ICRA

Indian Renewable Energy Sector

Elevated cell & module price levels internationally pose execution headwinds and cost pressures for IPPs & OEMs in the near term

OCTOBER 2021

Highlights

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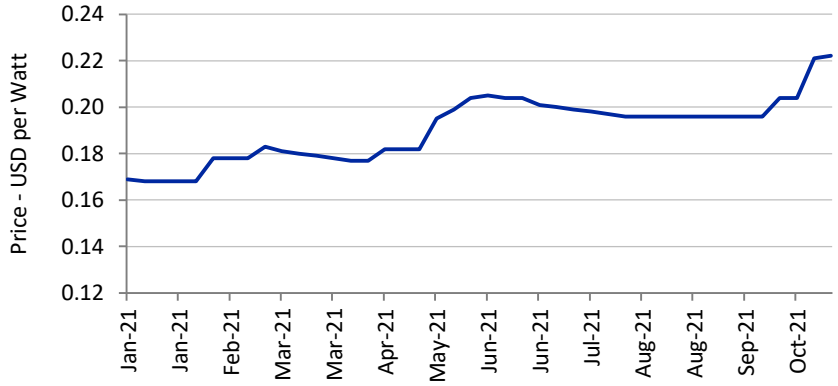
The prices of imported PV modules increased by 35% over the past 10 months driven by an increase in the polysilicon prices along with the recent supply side disruptions in China.

This is likely to moderate the debt coverage and return metrics for the projects bid out over the past one year. Also, projects are likely to face delays in execution owing to the supply chain constraints.

- The price of imported Mono PERC PV modules in India have increased by over 35% from 19-20 cents/watt in December 2020 to 22-23 cents per watt in June 2021 and further to 27-28 cents per watt in October 2021. This is mainly driven by an increase in the polysilicon prices, a key input for PV modules along with the recent supply-side disruptions in China.
- The disruption in manufacturing operations across the value chain of solar PV modules in China owing to the prevailing power cuts is leading to elevated price levels for solar PV cells and modules. Given the likely continuation of these power cuts amid the emission control targets in China, the prices are likely to remain elevated in the near term.
- Apart from the polysilicon, the cost pressures for solar power projects are arising from the sharp jump in the steel and aluminium prices which are used in mounting structures and back sheets for solar PV modules respectively.
- The increase in cell & module prices is likely to moderate the debt coverage and return metrics for the projects bid out over the past one year and with expected commissioning over the next 6-12 months. Further, developers are likely to face delays in execution owing to the supply chain constraints arising from disruptions in China. The availability of adequate timeline buffer under the PPAs or securing timeline extension from the bidding agency remains important.
- The increase in module prices and the recent hike in GST rate for solar power equipment is likely to increase the tariffs in the forthcoming solar bids by ~20-25 paise per unit from the levels seen over the past six months. Nonetheless, the tariffs are likely to remain competitive at less than Rs. 3.0 per unit.

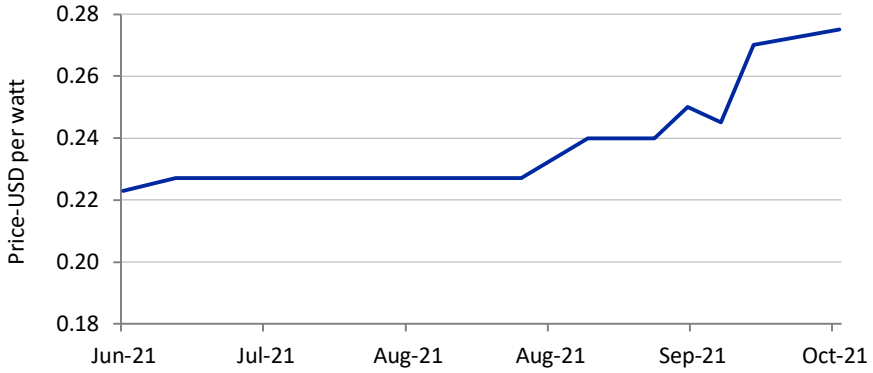
Rising module prices levels amid supply-side disruptions in China

Exhibit 1: Average solar PV module price trend as per SOLRASSM Index



Source: ICRA Research, Bloomberg

Exhibit 2: Price trend of Mono PERC modules

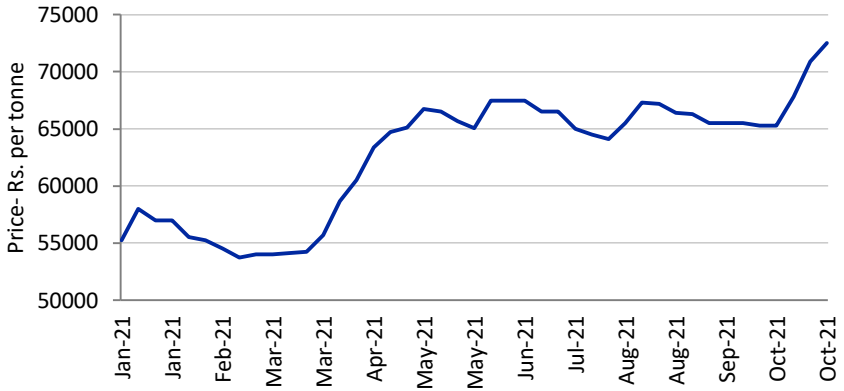


Source: ICRA Research, Infolink

- The average price of imported solar PV modules (multi) remains elevated at about 22-23 cents/watt, which is higher by about 30-35% compared to the prices seen in December 2020. Also, most of the utility scale developers are deploying Mono PERC modules in recent times and its prices have increased from 19-20 cents/watt in December 2020 to 22-23 cents per watt in June 2021 and further to 27-28 cents per watt in October i.e. increasing by over 35%.
- This is mainly driven by a sharp increase in the price of polysilicon, a key input for cell and module manufacturers, as seen over the last 10-12 month period. Further, the disruption in operations across the value chain of solar PV module manufacturing in China owing to the prevailing power cuts is leading to elevated price level for solar PV cells and modules recently. Given the likely continuation of these power cuts in the near term amid the emission control targets in China, the prices are likely to remain elevated in the near term.

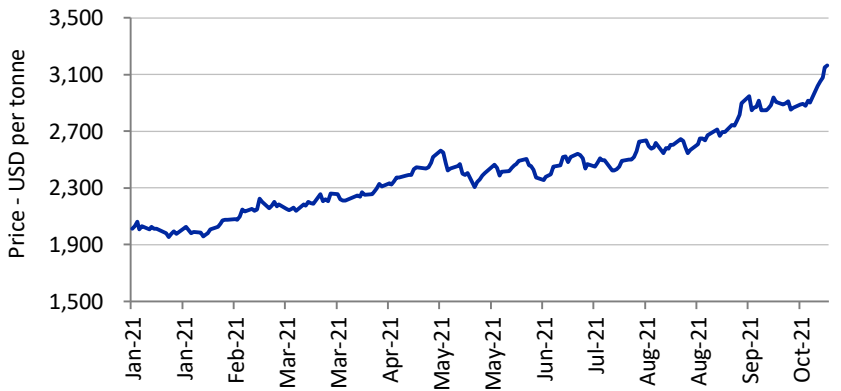
Hardening prices of key commodities to increase capital costs for solar developers

Exhibit 3: Steel price trend



Source: ICRA Research, Steelmint

Exhibit 4: Aluminum price trend



Source: ICRA Research, Steelmint

- Apart from polysilicon, a solar PV module requires glass and aluminium which is used as back-sheets. Further, a solar power plant is dependent on steel, which is used in the mounting structures. As reflected by the exhibits above, the prices of steel and aluminium have increased by ~30% and ~55% respectively on a YTD basis. Similarly, soda ash, which is a key component in manufacturing glass, has witnessed an increase of over 80% on a YTD basis.
- These inflationary pressures are likely to put upward pressure on the capital cost of solar power projects and impact the returns for the developers having under-construction projects. Moreover, the bid tariffs in the subsequent auctions are likely to increase, as developers will have to factor in the increase in input prices along with implementation of BCD on solar PV cells and modules.

Moderation in returns for solar projects awarded over the last 6 to 12 months

Exhibit 5: Impact assessment on DSCR (Illustrative) of a solar power project in the wake of upward pressure on module prices(without considering impact of BCD as it is expected to be a change in law for projects bid out prior to March 2021)

Cumulative DSCR		Module Price ($/Watt)					
		20.00	22.00	24.00	26.00	28.00	30.00
Tariff (Rs/unit)	2.00	1.23	1.17	1.12	1.08	1.04	0.99
	2.20	1.36	1.30	1.24	1.19	1.15	1.11
	2.40	1.49	1.43	1.36	1.31	1.26	1.21
	2.60	1.63	1.55	1.48	1.42	1.37	1.32
	2.80	1.76	1.68	1.60	1.54	1.48	1.42
	3.00	1.89	1.80	1.72	1.65	1.59	1.52

Source: ICRA Research; Debt and equity ratio of 70:30, interest rate of 8.0% with repayment tenure of 18 years post COD, DC plant load factor (PLF) of 18.0%, DC-AC ratio of 1.5 times and degradation factor of 0.7% per year; INR-USD exchange rate of 74.5; O&M cost of Rs. 2.5 laksh per DC MW with annual escalation of 5.0%; Provision for inverter replacement reserve of Rs. 15 lakhs per MW is considered to be built over a 10-year period

- Given the large dependence on imported cells and modules for Indian developers, the increase in cell & module prices is likely to moderate the debt coverage and return metrics for the projects bid out over the past one year with expected commissioning over the next 6-12 month period.
- As the PV module component comprises about 50-55% of the overall project cost, an increase in the module price level by about 2 cents/watt is likely to moderate the debt service coverage metrics for the project developers by about 5-6 basis points. At a bid tariff of Rs. 2.2 per unit, the project can remain viable up to a module price level of 25.0 - 26.0 cents per watt considering a interest rates of 8.0%. This is applicable for projects wherein BCD is not applicable or is a pass-through under change in law.

Projects likely to witness delays amid the supply chain disruption for PV modules

Exhibit 6: Impact assessment on DSCR (Illustrative) of a solar power project in the wake of upward pressure on module pricesalong with the impact of BCD on imported cell prices (for projects bid out post BCD notification in March 2021)

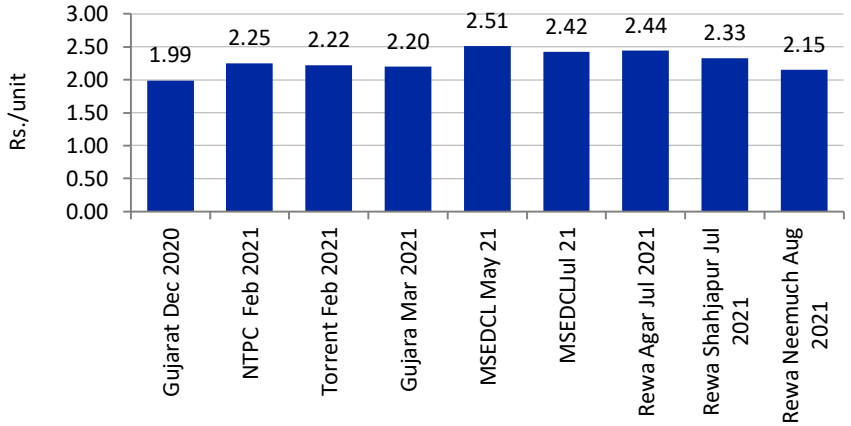
Cumulative DSCR		Module Price ($/Watt)					
		20.00	22.00	24.00	26.00	28.00	30.00
Tariff (Rs/unit)	2.00	1.15	1.10	1.05	1.00	0.96	0.92
	2.20	1.28	1.22	1.16	1.11	1.07	1.02
	2.40	1.40	1.33	1.27	1.22	1.17	1.13
	2.60	1.52	1.45	1.38	1.32	1.27	1.22
	2.80	1.65	1.57	1.50	1.43	1.37	1.32
	3.00	1.77	1.68	1.61	1.54	1.47	1.41

Source: ICRA Research; Debt and equity ratio of 70:30, interest rate of 8.0% with repayment tenure of 18 years post COD, DC plant load factor (PLF) of 18.0%, DC-AC ratio of 1.5 times and degradation factor of 0.7% per year; INR-USD exchange rate of 74.5; O&M cost of Rs. 2.5 laksh per DC MW with annual escalation of 5.0%; Provision for inverter replacement reserve of Rs. 15 lakhs per MW is considered to be built over a 10-year period; BCD of 25% assumed on imported PV cells

- Post the notification of BCD on imported PV cells and modules, the developers have won projects with quoted bid tariff largely between Rs. 2.3 to Rs. 2.5 per unit, which increased from the low of Rs. 1.99 per unit in December 2020. However, the extent of increase in the bid tariffs remained lower than expected level due to high level of competitive intensity in the bidding environment. The recent increase in module prices is likely to moderate the cumulative DSCR and project IRR for these projects by 10-12 bps and 100-110 bps respectively.
- Further, as modules for these projects have to be supplied from the OEMs which are a part of the ALMM list, a delay in execution of these projects is likely given the supply side constraints for procuring solar cells, wafers and polysilicon from China. The availability of adequate timeline buffer under the PPAs or securing timeline extension from the bidding agency remains important for the developers. Also, the disruption in supply chain in procuring cells & modules from China is likely to accelerate the development of domestic solar PV manufacturing value chain.

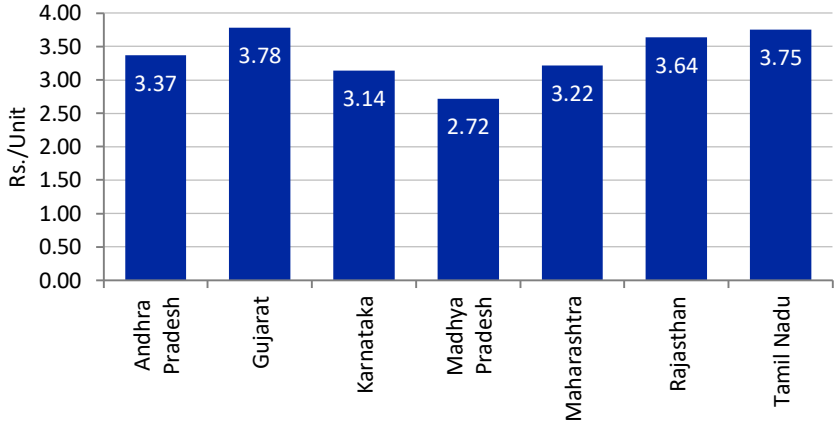
Upward pressure on bid tariffs; however, tariff competitiveness may remain intact

Exhibit 7: Solar Tariff Trends



Source: ICRA Research

Exhibit 8: Marginal variable cost of procurement (bottom 25% of merit order) for discoms in Key States

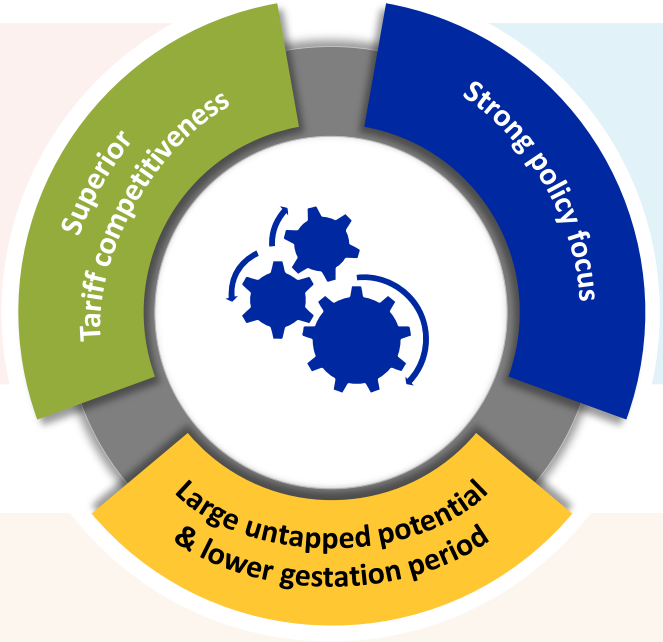


Source: ICRA Research, Meritindia.in

- The increase in module prices and the recent hike in GST rate for solar power equipment from 5% to 12% is likely to increase the tariffs in the forthcoming solar bids by ~20-25 paise per unit from the levels seen over the past six months. Nonetheless tariffs are likely to remain competitive at less than Rs. 3.0 per unit.
- From the perspective of ultimate off-takers i.e. state discoms, the solar power tariffs would remain cost competitive, given that marginal variable cost of power purchase (bottom 25% in merit order) for them across the key states remains well above Rs. 3/unit.

ICRA's outlook for renewable energy sector remains Stable

Solar power tariffs even after BCD impact to remain well below Rs. 3/unit; wind tariffs remain below Rs.3.0 per unit; competitive against marginal cost of generation from thermal sources



Highly supportive policy & regulatory framework. Government has set a target to achieve 450 GW RE capacity by FY2030. RPO framework in place. Amendments proposed to strictly enforce RPO compliance.

The presence of strong intermediate procurers like SECI and NTPC is supporting the growth of solar and wind capacities despite the challenges associated with discoms' finances

Solar power potential in India estimated at 748 GW; similarly, wind power potential estimated at 695 GW

Key constraints for the sector are the execution challenges and delays in signing of PPAs/PSAs. Further, the recent cost pressure from higher module prices and delays in module delivery would be a key headwind for the developers in the near term

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Thank You!