 1 and other state policies prevailing at that time?

JNNSM Phase -1, Batch	JNNSM Phase -1, Batch	Gujarat Solar Policy
1.	1.	1.
2.	2.	2.
3.	3.	3.
4.	4.	4.

7. Do you think a solar generation loan guarantee would have given better boost to the solar power sector considering today's scenario?

Yes/No

If yes, Why?

If no, what changes do you think that need to be made in a guarantee scheme to make it suitable for Indian condition?

8. Under what kind of business models have you been facing issues in achieving financial closure?

- Central Scheme (JNNSM) State Scheme Captive/Open Access Model REC Mechanism

If State scheme, please specify. _____

9. Are you able to achieve financial closure on non-recourse basis for your solar project?

Yes/No

If yes, please specify the name of the lenders _____

If no, what amount of collaterals do you usually provide to lenders in terms of the overall percentage of the loan amount?

- 10% 20% 30% >30%

For those who are aware of the guarantee mechanism introduced by ADB

10. As per your opinion, what was the key reason that the Guarantee scheme did not take off?

11. Were the guarantee fees too high for a lender to finance solar projects at a concessionary rate?

Yes/No

If no, were the lenders hesitant in passing on the benefit to you?

Yes/No

12. a. Was the time taken for approval of guarantee agreement too much for a developer to evaluate and wait for the option?

Yes/No

b. How much time was taken?

1 month 2 months 3 months >3 months

c. Was limited time for financial closure an issue?

Yes/No

13. a. What were the terms of the agreement that a borrower was supposed to enter with the lender as well as the guarantor?

Yes/No

b. Were they acceptable? Yes/No

If No, what terms were not acceptable? _____

c. Were the conditions under the agreements for the developers too stringent?

Yes/No

14. In case of Counterindemnity, ADB's claim to the Borrower was supposed to be converted to US Dollars. This would result into refinancing. Was the foreign currency price risk a major factor for rejection of the mechanism? Yes/No

15. If a Guarantee product was introduced in the Indian market, what features would you ascribe to it?

16. What are the current gaps you see in the financing environment for solar sector?

17. What kind of product innovations can help address?

Appendix 12 Terms of Reference

Lesson Learning from ADB India Solar Power Generation Guarantee Facility programme

1. Objective

The overall objective of the assessment is to identify key lessons why the market failed to respond to the ADB India Solar Loan Guarantee Facility and to make recommendations for future programmes that might use similar innovative financing mechanisms.

2. Scope of work

The core tasks which must be undertaken to deliver against the objectives are:

Task 1: A literature review of the solar project financing landscape in India

An overview of the renewable energy market in India with a particular focus on solar

- What are the current profit margins for the local banks and what level of subsidy is optimal to ensure increased lending in solar projects?
- Analysis of the current risk return pricing (or lack of it) in Indian solar PV project financing and reasons for the low appetite for guarantee products. What are the reasons for the Indian market currently not pricing their finance loans according to the level of risks involved? An overview of existing regulatory hurdles (e.g., RBI) which are barriers for foreign lenders to issue guaranteed and pay claims in a timely manner;
- An overview of similarities and differences across the various States (the guarantee facility could cover projects in any State.)
- What are the conditions necessary to increase solar loans and where public intervention would be appropriate?

Assessment of acceptable risk in solar projects in India

- Is ADB's risk evaluation model robust in this market?
- Are there other sources that could have been used to gather information on this market?
- How likely is it that companies making deals in this market are not making sustainable deals?
- Is there still a body of potential deals that are not currently being signed, and that could be with a guarantee?

Task 2: Analysis of the programme design and preparation processes

- Based on findings from the literature review, was the project design relevant to the market it was targeting?
- To what extent the process by which the overall programme was designed was effective? Assessment of how DFID India, ADB and DECC worked together in designing the intervention.
- Were timings and paperwork significant factors in the project's failure? If so, why?
- Are there ways to streamline the paperwork needed to make these deals happen?
- Are there ways to streamline the project approval/setup process to make these deals happen?

Task 3: Lessons learned and recommendations for ways forward

- Is this project failure a fundamental failure to understand how guarantees work in the renewable energy sector, or is the issue specific to this country/sector/delivery partner/project? Would this project have worked in a different country?
- Would this project have worked in a different renewable energy market / region in India?
- Are the risks pricing issues that have been observed common across all Indian renewables sectors? Are these issues common across all regions in India?
- What lessons about risk mitigation/ credit enhancement can be applied to our related work in India and to guarantee products elsewhere (especially under the ICF).

The research will comprise a mix of qualitative and quantitative methods and will focus on process, research on the renewable energy market in India to identify the reasons for failure.

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