



ICRA Rating Feature

Rating Methodology for Solar Power Producers

This rating methodology describes ICRA's approach towards assessing credit risk of solar power producers. It aims to help issuers, investors and other interested market participants understand ICRA's approach to analysing risks that are likely to affect rating outcomes of the companies in the solar energy sector.

Overview

The overall solar energy based capacity installations on an all India basis have grown considerably from 10 MW as on March 2010 to 12,300 MW as on March 31, 2017. Share of solar energy-based capacity within the renewable energy (RE) segment in India has improved considerably from negligible levels as on March 31, 2010 to 21.5% of overall renewable energy capacity as on March 31, 2017.

The growth in the solar energy sector has been driven by a strong policy support both by the Government of India (GoI) under its National Solar Mission and by several states through state specific solar energy policies, regulatory support in the form of Renewable Purchase Obligation (RPO) norms and significant improvement in cost competitiveness of solar energy over the last five or six-year period.

- » The National Action Plan for Climate Change (NAPCC), released in June 2008 by the Government of India, suggested a roadmap for increasing the share of renewable energy purchase obligation (RPO) from 5% in FY2010 to 15% in FY2020. In January 2011, the National Tariff Policy was amended to prescribe solar-specific RPO to be increased from a minimum of 0.25% in FY2012 to 3% by FY2022. In January 2016, the GoI revised the solar RPO target from 3% to 8% by FY2022 so as to be in line with the revised solar capacity installation targets of 100 GW by FY 2022.
- » The Jawaharlal Nehru National Solar Mission (JNNSM) was launched in January 2010 by the Government of India with the target of achieving 22 GW of solar capacity by FY2022, which included 20 GW of grid connected solar power based capacity (including rooftop) and 2 GW of off-grid solar applications. In June 2015, the Union Cabinet approved the upward revision in the target for solar capacity additions planned by five times to 100 GW by FY2022. The targeted cumulative capacity by FY2022 comprises 40 GW grid-connected rooftop-based projects and 60 GW large and medium scale grid connected projects. For development of large and medium grid-connected solar capacity, the GoI has provided support essentially in two modes i.e. 1) mechanism of "bundling¹" of solar power with relatively inexpensive thermal power from the unallocated quota of CPSUs and 2) mechanism of providing Viability Gap Funding (VGF) to make available solar power at reduced price.
- » In order to promote grid connected solar rooftop and small solar power plants, the GoI has provided a Central Financial Assistance (CFA) scheme apart from a number of other benefits. The GoI gives a subsidy or a CFA of 30% of the benchmark capital cost of the grid-connected solar rooftop system to any establishment (other than commercial and industrial) setting up a solar rooftop plant.
- » In the same breadth, many states have also launched state-specific solar policies. Also SERCs in most states have issued regulations for the RPO. An enabling framework of Renewable Energy Certificate (REC) to ensure RPO compliance was introduced in January 2010 by the CERC and required REC regulations have subsequently been issued by the SERCs across most states.

In addition to favourable policy and regulatory framework, the capacity addition in solar energy sector has also been driven by an improving tariff competitiveness of solar energy which in turn is supported by the rapid fall in PV module price level over a three or four-year period till FY2017 and bidding process followed

¹NTPC Vidyut Vyapar Nigam Ltd (NVTN) was appointed as procuring agency which would 'bundle' the relatively costlier solar power with the unallocated power from coal-based stations of NTPC and sell the 'bundled power' to the Distribution Utilities (Discom), thereby reducing the overall purchase cost for the Discoms

for award of projects. Normative benchmark capital cost estimate for solar PV project by the CERC declined by 34% from Rs. 8 Cr./MW in FY2014 to Rs. 5.3 Cr./MW in FY2017. Further, with bidding process followed for award of solar projects by nodal agencies, weighted average competitively bid solar PV tariff has shown a decline from Rs. 6.5 /kwh in CY2014 to Rs. 4.9 /kwh in CY2016. In the bidding rounds held during January till May 2017 for award of solar projects in solar parks, the bid tariff has declined further to Rs. 2.44/kwh (being the lowest solar PV tariff as on May 2017). With the decline in capital costs, the dependence of the solar power sector on Government subsidies and preferential tariffs has also reduced gradually.

Rating Methodology

ICRA's rating methodology for solar power producers involves an assessment of the business risk profile, regulatory risk, financial risk profile and management quality. The rating approach outlined in this document is applicable for both greenfield project(s) as well as operational project(s) (either single asset or portfolio of projects). The list of rating drivers covered here is not exhaustive by itself, but provides an overall perspective of considerations that are usually the most important. For the sake of analytical convenience, the key rating drivers are grouped under the following heads:

- **Business Risk Assessment**

- For Projects**

- Permitting risk
 - Funding risk
 - Construction risk

- For Projects and Operational Entities**

- Operating risk
 - Demand risk
 - Counter-party credit risk
 - Force majeure risk
 - Evaluation of key contracts
 - Debt transaction structure

- **Regulatory Risk Assessment**

- **Financial Risk Assessment**

- **Management Quality**

Business Risk Assessment

Within the business risk assessment, only the Greenfield or expansion projects are exposed to permitting risk, funding risk and construction risk.

Permitting Risk

Permitting risk refers to a company's ability to secure all statutory clearances required for constructing and operating a power plant, as well as compliance with the applicable norms. While assessing permitting risk, ICRA evaluates progress on land acquisition and also examines the status of various clearances in accordance with the laws of the land, for the projects under implementation. Permitting risk for a Greenfield solar power project is relatively lower as compared with thermal or hydro-based projects, given the exemption from environmental and forest clearance (except in case of use of forest land). In case of the projects awarded in solar park which provides a developed land plot with clearances & associated infrastructure including grid connectivity, permitting risk is relatively lower as compared with that for a green-field project at location outside the solar park.

Funding Risk

The company's ability to tie up the requisite finances, status of the funding tie-up and capital structure mix are the focus of the analysis here. Given the capital intensive nature of the solar energy projects and the normative debt-equity ratio of 2.33 times as per the regulatory framework, such projects tend to have a high

leverage. The capital cost and capital structure is also evaluated, in terms of comparison with other solar energy projects of a similar size. The reasons for variation (if any) in the capital cost with other solar energy projects is assessed, which may be due to higher cost associated with the land and/or equipment configuration. The equipment configuration² in case of solar PV projects may vary depending upon ratio of DC (Direct Current) capacity & AC (Alternating Current) capacity and use of trackers³, so as to maximise the PLF level within the permitted level as per PPA terms. The average cost of debt and the currency in which it is denominated is also assessed. While equity would be arranged by the sponsor, the developer would be dependent on banks, financial institutions (FIs) and bond markets for debt funding. ICRA evaluates the extent of actual funding tie-up and the likelihood of the balance funding being available in time, so that project progress is not delayed due to lack of funding tie-up. Even though project finance is generally 'non-recourse' in nature, the strength of the sponsors is an important risk mitigant as it imparts financial flexibility in terms of funding cost overruns or meeting other contingencies.

Construction Risk

Construction risks refer to risks associated with the physical construction of a plant as well as stabilisation of its design operating parameters (which includes plant availability and plant load factor (PLF)) subsequent to commissioning. Delays in either can lead to time and cost overruns. Fixed-price, fixed-time contracts, with adequate clauses for liquidated damages (LD) are usually the mitigants against construction risk (essentially, the risk gets transferred to the Engineering, Procurement & Construction, or EPC, contractor). Unlike a wind power plant, the EPC contractor in a solar power plant is usually different from the OEM suppliers. The developer may either source the plant components such as modules, inverters or balance of system components on its own or may enter into a supply contract with the EPC itself, who then sources it on behalf of the developer. Many developers have also developed expertise and undertake EPC in-house. While assessing construction risks, ICRA takes into account the track record and experience of the EPC contractor in execution of solar projects. In all project ratings, ICRA carries out a sensitivity analysis to evaluate the impact of the delay in commissioning or in stabilisation of plant operations on the projected cash flows and debt-servicing ability. The LD clauses, which are a part of the contract with the EPC contractor, are also evaluated to assess their adequacy with respect to the loss of profits and/or liquidated damages payable by the developer to off-takers. ICRA also assesses the creditworthiness of the EPC, to the extent possible, and its ability to pay the LD charges to the developer in case the situation arises. The construction risk also covers the development of ancillary services such as development of internal roads, progress achieved on setting up of the evacuation infrastructure etc.

Operating Risk

The operating risks for a company arise from variability in solar irradiation, which affects the plant's PLF, which is vulnerable to variability in irradiation levels, and weather conditions at the project location. In case of an issuer with multiple projects at different locations, ICRA focuses on the extent of geographical diversity in the operations, which acts as a mitigant against resource variability risk to some extent. The generation also remains susceptible to the performance of the solar PV modules and other major equipment such as an inverter. ICRA evaluates the performance warranty terms provided by OEMs (i.e. of PV modules for solar PV projects; as well as that of solar concentrator & steam-turbine generator for solar thermal projects) as well as the track record of such equipment, especially the modules in Indian conditions to analyse the operating risk to solar projects.

While assessing the resource variability risk, ICRA considers the base case PLF in its financial projections in line with P-90 estimate of the energy yield assessment study. Only in cases where the operating track record is well established beyond three years, ICRA considers the actual PLF level as the base case assumption in the projections. For operational solar projects, ICRA analyses the actual performance

² DC-AC Ratio: Capacity contracted as per PPA is in alternating current (AC) form so as to be compatible with grid network. At module level, generation is in direct current (DC) form which is converted into AC form through an inverter. Higher DC-AC ratio by way of having higher PV module capacity allows the project to generate higher solar energy; however this ratio is required to be kept at optimum level (which varies between 1.1 to 1.4 times), depending upon the permitted level of PLF in PPA as well as availability of land at the project site.

³ Tracker: Tracker directs solar panels or modules toward the sun, by changing their orientation throughout the day to follow the sun's path to maximize energy capture.

(especially performance ratio, plant availability and PLF) and its variance against the P-90 and P-75 generation estimate as per the energy yield assessment study by the company's consultant.

Further, ICRA assesses the track record and experience of the O&M contractor in the solar energy sector. ICRA studies the O&M contract to assess the responsibilities of the contractor and the mitigants available such as LD clauses for any shortfall in plant availability or performance ratio beyond the guarantee level or higher-than-guaranteed reactive power import. ICRA also examines the track record of grid availability for the project and incidence of any grid availability issues in the region. ICRA also evaluates the clause of compensation for non-availability of grid in PPA and factors the benefit of such clauses in the financial projections suitably. In case of PPAs which do not have such clause for compensation due to non-availability of grid, the energy generation is suitably adjusted in the financial projections to factor in the grid unavailability for supply of electricity to off-takers, particularly in states where such an issue has prevailed and is likely to remain for a longer period.

Demand Risk

Demand risk is normally sought to be mitigated through the tie-up of a long-term power purchase agreement (PPA), which generally includes payment of tariff linked to the electricity units supplied by the solar power project. For assessing demand risk, ICRA evaluates the progress in tie-up of the long-term PPA, nature of the PPA, and the PPA provisions such as tenure, tariff, take or pay obligation, billing and payment security mechanism. ICRA also assesses the revenue model of the company, which is dependent upon the PPA tied up.

The various revenue models available for a solar power project include

- Sale of power at competitive bid-based tariff [with or without viability gap funding (VGF)] with power being sold directly to a distribution utility or to a trading company with back to back power sale agreement (PSAs) with distribution utilities or bulk consumers
- Sale of power to the state-owned distribution utility at the feed-in tariff rate approved by the SERC
- Sale of power at average power purchase pooled cost (APPC) to the distribution utility or at the mutually agreed tariff with a third-party or on the power exchange and availing RECs
- Captive consumption
- Sale of power to third party consumers at mutually agreed tariff under open access

Purely from a demand perspective, PPAs with Central or state government-owned entities are assumed to carry a lower risk as compared to privately negotiated PPAs.

Table 1: Revenue models for a solar power project

	Realisation	Remarks
A) Competitive bid based	tariff + AD	Most of the solar projects which have been commissioned recently or are under development are based on competitively bid tariff based model. The bidding may be lowest bid (L1) based in which bidders are asked to match L1, or based on reverse bidding in which the bidder who quotes the lowest tariff will be selected first and so on till the total aggregate tender capacity is reached. Bidding is thus based on the discount to be offered to benchmark tariff (as per SERC/CERC's guidelines). The benchmark tariff is mentioned separately for projects which avail and do not avail accelerated depreciation benefit.
	Tariff + VGF	Solar Energy Corporation of India (SECI) is the nodal agency under JNNSM for award of solar projects under Viability Gap Funding (VGF) framework so as to improve tariff competitiveness. Under VGF framework, bid parameter is the quoted amount of VGF subject to a ceiling and the base solar tariff payable to bidder is pre-determined. The bidder with the lowest VGF requirement wins the bid. In case VGF quoted is zero, bid variable is the discount offered to the base tariff. Thus, revenue for the winning bidders comprises of a) sale of power at pre-determined solar tariff or quoted tariff whichever is lower

	Realisation	Remarks
		and b) VGF. VGF is disbursed to the winning bidders, post commissioning of the projects as per the terms of VGF framework. As per VGF policy framework for award of projects under Batch III (2000 MW) of Phase II dated December 2015, only those developers who bid zero are allowed to receive accelerated depreciation benefit. For project awards under VGF as per Batch IV (5000 MW) of Phase II guidelines dated March 2016, no bidders are allowed to claim VGF and AD simultaneously.
B) Feed-in tariff	Feed in tariff	Feed-in tariff is a normative tariff approved either by SERC and/or CERC based on normative assumptions (i.e. related to cost parameters, PLF & the regulated return on equity).
C) Renewable Energy Certificate (REC)	There are 2 components in both the REC options, i.e. a) electricity component and b) solar Renewable Energy Certificate (REC) component. Solar REC pricing is discovered on power exchange, subject to floor & ceiling levels as determined by CERC.	
Option 1	APPC + Solar REC	Cost of Electricity component is average power purchase cost (APPC), which is notified by the SERCs. In states where APPC is determined differently from the CERC's notified REC regulations or there is a delay in APPC determination, ICRA views the business risk of the solar assets negatively. Extent of overall RPO (comprising of solar and non-solar RPO) compliance by the obligated entities remains the key driver for demand and has an impact on the REC price level (for both solar and non-solar REC). Weak RPO compliance has led to depressed REC price levels as well as significant rise in unsold REC inventory.
Option 2	Bilateral tariff with third Party / Spot Tariff on Power Exchange + Solar REC	Electricity component in this option is either the bilateral tariff contracted with a third party or the spot tariff by sale of power on the power exchange.
D) Captive or group Consumption		Generated power is consumed captively, with the twin objectives of availing AD benefit and a waiver on cross subsidy surcharge. Such projects remain exposed to regulatory risk arising from any restrictions imposed by the utilities in open access and/or increase in banking / wheeling charges by SERC.
E) Third Party Sale	Mutually negotiated as per terms of contract	Economics for solar projects with third party sales remain favourable especially in states with relatively high HT tariffs for industrial customers. However, such projects also remain exposed to regulatory risk arising from any restrictions imposed by the utilities in open access and/or increase in banking / wheeling charges by SERC.

While analysing the demand risk, ICRA evaluates the trajectory of the approved solar RPO for the off-taking entities and estimates the solar energy capacity required to meet the solar RPO target. ICRA also assesses the adequacy of the banking and wheeling arrangements with the state distribution utilities under the prevailing open access regulations by the SERC, for projects having PPAs with third party consumers or for captive consumption. For projects availing the REC benefit, ICRA evaluates the solar REC sale trends and price movement on the power exchanges. Further, in case of projects selling power at APPC rate, the delay in determination or deviation from the CERC's regulations for determining APPC increases the business risk of the solar assets. ICRA continuously observes the regulatory and policy environment for any amendments or new developments that may impact the implementation of the REC, the RPO and the open access framework.

Though solar-based energy generation is allowed as a 'must run' principle under the Indian Electricity Grid Code, there have been back-down restrictions imposed by the utilities in the past in a few cases. ICRA assesses the cost competitiveness of the solar energy tariff with the cost of power purchase from

alternative sources for the off-taker. Solar power projects with competitive cost of generation can also explore other avenues for sale of power, especially in states with relatively high tariffs for HT industrial customers. However, such projects also remain exposed to regulatory risk arising from any restrictions imposed by the utilities on open access and/or increase in open access charges by the SERC.

Counter-party Credit Risk

In assessing counter-party credit risk, ICRA evaluates the financial position of the counter-party, track record of payments and the strength of the payment security mechanism (PSM). State-owned distribution utilities, being the key obligated entities to meet solar RPO norms, are off-takers for solar power producers in most cases. The PSM in PPAs with these utilities usually comprises letter of credit (LC) for an amount equivalent to one month of billing. In addition to the payment security mechanism, ICRA also examines the key clauses in the PPA such as for events of default, force majeure events, and the termination event. ICRA also assesses the availability of right for third party sale of power for the project, in case of delays exceeding a certain limit. However, in case of PPAs with multiple utilities, the diversification in the counter-party risk is factored into the rating. While the credit quality of a state-owned distribution utility is linked to the intrinsic credit quality of the state government, ICRA assesses the distribution utility's financial position in terms of trends in cost coverage ratio, periodicity and adequacy of tariff revision with respect to cost of supply as well as trends in operating efficiency metrics.

For projects where PPA is signed with an intermediary procurer such as NTPC Vidyut Vyapar Nigam (NVVN) or Solar Energy Corporation of India Ltd (SECI) which are the nodal agencies under NSM and in turn sign power supply agreement (PSA) with the ultimate off-takers being state-owned distribution utilities, ICRA examines key clauses under the PSA in addition to the same in the PPA. Further, ICRA evaluates and suitably factors in the policy benefits available while assessing the counter-party credit risk of discoms such as a) provision for payment security fund supported by budgetary allocation from the MNRE under the policy framework, b) bundling mechanism benefits for projects having PPAs with NVVN, which in turn improves the cost competitiveness of the bundled power from discom's perspective due to bundling of solar power with thermal power in predetermined ratio, and c) benefits available to the SECI, which is covered under the tri-partite agreement⁴ with the RBI, state governments and the Government of India so as to ensure timely payments under the power supply agreements between the SECI and state discoms for supply of power.

In case of PPAs with third party customers, ICRA also assesses the counter-party credit risk by evaluating the financial position of such off-takers. In case of operational projects, ICRA focuses on timeliness in cash collections from the off-takers and the extent of compliance of PSM in line with the terms of the PPA. Realisation of payments within PPA stipulated timelines from the off-takers is viewed positively by ICRA. For under-construction projects, ICRA analyses the track record of payments by the off-taking utility to other IPPs.

Force Majeure Risk

Like any infrastructure project, solar power projects are also vulnerable to force majeure events, given the single-asset nature of their operations. While this risk relates to the expected loss in the event of a default rather than the probability of a default, the presence of force majeure clauses in the PPA limits the company's liability arising from non-performance or underperformance. ICRA examines if, and the extent to which, the force majeure risks are mitigated through insurance contracts or by specific provisions in the PPA that cover such eventualities. The strength of these mitigants influences the overall financial flexibility of the company.

Evaluation of Key Contracts

ICRA analyses the key contracts involved in development and operation of the solar power project including EPC / equipment supply agreements, O&M contract, PPA and common loan agreement to ensure that all risks have been identified and allocated amongst the project participants.

⁴ SECI is a beneficiary of the tripartite agreement (TPA) between Government of India, State governments and Reserve Bank of India (RBI) which ensures a payment security mechanism for supply agreements between Central PSUs such as SECI and state discoms.

Debt Transaction Structure

ICRA reviews the debt transaction structure to evaluate features available to provide additional protection to the lenders / bond holders. This could include the cash flow waterfall mechanism, creation of reserve funds for debt servicing, stipulation on minimum coverage ratios that must be met before payment to subordinate debt holders or declaration of dividends, credit enhancement features like cash collateral for payment of interest during construction period, completion guarantees by sponsors and guarantee for debt servicing by other external entities, restriction on the ability of the project company to take on additional debt and / or capital expansion without the approval of the lenders / bond holders etc.

Regulatory Risk Assessment

While assessing regulatory risk, ICRA focuses on the trends in solar RPO norms and preferential tariffs for solar power producers, given that a favourable regulatory framework remains one of the key drivers for capacity addition in the sector. Weak RPO compliance by obligated entities coupled with inconsistencies in the RPO norms by the SERCs adversely affect the demand for renewable energy including solar power. The weak RPO compliance also affects the demand for the RECs, in turn affecting the projects based on the REC route. Also, any constraints in allowing open access and banking arrangements and increase in open access charges pose regulatory risks for solar power projects, which are based on third party sale / captive consumption. ICRA further assesses the extent to which solar RPO norms laid out by the SERC vary against the suggested levels under National Plan for Climate Change and by the Ministry of Power, Government of India, actual solar RPO compliance by the obligated entities and also, enforcement measures by the SERCs for shortfall in solar RPO compliance. ICRA also assesses the impact of the scheduling and forecasting mechanism approved by CERC/SERCs, given the variable and intermittent nature of generation by solar power projects and the limited track record and experience of the Indian solar energy players in forecasting with the required accuracy. Further, given that state-owned distribution utilities remain the key off-takers in most cases, ICRA focuses on regulatory risks in the distribution sector pertaining to the risk of delay in the tariff determination process, risk of inadequate tariffs in relation to the cost of supply and/or risk of non-implementation of any tariff order due to litigation, which can impact the financial position of the state-owned distribution utilities.

Financial Risk Assessment

The financial risk analysis is related to assessing the ability of a company to generate sufficient cash flows to meet its debt-servicing obligations and is influenced by the degree of financial leverage in relation to cash flows. In order to assess the company's financial position, trends in profitability, gearing, coverage, liquidity and adequacy of future cash flows are analysed. These are discussed below.

Profitability: Given the single part nature of the tariff, the revenue profile for a solar power project remains sensitive to the level of energy generation, which in turn depends upon the solar irradiation/ weather pattern at the project location. Any adverse variation in weather pattern/solar irradiation availability has an impact on the generation, which in turn has an impact on the company's revenues and cash accruals. Given the capital intensity of the project and low operational expenses, the rating methodology focuses on return indicators (IRR) instead of profitability indicators. ICRA assesses the project IRR in relation to the company's weighted average cost of capital.

For projects based on regulated tariffs, returns remain dependent upon their ability to ensure both the actual costs and PLF within the normative benchmarks. For projects based on the REC route, returns remain exposed to the market risks associated with the REC demand and pricing. ICRA evaluates the extent of cash flow mismatches for such projects, if the RECs remain unsold.

For projects based on competitively bid tariff, returns remain critically dependent upon the project developers' ability to ensure the PLF level, the capital cost as well as other operating and financing costs in line with bid assumptions in quoted tariff.

The various ratios which are typically used by ICRA to analyse a company's profitability are:

Ratio	Computation
Operating Profit Margin	(Operating Profit) / (Operating Income)
Net Profit Margin	(Net Profit after Tax) / (Operating Income)
Return on Capital Employed	(Profit before Interest and Tax) / (Average Capital Employed)

Operating Income = Revenues from Operations (net of excise duty)

Operating Profit = Profit before Depreciation, Amortization, Interest, Tax and Non-Operating or Non-Recurring Income and Expense

Capital Employed = Total Debt + Net Worth + Deferred Tax Liability – Capital Work in Progress – Capital Advances

Gearing & Coverage Indicators: As solar energy projects are capital intensive, the extent of leveraging for these companies is inherently high. ICRA compares the capital cost and leverage of a project with those of its peers as well as with the normative benchmarks to assess its relative position. Generally, a conservative leverage ratio is viewed favourably as it reflects a lower quantum of committed outflows, while a long maturity profile and lower cost of the loans can partially offset the risk associated with a high financial leverage. The debt coverage indicators that are examined include interest coverage ratio, ratio of net cash accruals to Total Debt and debt service coverage ratio (DSCR). ICRA also evaluates multiple scenarios to assess the average DSCR over the debt repayment period as well as the project IRR with the key sensitive variables, which include project cost overrun, PLF, panel degradation and cost of debt (only for average DSCR) for projects selling power through the feed-in tariff route or competitive bid route. In case of projects adopting the REC route, additional sensitivity factors include the trends in APPC / bilateral / spot tariff rates and realisation of the REC. Further, in case of solar power projects selling power to third party consumers, additional sensitivity factors include open access charges and HT grid tariff of the counter-party consumer, as approved by the SERC.

The various ratios which are typically used to analyse a company's coverage metrics are:

Ratio	Computation
Interest Coverage Ratio	(Operating Profit) / (Gross Interest expense)
Debt Service Coverage Ratio	(Net Profit After Tax + Gross Interest + Depreciation) / (Gross Interest + Repayment + Dividend on Preference Shares)

Liquidity & Financial Flexibility: For a company with an operational project, ICRA assesses liquidity by analysing the trends in cash collections from the counter-party, availability of cash DSRA, trends in working capital limit utilisation as well as the extent of dependence on short-term debt to meet the working capital requirements. ICRA further evaluates the company's relationships with banks, financial institutions and other intermediaries, its financial flexibility — as reflected by its unutilised bank/credit limits, liquid investments - as well as the financial strength of the promoter group to infuse funds to meet cash flow shortfall, if any.

Adequacy of Future Cash Flows: Since the prime objective of the rating exercise is to assess the adequacy of the company's debt-servicing capability, ICRA draws up projections on the likely financial position of the company under various scenarios. Future cash flows are projected after taking into account the tariff, PLF (based on P-90 estimate in the base case scenario), O&M cost as per the contractual terms with the O&M contractor, interest cost, debt repayment schedule, working capital requirements and other funding requirements related to expansion (if any). These cash flows are then used to determine the company's future debt-servicing capability. ICRA also analyses other ratios such as fund flow from operations (FFO) to Total Debt and retained cash flows (RCF) to Total Debt. Further, ICRA evaluates the breakeven PLF for the project over the debt-servicing period and compares it with the estimated PLF as per solar resource assessment study for a greenfield project and with the actual PLF in case of an operational project, to determine the cushion available from a debt-servicing perspective.

The various cash flow measures assessed by ICRA are:

Cash flow measures	Computation
Fund Flows from Operations (FFO)	Operating Cash Flows less Operating Working Capital Changes
Gross Cash Flows (GCF)	FFO plus Non-Operating Income less Non-Operating Working Capital Changes
Retained Cash Flows (RCF)	GCF less Dividends Paid

Track record of debt servicing: ICRA also takes into account the past debt servicing track record, which is not only indicative of the operational and financial strength but also the overall credit culture of the company.

Tenure mismatches, and risks relating to interest rates and refinancing: Given the capital intensive nature of operations for solar power projects, ICRA views a longer debt maturity profile and ballooning repayment structure positively. Dependence on short-term borrowings to fund long-term investments can expose a company to significant re-financing risks, especially during periods of tight liquidity. The existence of adequate buffers of liquid assets/ bank lines to meet short-term obligations is viewed positively. ICRA also evaluates the impact of movement in interest rates on the debt coverage indicators of the project.

Foreign currency-related risks: The foreign currency risk can arise from unhedged foreign currency liabilities pertaining to funding of capital expenditure and/or working capital. The focus here is on assessing the hedging policy of the company concerned in the context of its PPA with the off-takers.

Accounting quality: Here, the accounting policies, notes to accounts and auditors' comments that are part of the annual report are reviewed. Any deviation from the Generally Accepted Accounting Practices is noted and the financial statements of the company are adjusted to reflect the impact of such deviations. In case of solar power projects adopting the REC sale route, the accounting policy related to unsold RECs is evaluated and suitable adjustments are made in the financial statements.

Contingent liabilities/ Off-balance sheet exposures: For this, the likelihood of devolvement of contingent liabilities/ off-balance sheet exposures and the financial implications of the same are evaluated.

Management Quality

All ratings necessarily incorporate an assessment of the quality of the company's management, as well as the strengths/weaknesses arising from the company being a part of a "group". Also of importance are the company's likely cash outflows arising from the possible need to support other group entities, in case the company is among the stronger entities within the Group. Usually, a detailed discussion is held with the company's management to understand its business objectives, plans and strategies, and views on past performance, besides the outlook on the (company's) industry. Some of the other points assessed are:

- Experience of the promoter/management in the line of business concerned
- Commitment of the promoter/management to the line of business concerned
- Attitude of the promoter/management to risk taking and containment
- The company's policies on leveraging, interest risks and currency risks
- The company's plans on new projects, acquisitions, expansion, etc.
- Strength of the other companies belonging to the same group as the company
- The ability and willingness of the group to support the company through measures such as capital infusion, if required

Summing Up

ICRA's credit ratings are a symbolic representation of its opinion on the relative credit risk associated with the instrument being rated. This opinion is arrived at following a detailed evaluation of the company's business and financial risks, likely cash flows over the life of the instrument being rated and the adequacy of such cash flows vis-à-vis its debt servicing obligations.

As this note highlights, for solar power projects, project risks assume importance during the implementation phase, while post-COD, it is the adequacy of cash flow generation vis-à-vis the debt servicing commitments that primarily influence the rating. As revenues and cash flows for a solar power project remain sensitive to the level of electricity generation and tariff tied-up under the PPA, various scenarios are drawn up to assess the impact of key variables on the debt-servicing metrics. While key sensitive variables vary depending upon the revenue model of the project, most commonly used are capital cost, tariff, PLF and interest rate for solar energy projects. While the financial projections enable ICRA to assess the adequacy of cash flows from the debt servicing perspective, the rating assigned is also dependent upon the strength of the sponsors and the track record of the sponsor group in power project development and operations.

Glossary

Key Terms	Definition
Average Pooled Purchase Cost (APPC)	The weighted average pooled price at which the distribution utility has purchased the electricity including cost of self generation, if any, in the previous year from all the energy suppliers long-term and short-term, but excluding those based on renewable energy
Accelerated Depreciation	The AD benefit is available at 80% of project cost for projects commissioned till March 31, 2017. For projects commissioned thereafter, the AD benefit will be lower at 40%.
Cost Coverage Ratio for a Discom	Annual Revenue Realisation (ARR) / Average Cost of Supply (ACS) ARR = Cash Collection inclusive of subsidy receipts / Units Sold ACS = Total expenditure / Units Sold
IPP	An IPP is a non-state utility, which owns and operates a power generation project for sale of power to discoms
Plant Availability Factor (PAF)	PAF for a generating station means the average daily declared capacity of the power plant as a percentage of the installed capacity less auxiliary consumption
Preferential or Feed-in Tariff	Tariff determined by the SERC for sale of electricity generation from a renewable energy project to the state distribution utility
P90 PLF	P90 estimate of generation is the generation which a solar plant is 90% likely to produce over an average year.
Renewable Purchase Obligation	Obligation of an entity (distribution utility, open access consumers and captive power consumers) to purchase a proportion of their electricity consumption from renewable sources of energy as per the notified regulations by respective SERCs
Renewable Energy Certificates	RECs have been designed to address the mismatch between availability of renewable energy sources and the requirement of obligated entities to meet their RPO, given that renewable energy sources are concentrated in few states. One REC is equivalent to 1 MWh of electricity. Renewable energy generating companies shall be eligible for issuing and trading RECs, subject to conditions notified by CERC. The obligated entities can purchase RECs on the energy exchange towards meeting their RPO target.



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