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INDIAN RENEWABLE ENERGY SECTOR

Solar power tariffs reach a new low - driven by a decline in module prices, softening interest rates and expectations of a higher PLF level

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SOLAR POWER TARIFFS: BREACHING THE 2.0 RUPEE TARIFF BARRIER & THE WAY FORWARD

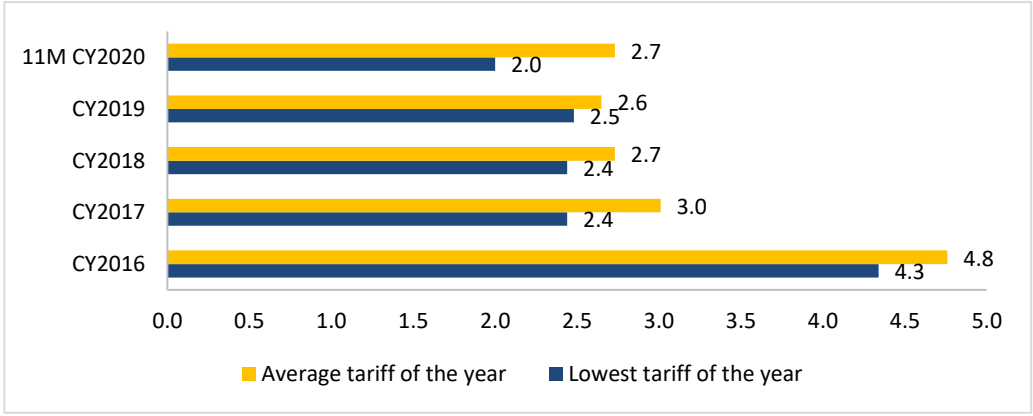
Apart from module prices and interest rates, the tariff decline is supported by the use of high-efficiency modules, better radiation levels in Rajasthan and expected timely signing of PPAs by the SECI

Improving tariff competitiveness to further support the capacity addition in the solar power segment

The solar power bid tariff reached a new low of Rs. 2.0 per unit in the reverse auction held on November 23, 2020 by the Solar Energy Corporation of India Limited (SECI) for setting up 1070 MW solar power capacity in Rajasthan under the Tranche III bid. This tariff has declined by 15% from the previous low of Rs. 2.36 per unit discovered in the reverse auction held by the SECI in June 2020 under the Tranche IX ISTS (inter-state transmission system) bid. The solar power sector breached the Rs. 5.0 per unit tariff for the first time in November 2015 and thereafter took 18 months to breach the Rs. 3.0 per unit tariff in May 2017. The tariffs have largely remained in the range of Rs. 2.4-3.0 per unit over the past 30 months. The solar sector is now closer to breaching the Rs. 2.0 per unit barrier.

The sharp decline in the solar power tariff in the latest bid is driven by a mix of factors including the expectations of a further decline in module prices, lower cost of debt and expectations on higher energy yield aided by the use of high-efficiency modules and/or trackers as well as relatively better radiation levels in Rajasthan. Moreover, the availability of power sale arrangement with Rajasthan discoms under this bid (based on industry sources) provided the developers an assurance of a timely signing of power purchase agreements (PPAs) with the SECI. However, the final tariff for the discoms could witness an increase depending on the clarity on extent of basic customs duty (BCD) on imported PV modules and/or extension of the safeguard duty (SGD) on imported PV modules beyond July 2021, as developers would claim additional tariff to compensate for the same under the change in law. The draft PPA includes a provision to provide relief to developers in case of a change of law at the rate of 0.5 paise per unit for every Rs. 1 lakh increase or decrease in project cost, which is a positive for the developers. The draft terms of the PPA under the 1070 MW SECI bid are provided in the Annexure.

Exhibit 1: Trends in year-wise lowest and average solar power bid tariffs



Source: ICRA research, SECI, State discoms, MNRE

The tariff discovery in the latest solar auction by the SECI however contrasts with the expectation expressed by the participants (constituting developers and financers) in ICRA's recent webinar on renewable energy (RE) sector held on November 19, 2020. As shown in Exhibit 2 here, most participants expect the tariffs to remain at around Rs. 2.5 per unit over the next two to three years and only about 11% of the participants expect the tariffs to fall below the Rs. 2.0 per unit mark. Similarly, on the installed RE capacity by December 2022, about 44% of the participants expect the RE capacity to be in the range of 110 – 130 GW by December 2022 and another 38% of the respondents expect the RE capacity to be in the range of 130-150 GW. Only about 6% of the participants expect the sector to meet the Government's target of 175 GW by December 2022.

Exhibit 2: Poll results on solar power tariff movement over the next two-three years from the participants of ICRA's webinar on RE sector

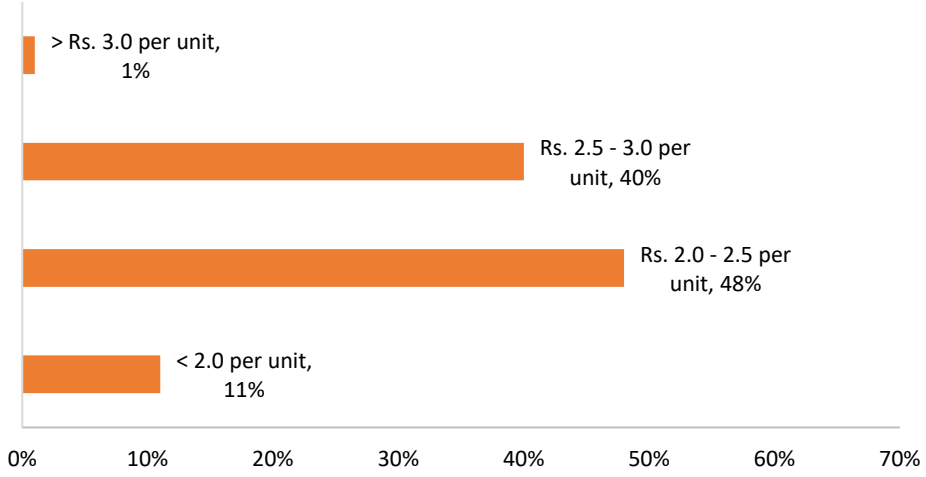
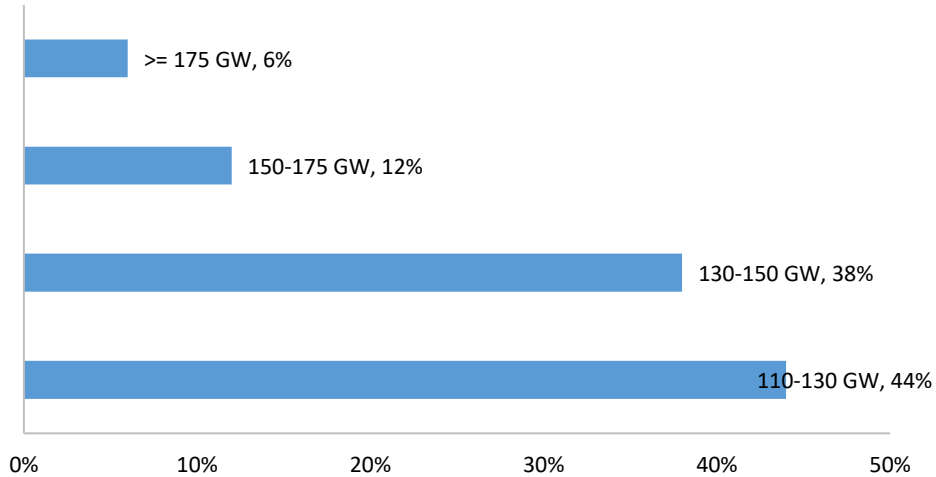


Exhibit 3: Poll results on expected RE capacity by December 2022 from the participants of ICRA's webinar on RE sector



Source: ICRA research

The solar power tariffs thus remain highly competitive for the utility off-takers against the conventional sources like coal, gas and nuclear power projects. Additionally, tariff competitiveness is also aided by the waiver of ISTS charges which is applicable for solar, wind and hybrid projects to be commissioned till June 2023. In addition, the solar power projects remain favourably placed with a relatively much lower construction period in comparison to the thermal and hydro power projects, which are exposed to significant execution-related risks. Moreover, the tariff discovered in the auctions, for supply of round the clock (RTC) power by RE projects blended with the storage, with a levellised tariff of Rs. 3.6 per unit is highly competitive against the cost of generation for thermal and nuclear power projects. The cost of generation from the conventional sources is impacted by the rising capital and fuel costs. A successful demonstration of the RE projects blended with storage (battery, pumped hydro etc) for RTC supply would also address the issue of intermittency associated with RE generation. In contrast to the decline in solar power tariffs, the wind power tariffs have been on an increasing trend because of the execution challenges witnessed and the lack of any meaningful reduction in capital costs. Nonetheless, the wind power tariffs remain below the Rs. 3.0 per unit and are competitive against the conventional sources.

VIABILITY OF THE TARIFF TO DEPEND UPON MODULE COST AND INTEREST RATES

The viability of the competitively bid-based solar tariffs remains critically dependent upon the capital cost, the availability of long tenure debt at cost competitive rates and the PLF level. With the use of imported PV modules by most developers, the capital cost remains exposed to volatility in PV module price level and rupee – US dollar exchange rate. At the prevailing module price level of 18-19 cents per watt (for high efficiency modules) and USD-INR exchange rate of 75, the developers would have to secure debt funding at less than 9.0% and achieve AC PLFs of 27.8% (assuming DC PLF of 18.5-19.0% & AC-DC ratio of 1.5 time) for reasonable returns. A further decline in the module prices would improve the project viability and returns to the developers. The Government is proposing to impose BCD on imported PV modules. While clarity is awaited on the timing and quantum of the BCD, the winning developers would have to claim the same through additional tariff under change in law in case of any imposition of BCD. Similarly, the extension of SGD beyond July 2021, say at 15%, would increase the levellised tariff by about 14-15 paise per unit at the prevailing module prices.

The viability of the Rs. 2.0 per unit tariff remains linked to the movement in module prices, cost of debt, debt tenure and the solar radiation level at the project location.

As seen from the Exhibit 4 here, the tariffs would remain viable at a module price level of 17-18 cents per watt or below and interest rates of below 9.0%. The ability of the developers to secure funding at rates below 9.0% over a long tenure remains important.

For every 2 cents variation in the module prices, the DSCR metric is estimated to vary by 6-7 basis points. While the use of high efficiency modules and trackers would increase the capital cost, the higher energy yield is expected to support the incremental cost.

Exhibit 4: Sensitivity of cumulative DSCR for a solar power project to module price and interest rates at the bid tariff rate of Rs. 2.0 per unit

		Module Price ($/Watt)					
		0.15	**0.17**	**0.19**	**0.21**	**0.23**	**0.25**
Interest rate on project debt	**7.5%**	1.46	1.38	1.31	1.25	1.20	1.15
	8.0%	1.42	1.35	1.28	1.23	1.17	1.13
	8.5%	1.39	1.32	1.26	1.20	1.15	1.10
	9.0%	1.36	1.29	1.23	1.17	1.12	1.08
	9.5%	1.33	1.26	1.20	1.15	1.10	1.05
	10.0%	1.31	1.24	1.18	1.13	1.08	1.03

Exhibit 5: Sensitivity of project IRR for a solar power project to module price and DC PLF (%) at the bid tariff rate of Rs. 2.0 per unit

		Module Price ($/Watt)					
		0.15	**0.17**	**0.19**	**0.21**	**0.23**	**0.25**
DC PLF (%)	**17.5%**	7.2%	6.5%	5.9%	5.4%	4.8%	4.3%
	18.0%	7.6%	6.9%	6.3%	5.7%	5.2%	4.7%
	18.5%	8.0%	7.3%	6.7%	6.1%	5.6%	5.1%
	19.0%	8.5%	7.7%	7.1%	6.5%	5.9%	5.4%
	19.5%	8.9%	8.1%	7.4%	6.8%	6.3%	5.8%
	20.0%	9.3%	8.5%	7.8%	7.2%	6.6%	6.1%

Source: ICRA research; Assumptions: Debt and equity ratio of 70:30 and interest rate of 8.5% with repayment tenure of 18 years post COD; DC plant load factor (PLF) of 18.5%, DC-AC ratio of 1.5 times and degradation factor of 0.7% per year; INR-USD Exchange rate of 75; the computation does not assume basic customs duty or SGD, given the pending clarify on imposition of customs duty on imported modules and as SGD is expiring in July 2021; Any levy of SGD or BCD beyond July 2021 is expected to be recovered through a change in law provision of PPA

TARIFF COMPETITIVENESS TO SUPPORT SOLAR CAPACITY ADDITION

The decline in solar bid tariffs over the years improved the tariff competitiveness of solar power projects vis-à-vis conventional sources and other renewable sources. This along with the strong policy support from the Central and the state governments, led to large capacity addition in the sector. The solar power segment witnessed a capacity addition of 32.3 GW over the past 5.5 years and the installed solar capacity reached 36.0 GW as of September 2020. This in turn increased the share of solar power capacity in the overall RE sector to 40.4% as of September 2020 from 15.8% as of March 2016.

There is a slowdown in solar capacity addition in H1 FY2021 at 1.4 GW owing to delays in implementation caused by the lockdown restrictions and the continued execution challenges related to land and transmission connectivity. Nonetheless, the execution is expected to improve in the second half of the FY2021, with easing of supply chain challenges and the capacity addition for the full year of FY2021 is expected to be about 5.5 – 6.0 GW in FY2021. Moreover, ICRA expects the solar capacity addition to improve to ~11-12 GW in FY2022, given the expected easing in execution headwinds and based on a large backlog of the projects awarded by the Central nodal agencies and the state distribution utilities.

The solar power segment continues to dominate the bidding mix with the wind segment witnessing subdued bidding activity given the delays in execution of the ongoing projects. The SECI has issued tenders for about 16.2 GW RE projects including 2.5-GW solar projects under the ISTS route in Karnataka, 7.5 GW solar projects in Leh and Kargil, Jammu & Kashmir, 1.2 GW hybrid projects and 5-GW tender for RE blended with coal or other sources. This apart, the solar capacity under-development remains large at about 37 GW, including the recently awarded bids wherein signing of the PPAs is pending (including the 12 GW manufacture linked tender). Further, another 4.0 GW has been awarded under the hybrid projects / hybrid plus RTC supply / hybrid plus peak supply, which would again be driven largely by solar power projects with a mix of battery storage or pumped hydro. Apart from project awards, the timely signing of the PPA/PSAs, easing land acquisition and improving transmission connectivity remain important for achieving the RE capacity targets.

Exhibit 6: Trends in installed solar power capacity and its share in overall RE capacity

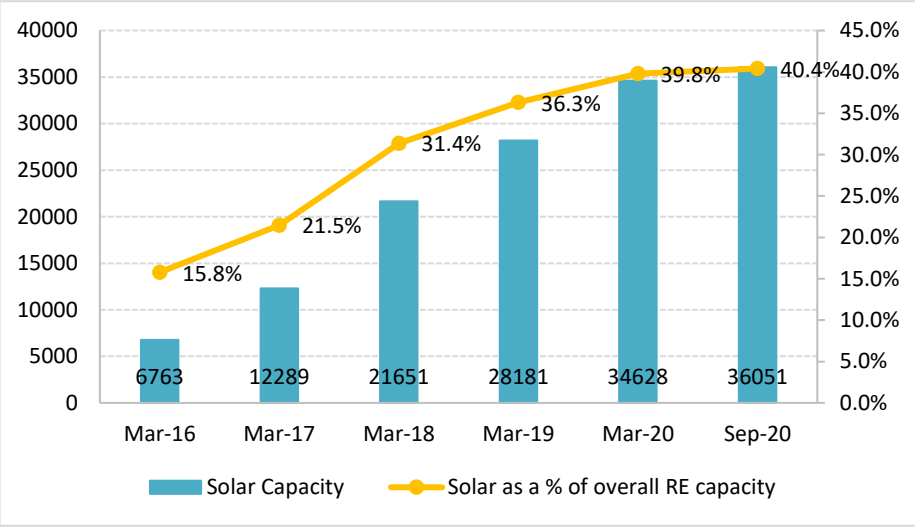
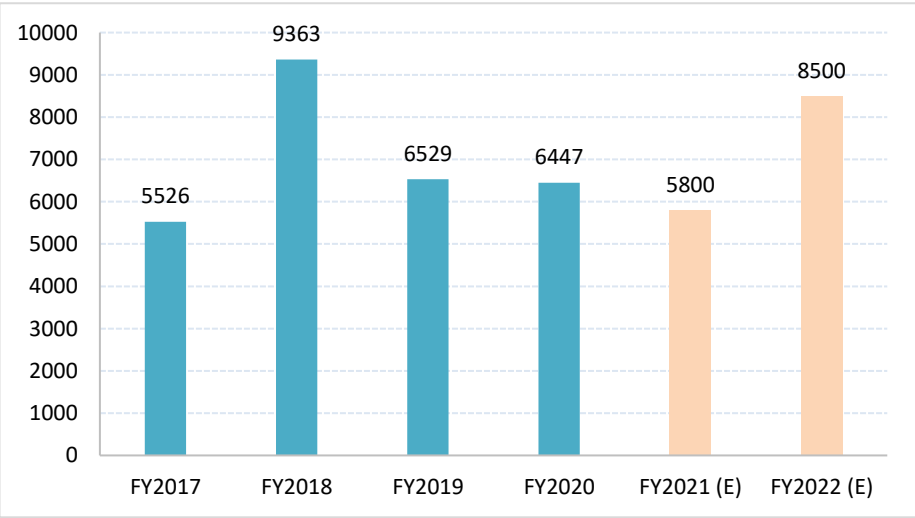


Exhibit 7: Trends in solar power capacity addition



Source: ICRA research, CEA, MNRE

ICRA-RATED SOLAR POWER PRODUCERS

Exhibit 8: Rating Distribution of ICRA-rated universe of solar power producers as on November 25, 2020

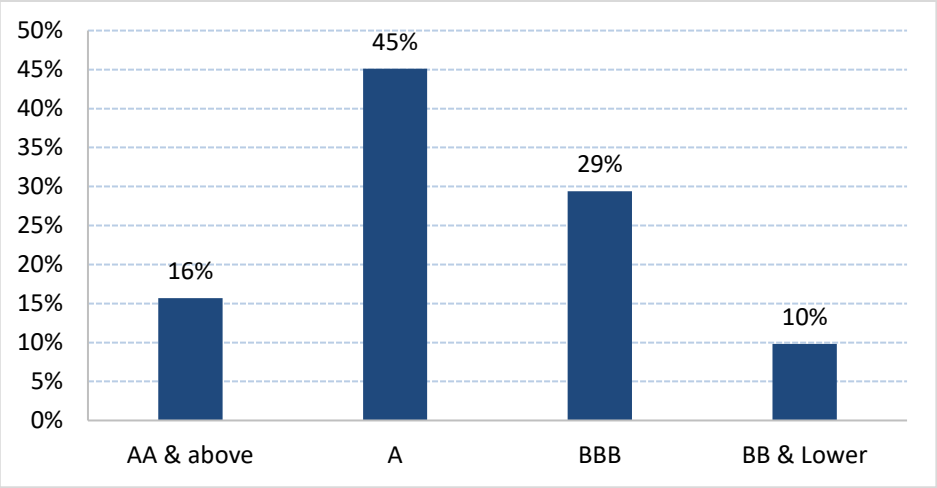
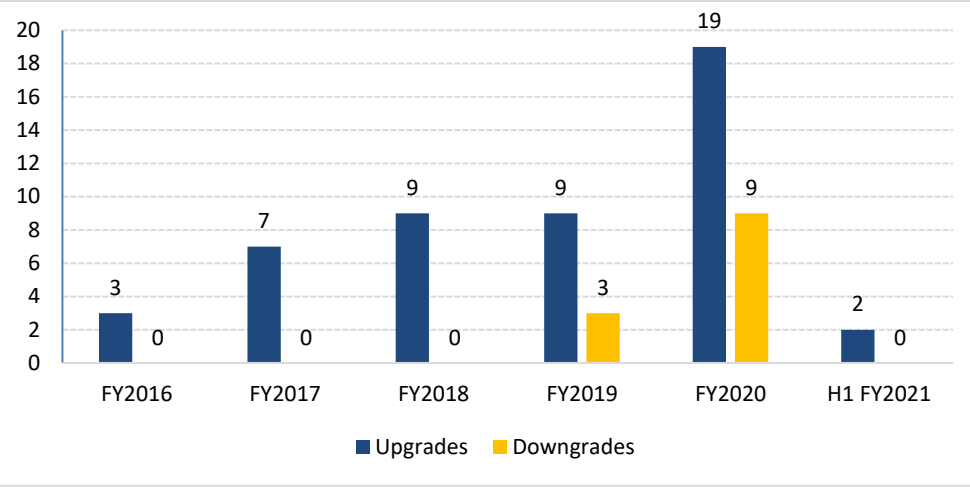


Exhibit 9: Count of upgrades and downgrades (ICRA rated universe of solar power producers)



Source: ICRA research

- The rating distribution mix for solar power producers as of November 2020 is presented in the exhibit above. The mix of investment grade ratings in the solar power sector remains high at 90%. Within the investment grade, a majority of the ratings i.e. 61% are in the AA/A category. The ratings in AA/A category are supported by an established track record of operations, diversified asset mix (mainly for AA category), healthy liquidity profile and strong promoter profile.
- Historically, the upgrade-to-downgrade ratio remained high led by several upgrades, post commissioning and demonstration of the generation track record by the solar power projects. The number of upgrades witnessed a sharp increase in FY2020, led by change in ownership for a group of assets. The other reasons for upgrades include improvement in generation and reduction in the leverage level. On the other hand, there is also a jump in the downgrades in FY2020 over FY2019, owing to a delay in receiving payments from off-takers and weak operating performance.
- In the first half of FY2021, the sector witnessed two upgrades and no downgrades. The upgrades were led by improvement in generation and favourable regulatory development. The downgrades were mainly because of the change in the rating approach for a group of assets, because of the change in strategic intent of the sponsor.
- While the outlook for the renewable energy sector remains negative given the regulatory challenges persisting for RE IPPs in the state of Andhra Pradesh, the execution headwinds for the under-construction projects and concerns on the financial health of the discoms, the credit profile for majority of the ICRA-rated solar power producers remains supported by the presence of long term PPAs, satisfactory operating performance, adequate liquidity buffer available (both in the form of debt service reserve account and access to working capital limits) and the strengths by virtue of a relatively strong sponsor profile as is also evident from the demonstrated track record of support in case of any cash flow mismatches.

ANNEXURE: KEY TERMS OF THE DRAFT PPA TO BE SIGNED WITH SECI

Key terms	Particulars
Project Commissioning	• Project to be commissioned within 18 months from effective date of PPA • Maximum period allowed for commissioning shall be limited to 6 months beyond the scheduled CoD (SCoD)
Offtake Constraints due to Transmission Infrastructure	• Compensation in case of offtake constraints due to transmission infrastructure not being complete/ready after SCOD shall be paid at normative CUF of 19% or committed CUF (whichever is lower) for the period of grid unavailability. Corresponding to the generation loss, the excess generation by the SPD in the succeeding 3 years shall be procured by SECI to offset the generation loss
Offtake Constraints due to Grid Unavailability	• Generation Loss = (Average generation per hour during the contract year)*(number of hours of grid unavailability during the contract year) ▪ Excess generation by the project shall be procured by SECI in the succeeding 3 years at the PPA tariff to offset the generation loss for the project
Offtake Constraints due to Backdown	• In the event of backdown, the project shall be eligible to a minimum generation compensation from SECI equal to 100% x (Average generation per hour during the month) x (No. of backdown hours) x PPA tariff). The SPD shall not get any compensation in case the backdown is for grid security, safety of any equipment/personnel or other such conditions
Minimum Generation & Maximum Purchase Caps	• Developer should declare capacity utilisation factor (CUF), which shall not be lower than 17.0% • Generation to remain within -10% to +15% of the declared CUF till the end of 10 years from CoD. For the remaining period of the PPA, generation to remain -20% to +10% of declared CUF • Any shortfall in supply will lead to compensation equal to the amount payable by the buying discom towards non-meeting of RPO, subject to a minimum of 25% of the cost of this shortfall in energy terms, calculated at PPA tariff. Any generation over the upper limit, may be purchased by the SECI at 75% of the PPA tariff. The surplus energy may be supplied to a third party only after refusal to offtake by the SECI and the ultimate buying utilities.
Payment Cycle	• The SECI shall pay the amounts by the due date. Due date has been defined as 75 days from presentation of a bill. • In the event of delay in payment of a monthly bill by the SECI beyond the due date, a late payment surcharge of 1.25% per month on a day to day basis shall be paid by the SECI provided such late payment surcharge is duly received by it under the PSA.
Rebate of monthly bills	• A rebate of 1.5% shall be payable to the SECI for payments made within 10 days of presenting the hard copies of the bill. A rebate of 1% shall be payable for payments made between 10 days and 45 days from the bill date.
Payment Security Mechanism	• The SECI shall provide a letter of credit (LC) to the developer equivalent of 1-month billing charges. The term of the LC would be 12 months and should be renewed annually
Payment Security Fund (PSF)	▪ The SECI shall set up a Payment Security Fund (PSF) to ensure timely servicing for the developers through the funds raised from developers. This fund will have a corpus to cover 3 months payments.
SECI Liability	• The parties (developer & SECI) agree that the SECI is an intermediary company to purchase and resell the electricity to discoms to enable them to fulfil the renewable purchase obligations (RPO) and therefore the performance of the obligations of SECI under this agreement shall be subject to the ability of SECI to enforce the corresponding obligations assumed by the discoms on resale under the PSA between the discoms and SECI.

	• However, it is specifically agreed that the payment of money becoming due from the SECI to the project under this agreement for supply of solar power to the extent of the contracted capacity shall not be on a back to back basis and will be as per: (i) the recourse under the Payment Security Mechanism provided in the PPA and PSA, as follows a) Letter of Credit; (b) State Government Guarantee/ Tri-Partite Agreement (TPA) signed between the Reserve Bank of India, the Central Government and the State Government of the Buying Entity, covering security for payment of energy charges, as applicable; (c) Payment Security Fund provided by the Buying Entity; ii) Payment security fund under the PPA. The SECI shall discharge the tariff payment obligation in terms of the provisions of this agreement. • The parties agree that in respect of the obligations other than the tariff payment obligation specifically mentioned herein above, in the event the developer has any claim against the SECI in regard to the performance of any obligation of the SECI under this agreement or enforcement of any right of the developer against the SECI under this agreement, the same shall be subject to the ability of the SECI to enforce the corresponding obligations assumed by the Buying Utility(ies) under the Power Sale Agreement to be entered into between the SECI and the Buying Utility(ies) on resale on mutatis mutandis basis and not otherwise.
Change in Law	• Change in law would include [a] enactment of any law and amendment or repeal of an existing law, [b] requirement for obtaining a new consent, permits or licensee, [c] any modification to the prevailing conditions prescribed for obtaining an consent, permit or license, not owing to any default of the Solar Power Developer and [d] any change in the rates of any Taxes including any duties and cess or introduction of any new tax made applicable for setting up the solar power project and supply of power from the Solar Power project which have a direct effect on the project • In case of a change in rates of safeguard duty, the GST and basic customs duty after the last date of bid submission and resulting in change in project cost, then such change will be treated as 'Change in Law' and the quantum of compensation payment on account of change in rates of such duties and shall be provided to the affected party by the other party, subject to the provision that the appropriate Commission recognizes such provisions at the time of adoption of tariff. • In case of change in law approved by the regulator, the relief will be as per the following - **every net increase/decrease of Rs.1 lakh per MW in the project cost, shall be liable for corresponding increase/decrease of an amount equal to Rs 0.005 /kWh**

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ABOUT ICRA

ICRA Limited (formerly Investment Information and Credit Rating Agency of India Limited) was set up in 1991 by leading financial/investment institutions, commercial banks and financial services companies as an independent and professional investment Information and Credit Rating Agency.

Today, ICRA and its subsidiaries together form the ICRA Group of Companies (Group ICRA). ICRA is a Public Limited Company, with its shares listed on the Bombay Stock Exchange and the National Stock Exchange.

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- Provide intermediaries with a tool to improve efficiency in the funds raising process.

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