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Foreword

The Indian rooftop market segment continued its strong showing with 456 MW of rooftop solar capacity added in the first quarter of the calendar year 2022, a 34% year-over-year growth. Installations were up by 13% quarter-over-quarter as well. The installations in Q1 were the second-highest in any quarter to date.

It was another great quarter for the rooftop solar market as post-Covid installations continued to surge. Rooftop installations have topped 400 MW for four quarters in a row, which is a first. Commercial and Industrial segments were again the driving force accounting for most installations. However, future growth is dependent on system costs. If the prices continue to go up and project economics deteriorate, demand is bound to contract in the short term.

Rooftop system costs were up 17% year-over-year. Gujarat remains the top state for cumulative solar rooftop installations, while Maharashtra and Rajasthan rank second and third.

As developers rushed to procure components from China, imports of solar cells and modules amounted to $1.23 billion in the first quarter of the calendar year 2022, a staggering 374% increase compared to the same period last year. These numbers, however, could see a shift with the BCD imposition already in effect since April. Most of the tenders issued by implementing agencies have also mandated the use of modules specified in the 'Approved List of Models and Manufacturers.

According to Mercom's recent Market Leaderboard, In 2021, ReNew Power was the largest utility-scale developer in terms of installations flowed by Adani Green and Azure Power.

Tata Power Solar, Fourth Partner Energy, Sunsure Energy, Amplus Solar, and Jakson Solar emerged as the top solar rooftop companies in 2021.

On the supply side, Sungrow, Sineng Electric, FIMER India (ABB), Ginlong (Solis) Technologies, and GoodWe were the top five solar inverter suppliers in the Indian solar market in CY 2021. While LONGI Solar, Jinko Solar, JA Solar, Adani Solar, and Trina Solar were the leading module suppliers.

India has installed 45.6 GW of utility-scale solar capacity to date, 14.4 GW shy of meeting the government-set target of installing 60 GW by 2022.

While the 100 GW of solar by 2022 is out of reach at this point, the 60 GW large-scale solar target is very achievable. A little push from the government to remove some of the hurdles facing the industry can help India meet its large-scale solar goal. If the government can facilitate the commissioning of stalled projects, that alone can get us over the line.

Reaching the 60 GW large-scale solar goal will be a significant achievement that will build investor confidence and demonstrate that the government is serious about utility-scale development. It also adds weight to the 280 GW goal set for 2030, making the large-scale solar market a much more attractive investment and an excellent long-term bet.

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India Adds 456 MW of Rooftop Solar Capacity

Mercom India Research's latest report reveals the rooftop solar capacity additions, the business models preferred by consumers and state-wise installations

By : Arjun Joshi

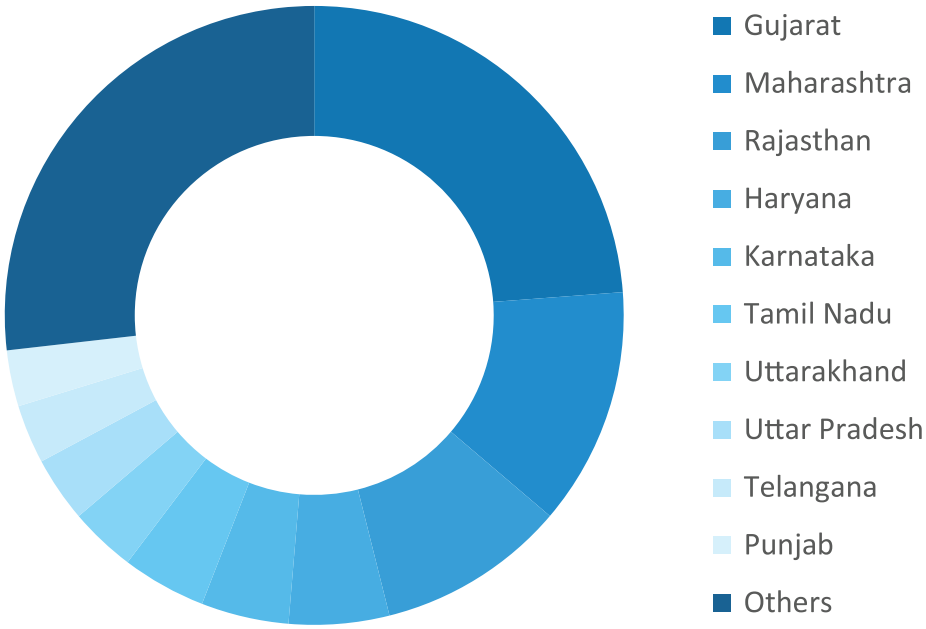
India added 456 MW of rooftop solar capacity in the first quarter (Q1) of the calendar year (CY) 2022, a 34% year-over-year growth compared to 341 MW registered in the same period last year. In a quarter-over-quarter (QoQ) comparison, installations were up by 13%, compared to the 402 MW installed in Q4 2021.

The installation numbers were the second-highest in any quarter after Q2 2021.

The numbers were revealed in Mercom India Research's latest report, 'Mercom India Rooftop Solar Market Report Q1 2022.'

In Q1 2022, rooftop solar accounted for 15% of the total solar installations. At the end of Q1, India's cumulative rooftop solar capacity was approximately 7.6 GW. During the quarter, 47% of the

Top 10 States with Cumulative Rooftop Solar Installations

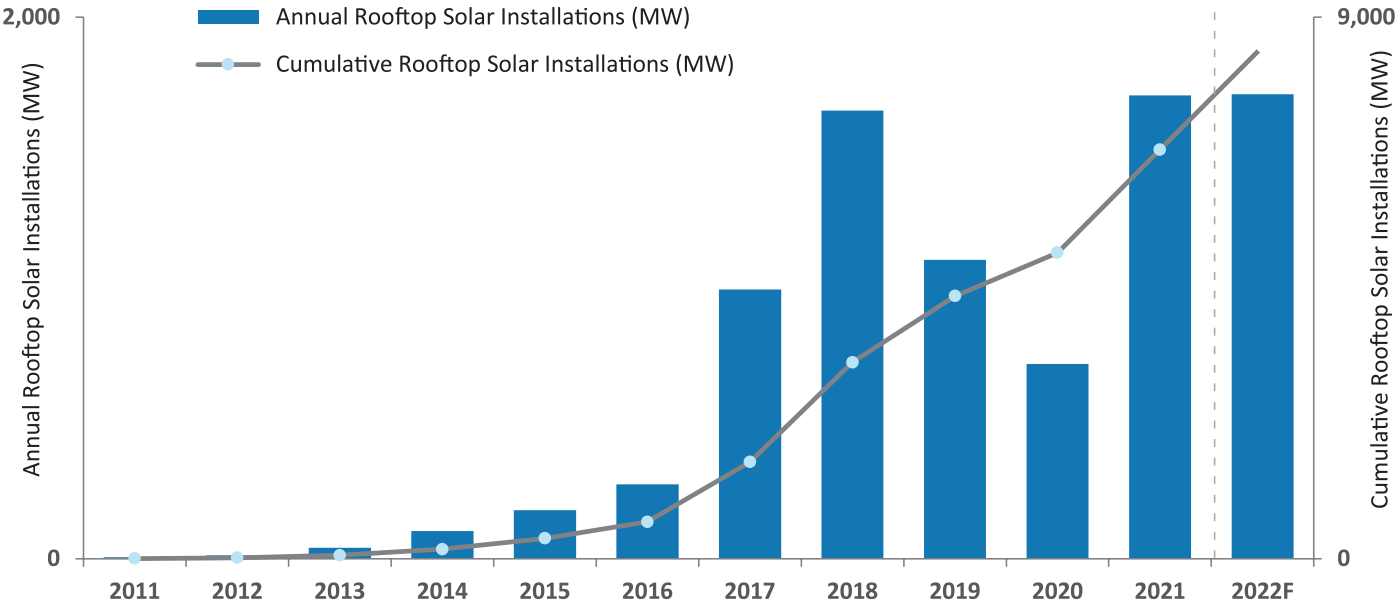


Source: Mercom India Research (Mar 2022)

installations were in the industrial segment, followed by 29%, 22%, and 2% in commercial, residential, and government segments.

"It was another great quarter for the rooftop solar market as post-Covid installations continued to surge. Rooftop installations have topped 400 MW for four quarters in a row, which is a first.

India Rooftop Solar Demand Forecast (MW)



Source: Mercom India Research (Mar 2022)

Commercial and Industrial segments were again the driving force accounting for most installations. However, future growth is dependent on system costs. If the prices continue to go up and project economics deteriorate, demand is bound to contract in the short term," said Raj Prabhu, CEO of Mercom Capital Group.

According to the report, the average cost of a rooftop solar system increased by 17% in Q1 2022 compared to the same period last year.

In Q1 2022, around 71% of the rooftop solar installations were under the capital expenditure (CAPEX) model, while the operating expenditure (OPEX) or renewable energy service company (RESCO) model represented the rest. Overall project margins have reduced due to the rise in component prices, the advent of basic customs duty (BCD), and the hike in goods and services tax (GST).

States have been empaneling vendors and commissioning the allocated capacities under the Ministry of New and Renewable Energy's (MNRE) Phase II Rooftop Solar Program, driving CAPEX installations. About 1.2 GW of empanelment tenders were floated by Gujarat, Karnataka, Telangana, Madhya Pradesh, Odisha, Himachal Pradesh, Jharkhand, Nagaland, and West Bengal.

In Q1 2022, tendering activity increased by 269% compared to Q4 2021 and 214% compared to the same period last year.

Gujarat is the top state for cumulative solar rooftop installations

The top 10 states accounted for nearly 73% of cumulative rooftop solar installations at the end of Q1 2022. Gujarat is the top state for cumulative solar rooftop installations, while Maharashtra and Rajasthan rank second and third.

Key Highlights from Mercom India Research's India Rooftop Solar Market Report Q1 2022

- In Q1 2022, India added over 456 MW of rooftop solar capacity, the second-highest in any quarter after Q2 2021.
- Cumulative rooftop solar installations are 7.6 GW as of Q1 2022.
- The top 10 states accounted for nearly 73% of the rooftop solar capacity.
- In Q1 2022, 47% of rooftop solar installations came from the industrial segment, followed by 29%, 22%, and 2% in commercial, residential, and government segments.
- In Q1 2022, about 71% of rooftop solar installations were under the CAPEX model, while additions under the OPEX/RESCO model contributed to the remaining 29%.
- Gujarat was the top state for total rooftop solar installations, followed by Maharashtra and Rajasthan.
- Rooftop solar system costs have increased by 17% YoY.

The Mercom India Rooftop Solar Report Q1 2022 is 46 pages and covers all facets of India's rooftop solar market. For the complete report, visit: https://mercomindia.com/product/q1-2022-india-rooftop-solar-market-report.

Solar Imports Spike in the First quarter

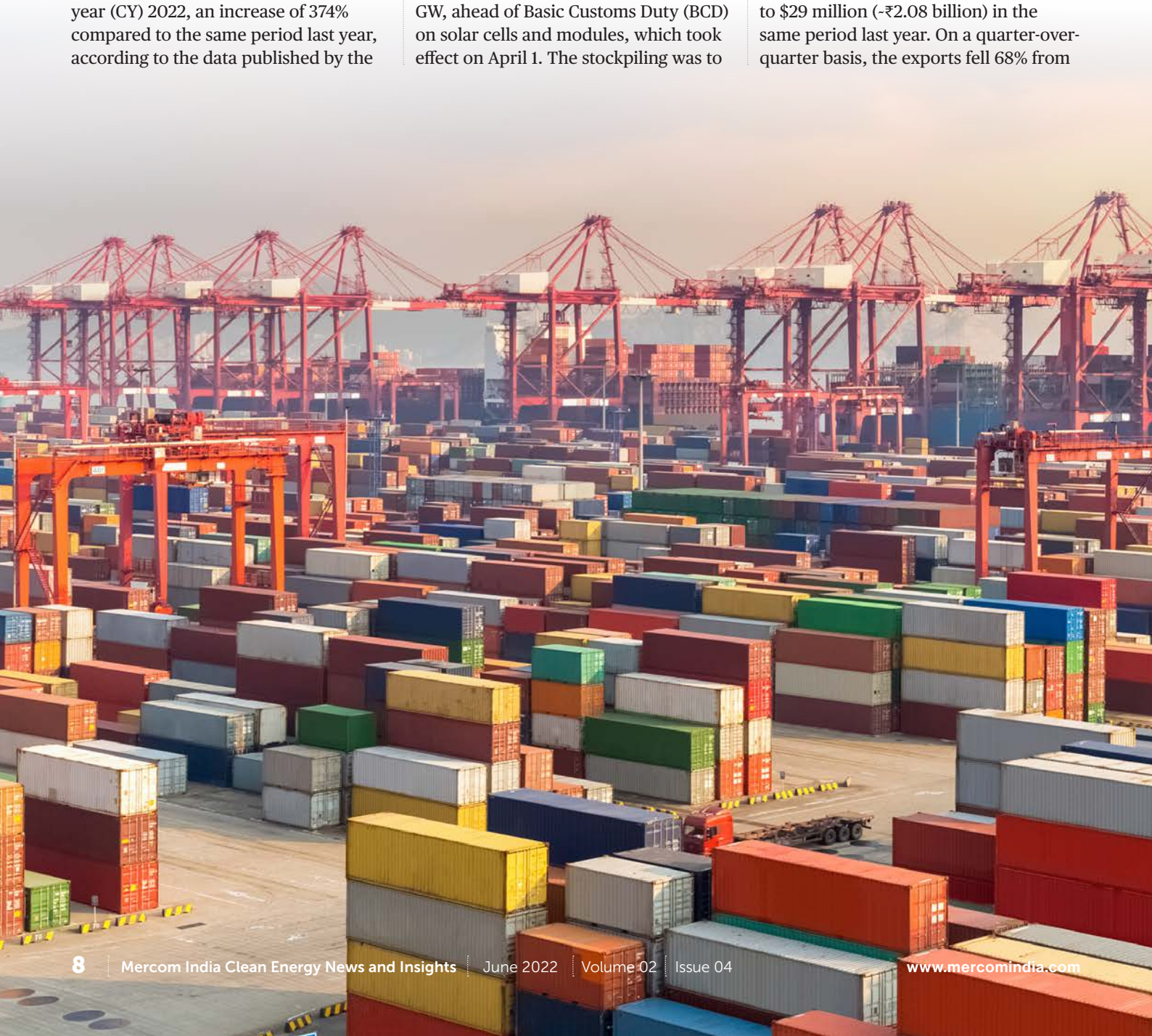
Solar Cell and Module imports increased to $1.23 billion in Q1 2022 as developers stockpile modules ahead of BCD to save on module costs

By : Arjun Joshi

India imported solar cells and modules worth $1.23 billion (-₹92.62 billion) in the first quarter (Q1) of the calendar year (CY) 2022, an increase of 374% compared to the same period last year, according to the data published by the Department of Commerce.

The rise in imports was primarily due to Indian solar developers stockpiling modules in large quantities – around 10 GW, ahead of Basic Customs Duty (BCD) on solar cells and modules, which took effect on April 1. The stockpiling was to save on module costs, which increased by 40% once BCD kicked in.

Exports decreased by 74% to $7 million (-₹535.01 million) in Q1 2022 compared to $29 million (-₹2.08 billion) in the same period last year. On a quarter-over-quarter basis, the exports fell 68% from



$23 million (-₹1.74 billion) in Q4 2021.

Solar imports in Q1 2022

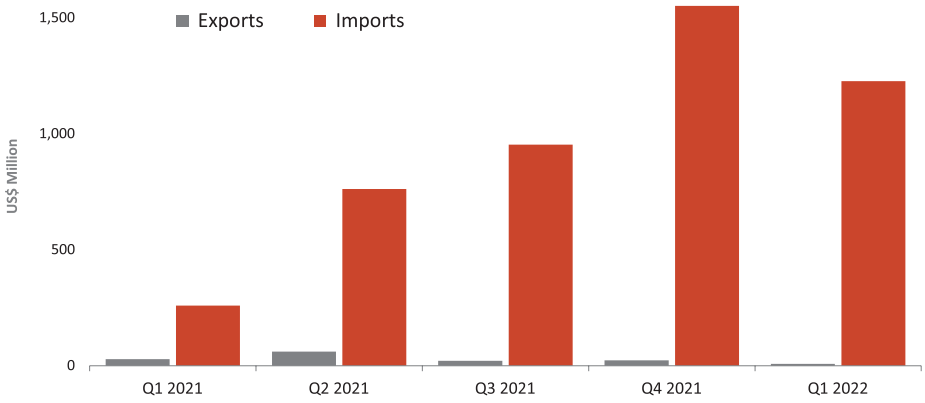
China was the largest exporter of solar modules and cells to India in Q1 2022, making up for nearly 96%, followed by Hong Kong, Malaysia, Singapore, and Switzerland with 2%, 1%, 0.6%, and 0.3%, respectively. In Q4 2021, China's share of India's solar imports was 89.50%.

These numbers, however, could see a shift with the BCD imposition that has taken effect since April. Most of the tenders issued by implementing agencies have also mandated the use of modules specified in the 'Approved List of Models and Manufacturers (ALMM).'

The Directorate General of Trade Remedies (DGTR) has recommended anti-dumping duty on fluoro backsheets imported from China and extended the anti-dumping duty on imported textured tempered glass (solar glass) from China by two more years.

The government's policy moves aim to encourage domestic production and curbing imports. But the question of whether domestic manufacturing would be able to meet the industry requirements remains.

India Solar Cell and Module Quarterly Import-Export Activity ($M)



Data from Department of Commerce *Source: Mercom India Research*

Solar exports

The United States continued to be the largest market for solar exports from India in Q1 2022. The U.S. accounted for 52% of the market share, compared to 39.6% in Q4 2021. Somalia, Afghanistan, Oman, Canada, and South Africa made up 15%, 15%, 5%, 5 and 2%, respectively.

For an in-depth look at the data, analysis, and charts, subscribe to our quarterly market report - Mercom India Solar Update. Detailed solar import and export data by component types, suppliers, manufacturers, and developers are available in Mercom's India Solar EXIM Tracker.

DISCOMs to Pay Overdue Amount in Installments

The Ministry of Power is working on a program to help DISCOMs pay the overdue amounts in installments without imposing the late payment fees to help mitigate their financial woes

By : Satish Shetty

The Ministry of Power (MoP) announced that it is working on a program to mitigate the financial woes of the Distribution Companies (DISCOMs) by liquidating their dues.

The delay in payments by DISCOMs to generating companies adversely impacts the companies' cash flow. The generators need to make provisions for the input of supplies like coal and other raw materials to operate their power plants without interruptions.

As per data available on the PRAAPTI portal, as of May 18, 2022, the DISCOMs owed power generators ₹1.18 trillion (-$15.20 billion) in overdue payments and ₹68.39 billion (-$881.13 million) in late payment surcharge dues.

The proposed program enables payment of these financial dues in easy installments by the DISCOMs. They will be offered a one-time relaxation wherein the outstanding amount, including the principal and the late payment surcharge, will be frozen on the date of the notification without the further imposition of late payment surcharges.

The DISCOMs will be provided the flexibility to pay the outstanding amount in up to 48 installments. The liquidation of outstanding dues in a deferred manner without imposing a late payment surcharge is expected to give DISCOMs time to shore up their finances.

The generating companies would benefit from assured monthly payments that were not forthcoming.

In case of delay in payment of an installment by the DISCOM, the late payment surcharge will be payable on the entire outstanding dues.

As a result of the proposed program, the DISCOMs are expected to save an amount of ₹198.33 billion (-$2.56 billion) on the late payment surcharges in the next 12 to 48 months.

States like Tamil Nadu and Maharashtra, with large outstanding dues, will save over ₹45 billion (-$579.70 million) each. Uttar Pradesh would save around ₹25 billion (-$322.06 million), while Andhra Pradesh, Jammu & Kashmir, Rajasthan, and Telangana will save between ₹11 billion (-$141.71 million) and ₹17 billion (-$219.01 million).

The saving by DISCOMs will benefit the electricity consumer with a reduced burden of late payment surcharges in the retail tariff. The measure is expected to provide timely liquidation of the outstanding amount, which is more critical to the generating companies than the amount foregone on these surcharges.

The ministry said that suitable measures would be put in place to ensure that DISCOMs pay their dues to generating companies regularly, failing which the supply to the DISCOMs would be reduced.

Early this year, Union Power Minister R.K Singh outlined the various steps taken by the government to help improve the financial health of the distribution companies (DISCOMs) in the country.

India Just 14 GW Away from the 60 GW Target

The Indian solar sector is tackling various challenges, as the country inches closer to the 2022 target of 60 GW for large-scale solar installations

By : Satish Shetty

India has installed 45.6 GW of utility-scale solar capacity to date, 14.4 GW shy of meeting the government-set target of installing 60 GW by 2022, according to Mercom's India Solar Project Tracker.

In 2015, the government announced the ambitious target of adding 175 GW of renewable energy by 2022, which included 100 GW of solar. A total of 60 GW was targeted for large-scale solar installations and 40 GW for the rooftop solar sector.

Only 7.6 GW of rooftop solar has been installed in the country so far.

"While the 100 GW of solar by 2022 is out of reach at this point, the 60 GW large-scale solar target is very achievable. A little push from the government to remove some of the hurdles facing the industry can help India meet its large-scale solar goal. If the government can facilitate the commissioning of stalled projects, that alone can get us over the line", commented Raj Prabhu, CEO of Mercom Capital Group.

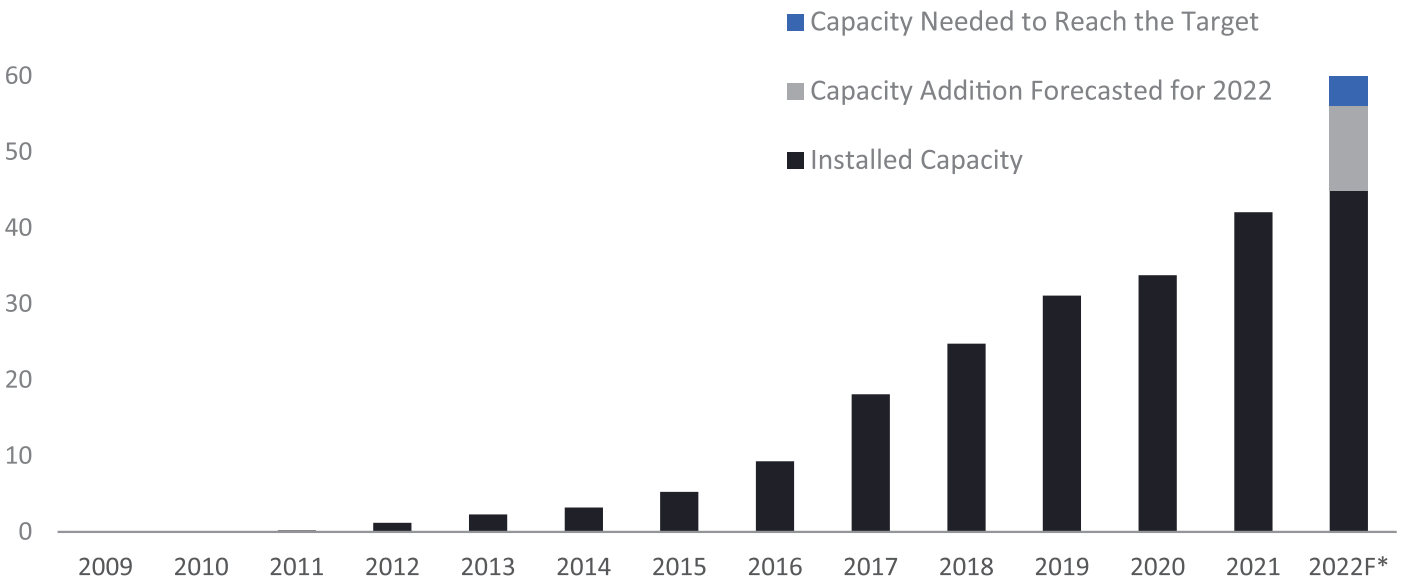
Large-scale solar installations account for a major share of the overall installations in the country. They added to approximately 86% of the total solar installations to date.

The 2022 target for utility-scale projects appears seemingly achievable, but the solar sector is facing various challenges.

The Great Indian Bustard Dilemma

The Great Indian Bustard (GIB) issue continues to delay project commissioning in Rajasthan and Gujarat. The Supreme Court recently heard two petitions reviewed by a committee that has been set up to exclusively examine projects impacted by the GIB issue. The developers of the two projects were directed to install bird diverters by July 20, 2022. In the future, all developers are instructed to refer to the committee, which will review the matters on a case-by-case basis.

India's Utility-Solar Capacity Target (GW) for 2022



Source: Mercom India Research *(*As of Mar 2022)*

As the issue still awaits resolution, project development in the area continues to be stalled. The court is trying to strike a balance between protecting the rare species of birds and allowing the transmission of power cost-effectively.

Supply Chain Issues

As economies worldwide slowly recover from the after-effects of the pandemic, commodity prices have seen a new high, with the demand increasing across industries. This price rise has also impacted the solar industry, increasing the module prices and, in turn, the project cost.

The average cost of developing utility-scale solar projects increased 21.6% year-over-year (YoY) to approximately ₹43 million (-$566,008)/MW in Q4 2021.

India's domestic module manufacturing is yet to scale. The average selling prices for Chinese modules have increased for seven sequential quarters. Solar module manufacturers also believe that prices of modules are expected to stay high through a good part of 2022.

Managing project costs while dealing with low tariff bids in most government-issued tenders is a challenge most developers now seem to be dealing with. The Approved List of Models and Manufacturers (ALMM) in place for modules installed in these projects has further left developers with fewer options.

The GST & BCD Strain

The goods and services tax (GST) council, in September 2021, announced the GST increase for 'specified renewable energy parts,' from 5% to 12%, which came into effect the following month. At the project level, the effective rate of GST on wind and solar power comes to around 13.8%.

In March this year, the Ministry of Power (MoP) said that it would be writing to the Department of Revenue recommending a uniform slab of 5% GST on all renewable energy components.

Pending an update on this, the developers continue to bear the brunt of the high prices affecting the overall project cost.

Another major issue most solar project developers are dealing with is the basic customs duty (BCD), effective since April 2022. The announcement to impose BCD on solar cells and modules did not allow grandfathering of projects already auctioned. According to the National Solar Federation of India, unless grandfathered, BCD would impact approximately 15 GW of projects awarded before March 1, 2021. Many projects awarded before the BCD announcement were scheduled to be commissioned before BCD became effective. But the pandemic and the delay due to the order of the Supreme Court on the GIB case had pushed the commercial operation date of many of these projects beyond March 31, 2022. Developers are urging grandfathering projects to avoid the lengthy regulatory process of presenting petitions to the electricity regulatory commission and receiving the reimbursements in small installments through an annuity method.

However, in the first quarter of 2022, developers imported almost 10 GW of solar modules, stockpiling before the BCD implementation, which will help with installations this year.

"Reaching the 60 GW large-scale solar goal will be a significant achievement that will build investor confidence and demonstrate that the government is serious about utility-scale development. It also adds weight to the 280 GW goal set for 2030 and will make the large-scale solar market a much more attractive investment and a good long-term bet," added Prabhu.

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Transmission Network in the Great Indian Bustard Region

The Supreme Court of India approved two applications for setting up of transmission lines with bird diverters in the GIB region and has formed a committee to standardize the quality of diverters

By : Rakesh Ranjan Parashar

The Great Indian Bustard (GIB) saga that has been simmering for some time came up for hearing in the Supreme Court on April 21, 2022.

During the course of the hearing, the Apex Court said that the installation of bird diverters in the priority areas of Gujarat and Rajasthan should be taken up urgently, and bird diverters in these areas should be installed before July 20, 2022.

The court said that Rajasthan and Gujarat and private power producers should ensure that within the priority areas, a comprehensive exercise is completed within three weeks to assess the total length of transmission lines and the number of bird diverters required.

The petition has been listed for further hearing on July 20, 2022.

Background

In February this year, the Ministry of New and Renewable Energy (MNRE) said that all renewable energy projects located in the priority or potential territory of the GIB would be granted a 30-day extension on the scheduled date of commissioning after the date of judgment by the Supreme Court.

The Supreme Court had earlier ruled that the overhead transmission should be shifted underground to protect the endangered species of birds. In April 2021, it directed the authorities to complete moving the transmission lines underground within a year. Until then, diverters were to be hung from the existing powerlines.

Later, MNRE filed an interlocutory application in the Apex Court, citing the problems of bringing the transmission lines underground. "In case undergrounding of lines is insisted upon, India might need more fossil fuel-based conventional sources to meet the shortfall of renewable energy. This will increase our carbon footprint, which will be detrimental to the environment," it said.

Court's assessment

The Supreme Court said that out of the eight applications submitted, the committee constituted to look into the matter approved only two applications on the receipt of the Central Electricity Authority's (CEA) technical report permitting the laying of overhead transmission lines subject to the installation of bird diverters. The remaining six applications are being scrutinized.

The Court said that the committee should, within a month in consultation with the CEA, formulate the standards of quality required for the bird diverters so that uniformity can be maintained.

"The committee has stated that it has received reports regarding the ongoing installation of power lines despite the directions of this court. The states of Gujarat, Rajasthan, and private power producers should ensure that there is no breach of the directions of this court. As noted earlier, the committee is examining the feasibility of and need to install new overhead transmission lines on a case-to-case basis. Hence, applicants have sufficient remedies to approach the committee and move this court if there be any subsisting grievance," the Court noted.

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Karnataka's New Renewables Purchase Target

The state regulator has issued draft yearly renewable purchase obligation targets, including solar, non-solar and hydro for the DISCOMs and captive and open access consumers until 2029-30

By : Arjun Joshi

Karnataka Electricity Regulatory Commission (KERC) has issued amendments to the KERC (Procurement of Energy from Renewable Sources), Regulations, 2011 to specify the Renewable Purchase Obligation (RPO) target for 2022-23 to 2029-30.

The KERC (Procurement of Energy from Renewable Sources) (Eighth Amendment), Regulations, 2011, came into force on April 1, 2022.

In the previous amendment, the Commission had specified the renewable purchase obligation (RPO) target for compliance by the distribution licensees, including deemed licensees in the state, until 2021-22.

Stakeholders can submit their objections and suggestions byMay 12, 2022. The Commission has scheduled a public hearing on May 20, where stakeholders can submit their views.

Non-solar RPO

Under the new regulations, Bangalore Electricity Supply Company (BESCOM) has a non-solar RPO target of 14% for the year 2022-23. Mangalore Electricity Supply Company (MESCOM) and Gulbarga Electricity Supply Company (GESCOM) have a target of 15 and 11%.

Hubli Electricity Supply Company (HESCOM) and Hukeri Rural Electric Co-operative Society (HRECS) have a non-solar RPO target of 13%.

Non-solar RPO Trajectory for Distribution Licensees and Other Obligated Entities

ESCOMs	BESCOM	MESCOM	CESC	HESCOM	GESCOM	HRECS
2022-23	14%	15%	12%	13%	11%	13%
2023-24	16%	17%	13%	14%	13%	14%
2024-25	17%	19%	13%	16.5%	15%	16.5%
2025-26	19%	21%	13.5%	17.5%	17%	17.5%
2026-27	21%	23%	14%	19.5%	19%	19.5%
2027-28	23%	25%	15%	21.5%	21%	21.5%
2028-29	24%	26%	16%	22.5%	23%	22.5%
2029-30	26%	29%	17%	24.5%	24.5%	24.5%

RPO target for deemed licensees be same as that of ESCOM where the deemed licensee is situated

Source: KERC *Mercom India Research*

Solar RPO

Under the new regulations, all distribution licensees, including deemed licensees, have a solar RPO target of 11.50% for 2022-23.

Non-solar and Solar RPO Trajectory for Captive and Other Open Access Consumers

Source	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
Non-Solar	13%	14.75%	16.5%	18%	20%	21.5%	23%	25%
Solar	11.5%	12.5%	13.5%	14.5%	15.5%	16.50%	17.5%	19%

Source: KERC *Mercom India Research*

Captive and other open access consumers

The RPO target will apply to all grid-connected captive consumers, which are units of a single legal entity but located in more than one location in Karnataka. The combined RPO of all the units in the state will be considered to meet the RPO target.

Captive consumers and other open access consumers who have achieved a non-solar RPO of 85% will be permitted to meet the shortfall by excess solar, hydropower, or renewable energy certificates (REC) purchased beyond the specified solar RPO or hydropower purchase obligation (HPO) for the year.

Captive consumers and other open access consumers who have achieved a solar RPO of 85% will be permitted to meet the shortfall by excess non-solar,

hydropower, or renewable energy certificate purchased beyond the specified non-solar RPO or HPO for the year.

Hydropower purchase obligation

Captive consumers, other open access consumers, and distribution licensees, including deemed licensees, must procure hydropower from large hydro projects with more than 25 MW capacity and have a commercial, operational date after March 8, 2019, and up to date March 31, 2030.

HPO target will be trued up annually based on revised commissioning of hydro projects. Hydropower imported from outside India will not be considered for HPO.

Entities that have achieved an HPO target of 85% and above can meet their shortfall through excess solar and non-solar RPO for that particular year. If an entity cannot meet the HPO target due to the non-availability of hydropower of hydro-REC, the entity will be deemed to have met the HPO.

Solar RPO Trajectory for Distribution Licensees and Other Obligated Entities

ESCOMs	BESCOM	MESCOM	CESC	HESCOM	GESCOM	HRECS
2022-23	11.5%	11.5%	11.5%	11.5%	11.5%	11.5%
2023-24	12.5%	12.5%	12.5%	12.5%	12.5%	12.5%
2024-25	13.5%	13.5%	13.5%	13.5%	13.5%	13.5%
2025-26	14.5%	14.5%	14.5%	14.5%	14.5%	14.5%
2026-27	15.5%	15.5%	15.5%	15.5%	15.5%	15.5%
2027-28	16.5%	16.5%	16.5%	16.5%	16.5%	16.5%
2028-29	17.5%	17.5%	17.5%	17.5%	17.5%	17.5%
2029-30	19%	19%	19%	19%	19%	19%

RPO target for deemed licensees be same as that of ESCOM where the deemed licensee is situated

Source: KERC *Mercom India Research*

Karnataka: Hydropower Purchase Obligation

Year	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30
Target HPO (%)	0.35	0.66	0.08	1.48	1.80	2.15	2.51	2.82

Source: KERC *Mercom India Research*

The Ministry of Power issued a notification specifying RPO targets, including large hydropower projects commissioned after March 08, 2019. The government also issued policy measures to promote the hydropower sector and declared that large hydropower projects, including pumped storage projects with over 25 MW capacity which achieved commercial operation after March 08, 2019, are eligible to be classified as renewable energy sources.

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Export Duty on Steel Affecting Mounting Structure Prices

The Ministry of Finance announced a duty on export of steel and removal of duty on raw materials used for steel manufacturing which could bring down prices of module mounting structures

By : Rakesh Ranjan Parashar

The Ministry of Finance (Department of Revenue) has imposed a duty of 15% on the export of steel. The move is likely to bring down the prices of solar mounting structures, providing some relief to mounting structure manufacturers and solar project developers.

A 15% duty has been imposed on flat-rolled products of steel of a width of 600 mm or more, other bars and rods of stainless steel, and bars and rods hot rolled into irregularly wound coils of other alloy steel.

The government has decided not to impose any duty on the import of raw materials used for the production of steel, like pulverized coal, coking coal, and ferronickel.

Steel prices have been on an upward trend since last year.

JSW and Tata Steel dominate the Indian market. The export of steel by these companies adds to the demand-supply gap in the domestic market.

Harshal Akhouri, Co-founder of Strolar Mounting Systems, reacted to the government move by saying, "There is a considerable gap between domestic demand and supply. A 15% duty on steel export is a good step. With the duty in place, Indian products will not be competitive enough in the international market."

He also said that with no duties for raw materials, the price of coking coal is expected to decrease by 5%. He expected that the prices of module mounting structures would come down by nearly 10%.

"Once the demand picks up, prices will stabilize, and the developers will get a clearer picture of project development. For utility-scale projects, steel module mounting structures are used, whereas, for rooftop projects, aluminum is used," Akhouri added.

In the calendar year (CY) 2021, SNS Corporation, Strolar, and ISHKON Industries were the top three module mounting structure suppliers in the Indian solar market.

A top executive from another module mounting structure manufacturer said, "I think steel producers were exporting large quantities and creating a vacuum in India. Now, things will improve. With steel prices expected to decrease, developers and independent power producers will be happy. The price reduction could be up to 10%."

The executive, however, felt that the prices would come down only in July or August.

Last September, the Directorate General of Trade Remedies recommended anti-dumping duty on certain flat-rolled aluminum products imported from China to offset the injury caused due to dumping in the Indian market. Flat-rolled aluminum is used in manufacturing solar module mounting structures for rooftop solar projects.

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Energy Banking Regulations for Renewables in Chhattisgarh

The state regulator issued an order clarifying the energy banking regulations related to settlements, power scheduling, charges, wheeling of power

By : Rakesh Ranjan Parashar

The Chhattisgarh State Electricity Regulatory Commission (CSERC) recently issued an order to clarify the wheeling and banking regulations for independent distributed renewable energy systems (IDRES).

The Commission had decided to register the suo motu petition to remove any difficulties regarding the banking of energy as per provisions in clause 29 of the Distributed Renewable Energy (DRE) Regulations 2019.

Background

After notification of the first amendment to the DRE Regulations 2019, the draft order was revised, and a regulatory process was initiated before finalizing the order. The Commission also invited comments from stakeholders, based on which the Commission addressed the issues related to the banking of energy in the new order.

In September 2020, CSERC had proposed modalities for renewable energy banking, accounting, and wheeling of power to provide more clarity on the DRE regulations 2019.

Commission's Analysis

Calculation of banked energy

The Commission observed that the formula for calculating banked energy was clear, and there was no need to elaborate anymore.

Energy injection into the grid and consumption or drawal from the grid should be calculated in each time block for a day, and the monthly account should be prepared accordingly. To supply power to multiple consumers within the state, the solar project should provide the energy injection schedule to the state load despatch center (SLDC) for each consumer.

The Commission added that the transmission and wheeling charges would not be applicable for the entire useful life of the solar project; however, compensation for technical losses would be applicable.

The total renewable energy injected during the month, the total renewable energy adjusted during the month, renewable energy adjusted from the previous banked energy during the month, and net banked renewable energy for the month should be worked out by the distribution licensee by the end of that respective month.

Settlement of banked energy

On the issue of the settlement of banked energy, the Commission noted that the order would apply to IDRES plants and not the prosumer distributed renewable energy system (PDRES).

Independent distributed renewable energy systems of 500 kW can be set up for captive use or sale

The settlement of energy at the consumer end should be in the following priority:

- Solar energy injection after adjustment of transmission and wheeling losses
- Captive energy from the captive generating projects located at a distant location after adjustment of transmission and wheeling charges and losses as applicable
- Open access energy through exchange or any other source
- Banked solar energy redemption, and after that, any excess consumption should be considered as energy of distribution licensee

However, banked solar energy should be redeemed in the following order:

- Banked solar energy should be adjusted during the off-peak period as per the retail tariff order
- Banked solar energy should be adjusted during the normal period as per the retail tariff order
- Banked solar energy should be adjusted during the peak period as defined in retail tariff order with applicable peak with drawl charge

The Commission clarified that anyone could set up IDRES projects of 500 KW to sell electricity to anyone or for captive use. Thus, the

Commission specified a limit of 500 KW for users seeking open access.

Scheduling of power

Regarding scheduling of power, the state regulator noted that solar power projects should not be subjected to backing down; however, scheduling would be applicable without any commercial implications for the grid operations purpose. The scheduling of power will be governed through appropriate regulations without any commercial implications for solar power. Solar power not consumed due to stoppage or breakdown at the consumer end will be deemed to be banked.

The consumer should submit a time block-wise (15 minutes) schedule of power required in MW to SLDC daily for the next day, showing his energy drawl from the following sources:

- Solar Project
- Captive generating project located at a distant location
- Open access power through exchange or any other source

After the adjustment of energy, the remaining power consumption should be considered as banked energy redemption. After that, any excess energy should be deemed to be consumed from the distribution licensee and should be billed at the applicable retail tariff. Solar power not consumed due to stoppage or breakdown at the consumer end should be deemed to be banked.

Tariff and other charges for energy

The Commission noted that the deviation settlement mechanism (DSM) regulations 2016 specified the determination of demand charges for consumers procuring power from renewable projects for less than 5 MW. The same principle should be continued for all capacities of solar projects. The Commission also agreed that for the consumers availing solar power by open access, the applicable rate for demand charges needed to be rationalized reasonably to promote the use of solar power in the state.

Also, to balance the interest of consumers and the licensee, the applicable rates should be 60% of the

demand charges specified in the retail tariff order for the relevant consumer category.

The cumulative energy drawn from the distribution licensee should be billed to the consumer as per the relevant tariff category. Also, variable cost adjustment charges will apply to the distribution licensee's energy consumption.

Wheeling of power

The Commission noted that the provisions related to cross subsidy surcharge had already been specified in the DRE Regulations 2019, and the provisions were very clear. CSERC added that the review of any provisions of the DRE regulations was not within the scope of the current regulatory process.

Such consumers who procure power from solar projects through open access, a cross subsidy surcharge will not be levied till the life of that solar project. Transmission and wheeling charges will not be applicable for the entire useful life of the solar projects.

Also, SLDC charges will not be payable for the entire life of the solar project, i.e., 25 years from the commercial operation date.

Other points

The state regulator further noted that the modalities of banking and settlement as specified in this order would also be applicable for all the projects that achieved commercial operation dates after October 4, 2019. However, after such energy settlement, the unutilized energy or surplus energy will be purchased per the DRE Regulations provisions. Also, the solar energy generated by IDRES, except for energy use by obligated entities, will be considered for renewable purchase obligation (RPO) compliance of the distribution licensee.

In January this year, CSERC issued amendments to its CSERC (Grid Interactive Distributed Renewable Energy Sources) Regulations, 2019, for distributed solar power projects.

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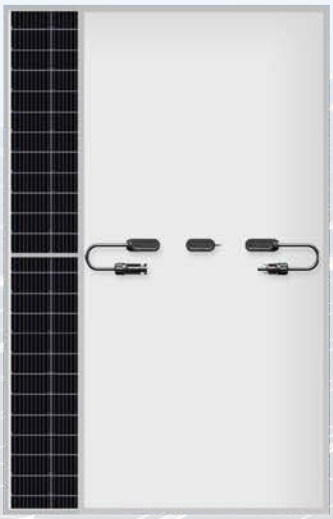

- JB Rated voltage 1500VDC
- Integrated Module type diode with "dual-chip" tranch
- JB rated current - 20A, 25A & 30A
- IP68 rating
- RTI of plastic 125°C
- Flammability class of V0-5VA
- 3xIEC for longer duration tests

DhaSh-Trio Junction Box
DSJB12y-1500VDC
20A,25A & 30A (Soldering type)

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Bank Guarantee Exemption for Agriculture Solarization Projects

The MNRE issued a notification exempting solar power projects under Components A and C of the PM-KUSUM program from a separate performance bank guarantee payment

By : Arjun Joshi

The Ministry of New and Renewable Energy (MNRE) has scrapped the need for a separate performance bank guarantee for solar projects to be set up under the Component A of the Pradhan Mantri Kisan Urja Suraksha Evem Utthan Mahabhiyan (KUSUM) program.

MNRE has also done away with submitting a performance bank guarantee under the guidelines for solarization of agricultural feeders under component-C of the KUSUM program.

Component-A

Earlier, developers had to submit an earnest money deposit (EMD) of ₹100,000 (-$1,289) in the form of a bank guarantee with the expression of interest. A successful bidder had to pay ₹500,000 (-$6,445) as a performance bank guarantee within 30 days of issuing the award letter. After submitting the performance bank guarantee, the initial EMD was returned to the successful developer.

Per the amended guidelines, developers must submit an EMD of ₹100,000 (-$1,289) in the form of a bank guarantee with the expression of interest. Once a developer wins the bids, the EMD will be converted into a performance bank guarantee.

Earlier, the successful bidder was required to sign a power purchase agreement (PPA) with the distribution company (DISCOM) as per the timeline. If the bidder failed to execute the PPA on time, DISCOM could encash the bank guarantee equivalent to EMD as a penalty.

Under the amended guidelines, the successful bidder must sign a PPA with the DISCOM as per the timeline. If the bidder fails to execute the PPA on time, DISCOM is allowed to encash the entire bank guarantee as a penalty.

Component-C

Per the amended guidelines, renewable energy as a service company (RESCO) developers no longer have to submit a bank guarantee to secure central financial assistance (CFA). The CFA will now be released after two months of the operation of the solar project.

Earlier, RESCO developers had to furnish a bank guarantee to avail CFA. The bank guarantee was then released in four lots of 25% each after 2.5 years, 5 years, 7.5 years, and 10 years from the commercial operational date.

In December 2021, MNRE issued a new guideline stating that states can invite bids to empanel vendors for different regions to install standalone solar pumps under the KUSUM program. However, the price discovered in the latest centralized tender would be considered the ceiling price.

Mercom reported that the performance bank guarantee criterion was a barrier for many to participate in bids in large numbers. There were suggestions that the performance bank guarantee could be restricted to the number of pumps the bidders intend to install in a cluster.

Top Players in the Indian Solar Market for 2021

Mercom India Research's India Solar Market Leaderboard 2022 includes the market share, shipment rankings of major stakeholders across the Indian solar supply chain in 2021

By : Rakesh Ranjan Parashar

Mercom India Research has released its latest report, India Solar Market Leaderboard 2022, which reveals the solar industry market leaders for the calendar year (CY) 2021.

The report features the industry's leaders, competitive landscape, market share, and shipment rankings across the Indian solar supply chain.

Top Utility-Scale Solar Developers in 2021

India added 10 GW of solar capacity in the CY 2021, making it the best year for the solar sector. The installations marked a 210% YoY growth, compared to 3.2 GW installed in CY 2020.

Large-scale solar projects accounted for 83% of installations during the year with 8.3 GW, a 230% increase YoY.

In 2021, ReNew Power was the largest utility-scale developer in terms of installations. It acquired 260 MW of

solar projects in Telangana and installed 250 MW solar projects connected to the interstate transmission system (ISTS) in Jaisalmer, Rajasthan. The company was listed on the Nasdaq in 2021 after completing a business combination with RMG Acquisition Corporation II, a special purpose acquisition company (SPAC).

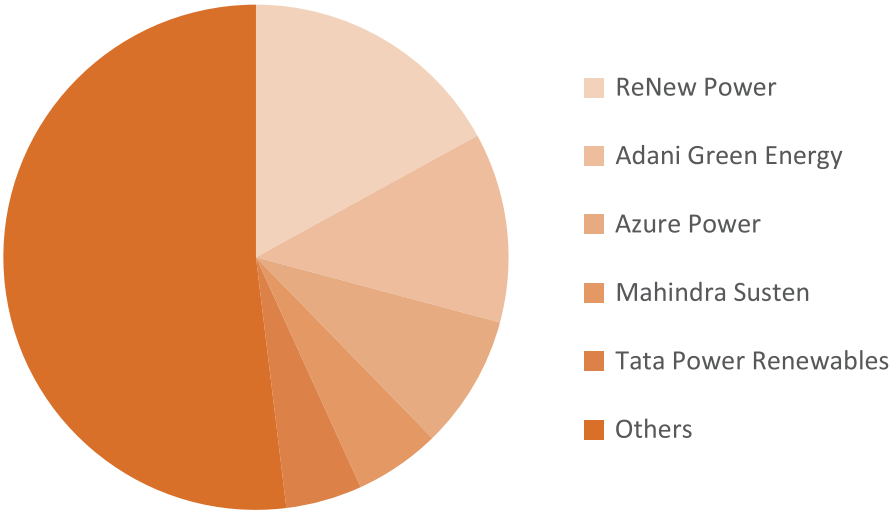
Adani Green had the second most installed capacity in 2021, which included a 150 MW solar project in Kutch, Gujarat, commissioned three months ahead of schedule. The acquisition of SB Energy expanded its portfolio by 1,700 MW of operational and 3,554 MW of projects under construction. Other acquisitions by Adani included solar projects of Essel Green Energy, Sterling & Wilson, SkyPower Global, and Hindustan Power during the year.

Azure Power was third on the list of top developers in 2021. The company sold its non-core rooftop solar portfolio during the year. OMERS Infrastructure acquired a 19.4% stake in the company for $219 million from International Finance Corporation (IFC) and IFC GIF Investment Company.

Mahindra Susten and Tata Power Renewables rounded off the top five in the list.

The top five developers accounted for almost 50% of the total utility-scale solar added in CY 2021.

Leading Utility-scale Solar Developers in India CY 2021 (Jan-Dec)



Source: Mercom's India Solar Market Leaderboard CY 2021

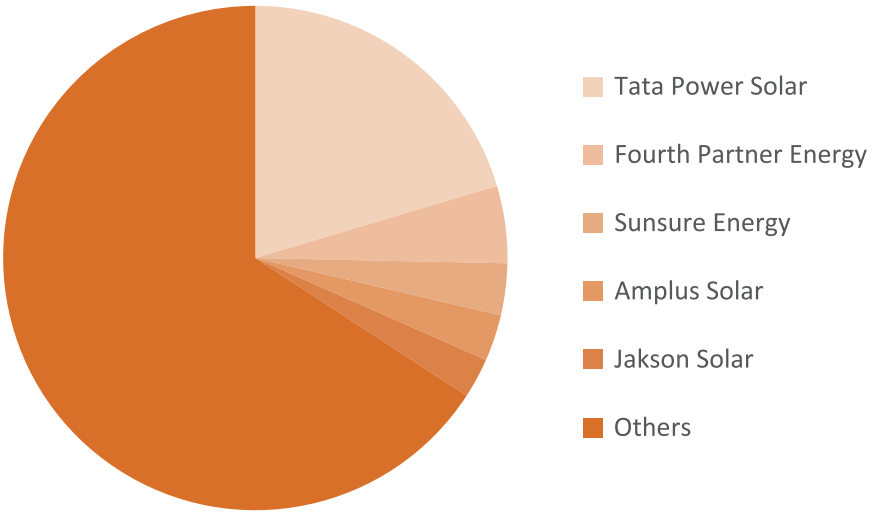
Adani Green Energy was the top utility-scale developer (both cumulative operational and under-development capacity) as of December 2021, followed by Azure Power and NTPC.

The top 10 utility-scale solar developers collectively accounted for 68% of the total installations.

Adani Solar, Avaada Energy, and Azure Power were the top utility-scale solar project developers in the first half (1H) of CY 2021.

Top Rooftop Solar Companies in 2021

Leading Rooftop Solar Installers in India CY 2021 (Jan-Dec)



Source: Mercom's India Solar Market Leaderboard CY 2021

Tata Power Solar, Fourth Partner Energy, Sunsure Energy, Amplus Solar, and Jakson Solar emerged as the top solar rooftop companies in India in CY 2021.

The top three companies accounted for 29% of the total market share in CY 2021.

The top ten companies accounted for 44% of the total rooftop installations in 2021.

In CY 2021, India added 1.7 GW of rooftop solar, the highest in any given year. The top 10 states accounted for nearly 83% of the cumulative rooftop solar installations at the end of Q4.

The rooftop segment experienced two consecutive years of slowdown (2019 and 2020) in installations due to the COVID pandemic and policy uncertainty. 2021 was a bounce-back year for the rooftop segment.

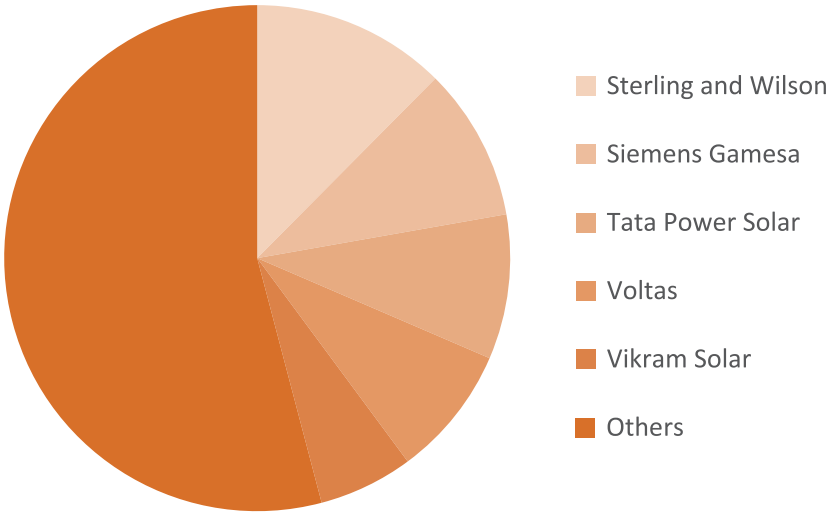
Rooftop Developers

Fourth Partner Energy, Amplus Solar, ORB Energy, Hero Future Energies, and Enerparc were India's top rooftop solar developers in CY 2021. The top three companies accounted for 38% of the total market share in CY 2021.

Rooftop EPCs

Tata Power Solar, Sunsure Energy, Jakson Solar, Roofsol Energy, and Havells India were India's leading solar engineering, procurement,

Leading Utility-Scale Solar EPC Companies in India CY 2021 (Jan-Dec)



Source: Mercom's India Solar Market Leaderboard CY 2021

and construction (EPC) companies in CY 2021. The top three companies accounted for 34% of the total market share in CY 2021.

The Ministry of New and Renewable Energy (MNRE) has stated that all open access and net metering (rooftop solar) projects will need to source modules from the vendors listed in the ALMM starting October 1, 2022.

The Distributed Solar Power Association (DiSPA), an industry body of developers of distributed solar projects, had petitioned the Delhi High Court against the ALMM mandate, which it claimed could adversely impact the projects under open access and net metering. It suggested that MNRE delay ALMM implementation for commercial and industrial solar projects by one year.

Even with policy restrictions and price volatility in the market, the economic and the environmental benefits of clean energy sources of power, specifically solar is, driving the growth in the rooftop solar segment.

Top Utility-Scale Solar EPC Companies in 2021

Sterling and Wilson, Siemens Gamesa, and Tata Power Solar were the top utility-scale solar EPC service providing companies in 2021.

Voltas and Vikram Solar rounded off the top five.

Sterling and Wilson led the way with a market share of 12%. In February this year, Reliance New Energy Solar, the green energy arm of Reliance Industries, completed the 40% stake acquisition in Sterling and Wilson Renewable Energy. Reliance acquired the stake through a primary investment, a secondary purchase, and an open offer.

Siemens Gamesa was second on the list with 10%. Siemens Gamesa provided EPC services to a 300 MW utility-scale solar project in Rajasthan commissioned in CY 2021.

Tata Power Solar accounted for 9% of the market share. Recently, SJVN awarded the EPC contract for its 1 GW solar project in Bikaner, Rajasthan, to Tata Power Solar Systems. The project will be developed at an estimated cost of ₹54.91 billion (-$72.21 million), making it India's largest solar EPC contract.

Voltas and Vikram Solar made it to the top five in 2021 with 8% and 6% of the market share, respectively.

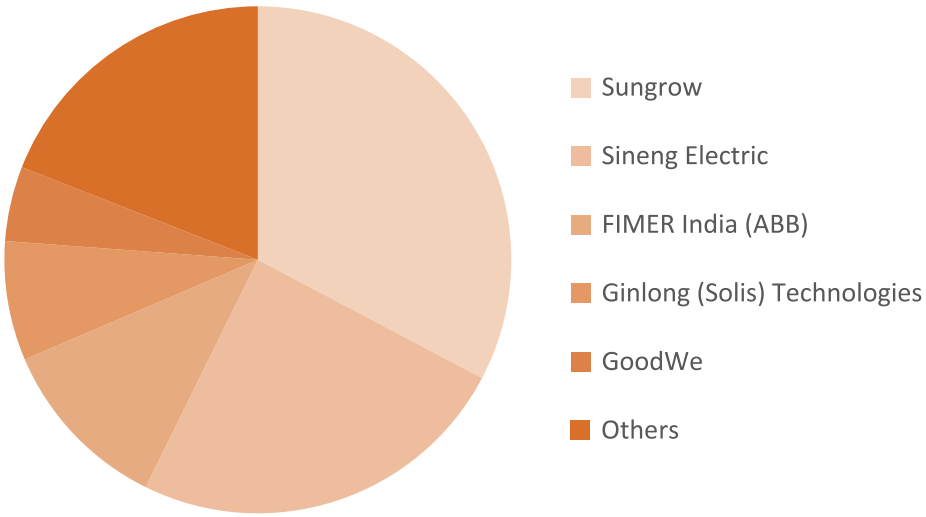
The top ten EPC players garnered 70% of the total market share in CY 2021.

Solar EPC segment in the country

India has become an attractive destination for investors with 53.2 GW of large-scale solar projects in the pipeline, with another 27.7 GW of projects tendered and pending auction at the end of 2021. According to the Central Electricity Authority, India's installed power capacity is expected to rise to 817 GW by 2030 from 393 GW as of December 2021.

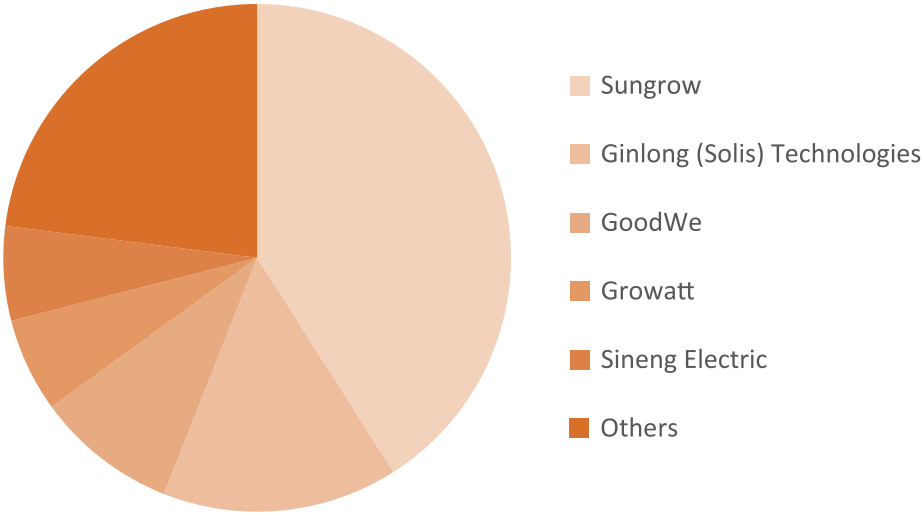
Despite the challenges plaguing the sector, the developments in the Indian solar sector bode well for the future, and more Indian players are now venturing into the EPC segment. Several domestic module manufacturers are foraying into the EPC business to enhance their revenues and margins.

Leading Solar Inverter Suppliers in India CY 2021 (Jan-Dec)



Source: Mercom's India Solar Market Leaderboard CY 2021

Leading Solar String Inverter Suppliers in India CY 2021 (Jan-Dec)



Source: Mercom's India Solar Market Leaderboard CY 2021

Expectations are high for 2022 and 2023 after a strong 2021 for the solar sector. The entry of Voltas and Siemens Gamesa into the top five is an example of new players making their mark in the EPC segment in India.

Earlier, Mahindra Susten, Vikram Solar, and BELECTRIC were the top utility-scale solar EPC service providers in the first half (1H) of CY 2021.

Top Solar Inverter Suppliers in 2021

Sungrow, Sineng Electric, FIMER India (ABB), Ginlong (Solis) Technologies, and GoodWe were the top five solar inverter suppliers in the Indian solar market in CY 2021.

The top three companies accounted for 68% of the total market share in CY 2021.

The top five solar inverter suppliers accounted for almost 81% of the total inverter supplies to the country in 2021.

String Inverters

String inverters have made rapid inroads in the Indian solar market over the past couple of years and, for the first time, overtook central inverters in 2021. In this category, Sungrow, Ginlong (Solis) Technologies, GoodWe, Growatt, and Sineng Electric were the top five suppliers in the Indian solar market in CY 2021.

The top three companies accounted for 65% of the total market share in CY 2021. The top five string inverter suppliers accounted for nearly 77% of the total inverter supplies to the country in 2021.

Central Inverters

In the central inverters category, Sineng Electric, Sungrow, FIMER India (ABB), TMEIC, and Delta Electronics were the top five suppliers in the Indian solar market in CY 2021.

The top three companies accounted for 93% of the total market share in CY 2021. The top five central inverter suppliers accounted for almost 99% of the total inverter supplies to the country in 2021.

Sungrow, Sineng Electric, and TBEA Energy were the top solar inverter suppliers in the Indian solar market in the first half of the calendar year 2021, according to Mercom's India Solar Market Leaderboard 1H 2021 report.

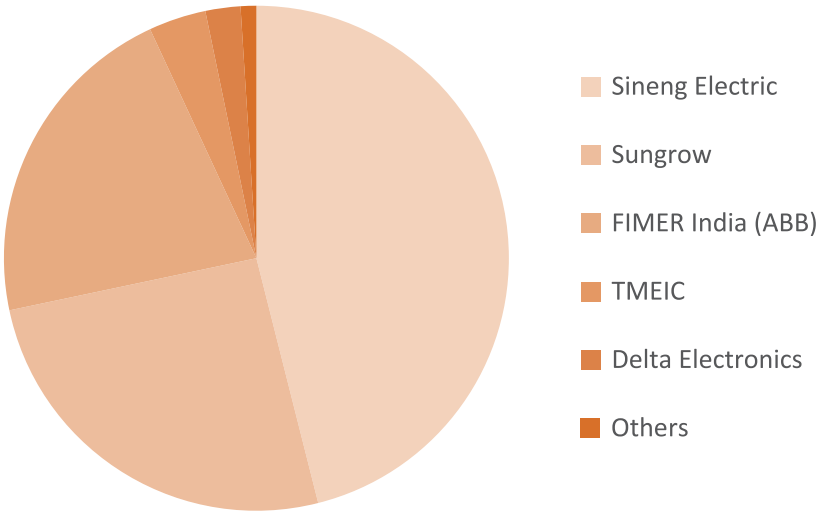
MNRE issued a fresh notification extending the self-certification of solar photovoltaic inverters under the Bureau of Indian Standards from December 31, 2021, to June 30, 2022. The extension was granted as the industry had sought more time for compliance, considering the issues relating to testing and the level of preparation of test labs. However, this deadline has elapsed, and it is unclear what actions the government will take on the issue of BIS certification for solar inverters.

Top Module Suppliers in 2021

LONGI Solar, Jinko Solar, JA Solar, Adani Solar, and Trina Solar were the leading module suppliers to the Indian solar market in CY 2021. The three companies were responsible for half of the modules supplied to solar projects in India during the year.

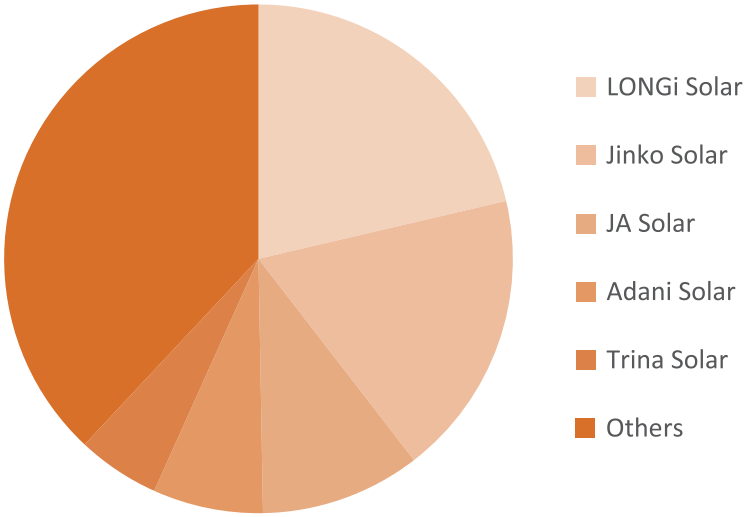
The top five module suppliers accounted for approximately 60% of the market share. LONGi Solar was the leading module supplier to India for the

Leading Solar Central Inverter Suppliers in India CY 2021 (Jan-Dec)



Source: Mercom's India Solar Market Leaderboard CY 2021

Leading Solar Module Suppliers in India CY 2021 (Jan-Dec)



Source: Mercom's India Solar Market Leaderboard CY 2021

second consecutive year.

Three other Indian module manufacturers besides Adani Solar made it to the top 10 module suppliers list in 2021.

In CY 2021, polycrystalline modules made up for about 30% of the total modules supplied to the Indian solar market, whereas monocrystalline modules accounted for over 60%. According to the report, bifacial, thin-film, and HJT modules were supplied in minimal capacities during the year.

Solar imports in 2021 spiked 641% compared to the previous year. Being the last quarter before the basic customs duty on modules and cells took effect, 9.7 GW of solar modules were imported in the first quarter of 2022.

To curb imports and achieve gigawatt-scale high-efficiency solar module manufacturing capacity in the country, the Ministry of New and Renewable Energy has issued new guidelines for the second phase (Tranche II) of the production-linked incentive program. An additional ₹195 billion (-$2.51 billion), along with the initial allocation of $45 billion ($617 million), has been announced in the 2022-23 Union Budget to fund the program.

Top Module Mounting Structure Suppliers in 2021

In the CY 2021, SNS Corporation, Strolar, and ISHKON Industries were the top three module mounting structure suppliers in the Indian solar market. Arctech and Voltas rounded off the top five, according to Mercom's recently released report India Solar Market Leaderboard 2022.

Together, these five companies accounted for 63% of the market demand, while the top 10 suppliers commanded nearly 77% of the market share.

Module mounting structures are an integral part of any solar power project. A good mounting structure is of utmost importance for any ground-mounted or rooftop solar project. They sustain the weight of the modules and withstand temperature variations and high wind speeds.

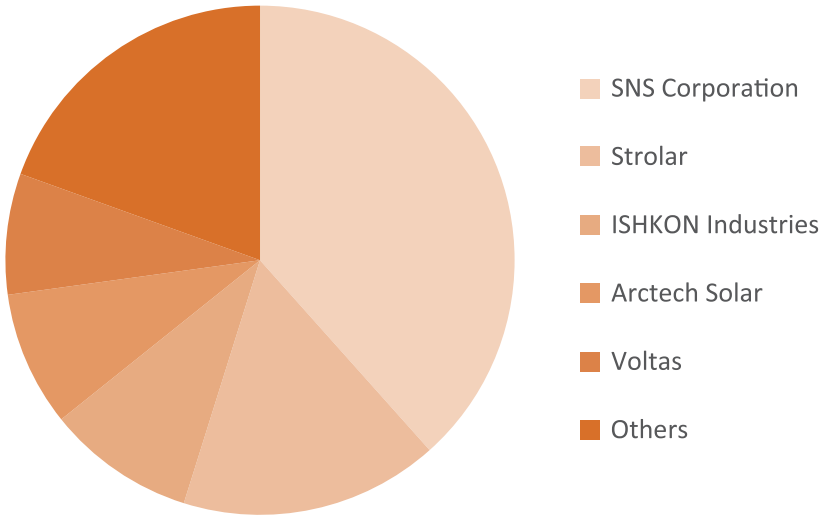
The report noted that seven new companies entered the top ten list in CY 2021.

Last September, the Directorate General of Trade Remedies recommended anti-dumping duty on certain flat-rolled aluminum products imported from China to offset the injury caused due to dumping in the Indian market. Flat-rolled aluminum is used in manufacturing solar module mounting structures used in ground-mounted and rooftop solar projects. The investigation was conducted for April 1, 2019, to March 31, 2020.

The demand-supply gap and the increasing prices of raw materials like steel and aluminum were the main factors that impacted India's solar mounting structure market in 2021.

Despite several challenges, 2021 proved to be a good one for the solar sector, breaching the 10 GW mark for the first time. Module mounting structure suppliers can expect a better year in 2022.

Leading Solar Module Mounting Structure Suppliers in India in CY 2021



Source: Mercom's India Solar Market Leaderboard CY 2021

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Anti-Dumping Duty on Solar Glass Imports from China to be Extended

After a thorough review, the DGTR of India recommended an extension of anti-dumping duty on imported textured tempered glass (solar glass) from China for two more years

By : Arjun Joshi

The Directorate General of Trade Remedies (DGTR) has recommended extending the anti-dumping duty on imported textured tempered glass (solar glass) from China by two more years.

DGTR found that solar glass continues to be exported to India at prices below normal value resulting in continued dumping. The dumping margin had increased during the period of the sunset review investigation as compared to the time of the original investigation.

According to the findings, the volume of imports from China will likely increase significantly, considering the dumped and injurious price at which goods have been exported. DGTR found a high export orientation of producers and exporters for solar glass in China who have significant surplus capacities.

Having conducted the review into dumping, injury, and the likelihood of continuation or recurrence of dumping and injury, DGTR concluded that continued imposition of anti-dumping duty is necessary.

Background

The Finance Ministry had imposed an anti-dumping duty on Chinese solar glass for five years, with effect from August 18, 2017. DGTR initiated an anti-dumping probe following a request from Indian solar glass manufacturer Borosil Renewables.

After an investigation, DGTR found no material difference between solar glass exported from China and those produced in India. The directorate found that solar glass produced domestically was comparable to the imported product in terms of physical characteristics, production technology, manufacturing process, and uses.

Price undercutting and suppression

DGTR found that the landed value of solar glass from China is significantly below the net sales realization of the domestic industry. Accordingly, the imports are undercutting the prices of the domestic industry. DGTR also found that the weighted average landed value of solar glass from China is consistently below the weighted average selling price and the weighted average cost of domestically produced solar glass. It also found that imported solar glass was undersold by ₹50 - ₹60 per ton.

DGTR noted that one of the Chinese producers shifted its exports from China to Malaysia after imposing anti-dumping duties on China. The combined market share of imports from China and Malaysia was significant during the entire investigation period.

Recommended anti-dumping duty

DGTR has recommended an anti-dumping duty of $192.82/MT on solar glass originating in or exported from China from producers Flat Glass Group, Anhui Flat Solar Glass Co, and Zhejiang Jiafu Glass Co. An anti-dumping duty of $253.39/MT on Shaanxi Topray Solar Co and $226.37/MT on Wujiang CSG Glass Co and Dongguan CSG Solar Glass Co has also been imposed.

An anti-dumping duty of $302.65/MT has been recommended on solar glass originating from any country other than China.

In March this year, DGTR recommended imposing anti-dumping duty on the imports of fluoro backsheet originating in or exported from China for five years. It initiated an anti-dumping probe after Indian module manufacturer RenewSys claimed that the Chinese fluoro backsheet is identical to what is manufactured in India.

DGTR has also recommended anti-dumping duty on certain flat-rolled aluminum products imported from China to offset the injury caused due to dumping in the Indian market. Hindalco Industries had filed an application seeking an anti-dumping investigation on the imports of flat-rolled aluminum products used in solar mounting structures.

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Anti-Dumping Investigation on Imports of Textured Tempered Glass (Solar Glass) Originating in or Exported from China PR

Tariff Item	Description	Country of Origin	Country of Export	Producer	Amount	
					$/MT	~₹/MT
70071900	Textured Toughened (Tempered) Coated and Uncoated Glass*	China PR	Any country including China PR	Flat Glass Group Co., Ltd.	192.82	14,882.43
		China PR	Any country including China PR	Anhui Flat Solar Glass Co., Ltd	192.82	14,882.43
		China PR	Any country including China PR	Zhejiang Jiafu Glass Co., Ltd.	192.82	14,882.43
		China PR	Any country including China PR	Shaanxi Topray Solar Co Ltd	253.39	19,557.40
		China PR	Any country including China PR	Wujiang CSG Glass Co., Ltd	226.39	17,473.46
		China PR	Any country including China PR	Dongguan CSG Solar Glass Co., Ltd.	226.37	17,471.92
		China PR	Any country including China PR	Any producer other than mentioned above	302.65	23,359.43
		Any country other than China PR	China PR	Any producer	302.65	23,359.43

** Note: Textured Toughened (Tempered) Glass with a minimum of 90.5% transmission having thickness not exceeding 4.2 mm (including tolerance of 0,2 mm) and where at least one dimension exceeds 1500 mm, whether coated or uncoated.*

Source: Government of India

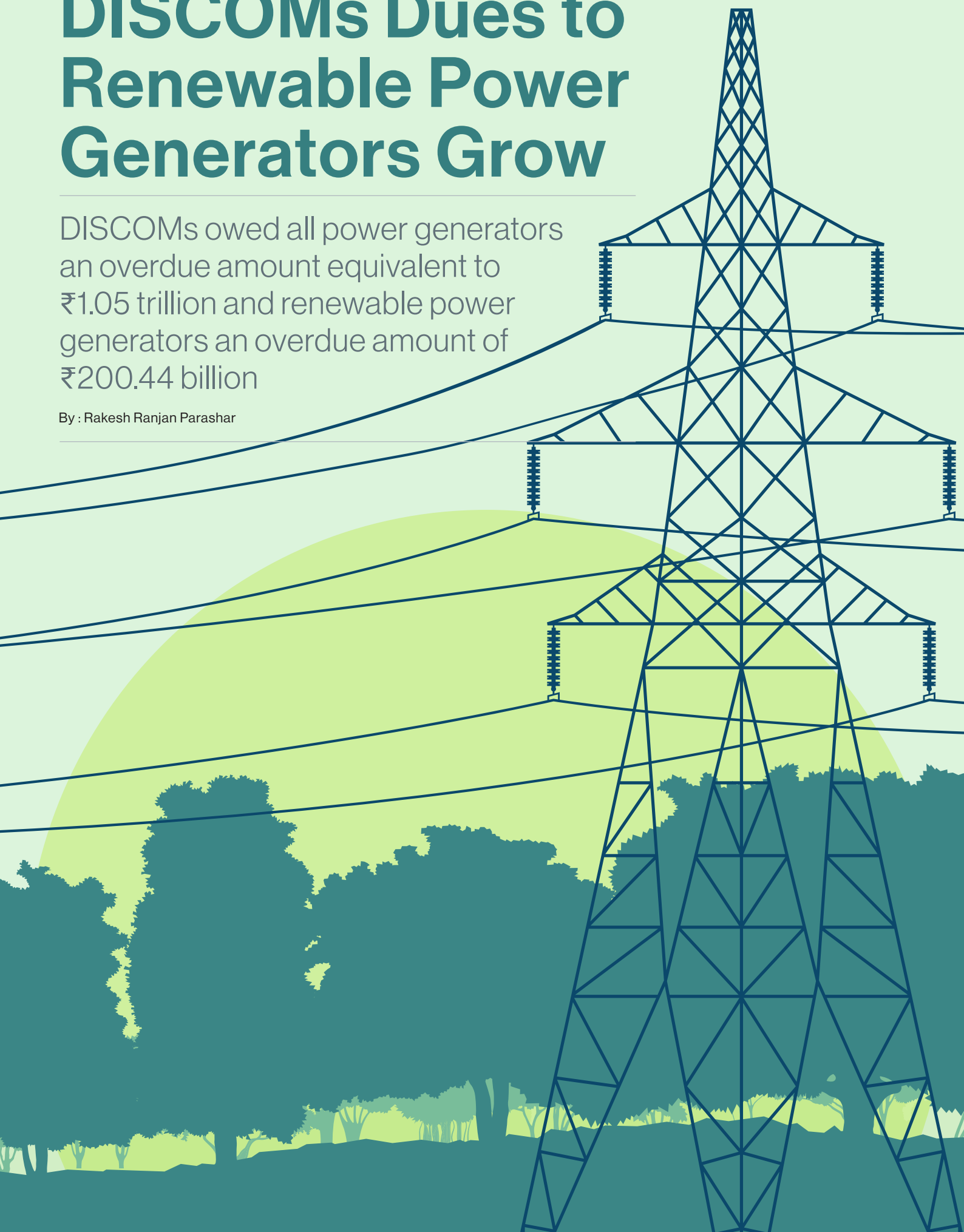
Mercom India Research

[Markets]

DISCOMs Dues to Renewable Power Generators Grow

DISCOMs owed all power generators an overdue amount equivalent to ₹1.05 trillion and renewable power generators an overdue amount of ₹200.44 billion

By : Rakesh Ranjan Parashar



Distribution companies (DISCOMs) owed renewable generators ₹204.39 billion (-$2.64 billion) in overdue payments (excluding disputed amounts) at the end of May, according to the data released by the Ministry of Power.

The figure marked an increase of nearly 2% compared to ₹200.44 billion (-$2.59 billion) at the end of April 2022.

Overdue amounts are payments that are past their due date (between 45-60 days) and remain partially or entirely unpaid.

According to the data released by the Ministry of Power's payment ratification and analysis portal PRAAPTI, the outstanding amount to renewable generators at the end of the month increased by a massive 425% to ₹8.97 billion (-$115.53 million). At the end of April, the amount was ₹1.71 billion (-$22.02 million).

At the end of May, DISCOMs owed power generators an overdue amount of ₹1.05 trillion (-$13.60 billion), increasing 12% from ₹939.39 billion (-$12.12 billion) at the end of April 2022.

The outstanding amount at the end of the month stood at ₹189.68 billion (-$2.45 billion), 24% less than the ₹250.94 billion (-$3.24 billion) at the end of April.

The DISCOMs released ₹138.04 billion (-$1.78 billion) against the overdue amount in May, a decrease of 7% compared to ₹148.71 billion (-$1.92 billion) during April.

They also released ₹61.56 billion (-$792.89 million) against the outstanding amount, 10% higher than the ₹56.11 billion in April (-$722.69 million).

At the end of the month, the renewable energy generators that DISCOMs owed the most were Adani Green Energy, Hero Future Energies, Tata Power Company, and ACME Solar.

Among the states, Tamil Nadu had the highest backlog with an overdue amount of ₹216.2 billion (-$2.78 billion), followed by Maharashtra and Andhra Pradesh, with ₹215.45 billion (-$2.77 billion) and ₹114.91 billion (-$1.48 billion), respectively.

In terms of ease of doing business with the DISCOMs, Jammu and Kashmir and Meghalaya were ranked the lowest. Other states that performed badly during the month were Maharashtra, Telangana, Andhra Pradesh, Tamil Nadu, and Jharkhand.

During the month, the states that did well were Himachal Pradesh, Uttar Pradesh, Uttarakhand, Nagaland, Bihar, Gujarat, Goa, Arunachal Pradesh, Mizoram, Assam, Odisha, Chhattisgarh, and Goa.

Recently, the Ministry of Power announced that it was working on a program to mitigate the financial woes of the DISCOMs by liquidating their dues. The proposed program enables payment of these financial dues in easy installments by the DISCOMs. They will be offered a one-time relaxation wherein the outstanding amount, including the principal and the late payment surcharge, will be frozen on the date of the notification without the further imposition of late payment surcharges.

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DISCOMs' Dues to Power Generators

Particulars	Up to May 2022		Up to April 2022		% of Change
Overdue and Outstanding	**₹ in Billion**	**~$ Billion**	**₹ in Billion**	**~$ Billion**	**% of Change**
Overdue amount at the beginning of the month	939.39	12.12	902.9	11.65	*4.0%*
Total amount billed to DISCOMs	252.98	3.26	312.26	4.03	*-19.0%*
Amount paid by DISCOMs against overdue	138.04	1.78	148.71	1.92	*-7.2%*
Amount paid by DISCOMs against outstanding	61.56	0.79	56.11	0.72	*10%*
Overdue amount at the end of the month	1054.42	13.60	939.39	12.12	*12.2%*
Outstanding amount at the end of the month	189.68	2.45	250.94	3.24	*-24%*
RE Generetors - Overdue amount at the end of the month	204.3984	2.64	200.44	2.59	*1.97%*
RE Generetors -Outstanding amount at the end of the month	8.9712	0.12	1.71	0.02	*425%*

Overdue invoices are those which remain fully or partly unpaid past the due date*

Source: PRAAPTI

Mercom India Research

Government Invokes Emergency Provisions to Tide Over Coal Shortages

The Ministry of Power has invoked Section 11 of the Electricity Act to manage the coal shortages and the rising power demand across the country

By : Arjun Joshi

Faced with a severe coal shortage at coal-based thermal power plants leading to load shedding in many areas across India, the Ministry of Power has directed all imported coal-based power plants to generate power at full capacity. It has directed all states and domestic coal-based power generation companies to import at least 10% of the coal requirement for blending.

Invoking Section 11 of the Electricity Act in response to the emergency, the ministry has advised the states to allow the price of coal to be pass-through. Most states have done that, and about 10 GW out of 17.6 GW of imported coal-based generation capacity has started operating.

According to Section 11 of the Electricity Act, the "Government may specify that a generating company shall, in extraordinary circumstances, operate and maintain any generating station in accordance with the directions of that Government." And "the appropriate Commission may offset the adverse financial impact of the directions on any generating company in such manner as it considers appropriate."

Power demand has gone up by almost 20%, and despite the increase in domestic coal supply, the demand is not being met. This has led to load shedding in several parts of India. With the mismatch between the daily coal consumption for power generation and the daily coal receipts at the power plants, coal stocks have been depleting at an alarming rate.

The international price of coal has skyrocketed to around $140/ton. As a result, the import of coal for blending was ~37 million tons in 2015-16. However, coal import has dwindled, leading to more pressure on domestic coal. The current imported coal-based generation capacity is around 17.6 GW, the Ministry of Power said.

The purchase power agreements (PPA) for imported coal-based plants do not have adequate provision for the pass-through of the increase in international coal prices. Given the current imported coal price, operating an imported coal-based plant and supplying power at the PPA rates will lead to enormous losses for the generators. This has led to generators' unwillingness to run the plants.

In the light of the present emergency circumstances, the ministry has issued directions under Section 11 of the Electricity Act. The order will remain valid up to October 31, 2022.

All imported coal-based power plants must operate and generate power to their full capacity. The ministry stated that these plants must supply power to PPA holders first, and any surplus power sold at the power exchanges.

If a plant has PPAs with multiple distribution companies (DISCOMs), and one DISCOM does not schedule any quantity of power, that power must be offered to other PPA holders. Any remaining quantity must be sold through the power exchanges.

Since PPAs do not provide for the pass-through of high costs of imported coal, the rates at which the power will be supplied to PPA holders must be worked out by a committee constituted by the ministry. The committee will have representatives from the Ministry of Power, Central Electricity Authority, and Central Electricity Regulatory Commission. To ensure a fair margin, it will ensure that the benchmark power rates meet all the prudent costs of using imported coal for generating power, including the current coal price, shipping costs, and operation and maintenance costs.

If the generators own coal mines abroad, the mining profit will be set off to the extent of the shareholding of the generating company in the coal mine.

The PPA holders will pay the generating companies according to the generator's benchmark cost or mutually negotiated rate with the generating company. Payments must be made to the generating company weekly.

If any DISCOM is unable to enter into mutually negotiated rates with the generating company, or unwilling to procure power at the benchmark cost worked out by the committee, or unable to make weekly payments, such quantities of power will be sold in the power exchanges. The net profit from this sale must be equally shared between the generator and PPA holder monthly.

The ministry has advised the states to allow the price of coal to be pass-through

Benchmark costs worked out by the committee will be reviewed every 15 days, considering the change in the price of imported coal and shipping costs.

Union Power Minister R.K. Singh advised the States to place orders to import coal for blending so that the additional coal reaches power plants from the current month. He said domestic coal would be supplied to all power generation companies in proportion to the coal received.

He also advised the states to increase the output from the captive mines to meet their coal requirements which will help reduce the burden on coal linkages. He emphasized that states need to take action to ensure coal supply to their power plants by confirming off-take in the rail-cum-road (RCR) mode to meet the shortfall.

If the states do not lift the RCR coal, it would be offered to other states.

Tamil Nadu and Maharashtra have placed orders to import coal, while Punjab and Gujarat are finalizing tenders. Rajasthan and Madhya Pradesh are in the process of issuing the tenders. Haryana, Uttar Pradesh, West Bengal, Odisha, and Jharkhand have not yet issued tender or taken any significant actions to import coal and were advised to ensure coal supply to their power plants.

The Status of RCR was also deliberated upon, and it was seen that the progress of Andhra Pradesh, Karnataka, Madhya Pradesh, West Bengal, Haryana, and Uttar Pradesh on lifting the allotted coal was not satisfactory. These states were advised to expedite lifting this coal, failing which this RCR coal would be allocated to other power generation companies which need it.

Mercom had reported that India had faced a similar situation last year when it witnessed a surge in power demand, with industrial and economic activity picking up pace post-pandemic. Thermal power plants faced a crisis with coal stocks bottoming out.

Coal accounts for about 70% of India's power generation.

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India's Solar Installations Rise by 50%

According to Mercom's recently released Q1 2022 India Solar Market Update, India installed 3 GW of solar capacity in Q1 2022, while the industry contemplates if the country would achieve its 2022 target

By : Arjun Joshi

India installed over 3 GW of solar capacity in the first quarter (Q1) of the calendar year (CY) 2022, a quarter-over-quarter (QoQ) increase of 21% compared to 2.6 GW installed in the previous quarter. On a year-over-year (YoY) basis, installations rose by 50% from the 2 GW installed in the same period last year.

The latest installation data was revealed in Mercom's newly released report - Q1 2022 India Solar Market Update.

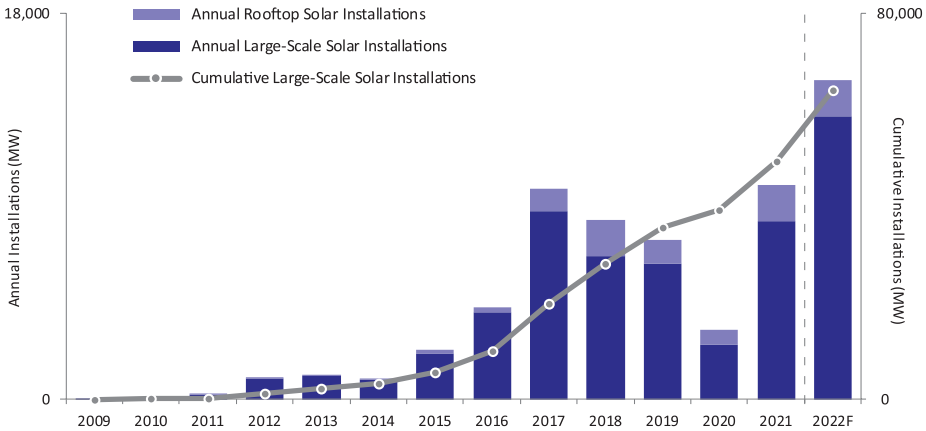
In Q1 2022, India installed 2.7 GW of large-scale solar, a QoQ increase of 23% compared to 2.2 GW installed in the previous quarter and up 53% YoY compared to 1.7 GW installed in the same period last year.

Large-scale solar accounted for 85% of the installations, and rooftop accounted for the remaining 15% during the reporting period. India's cumulative installed solar capacity now stands at 52 GW.

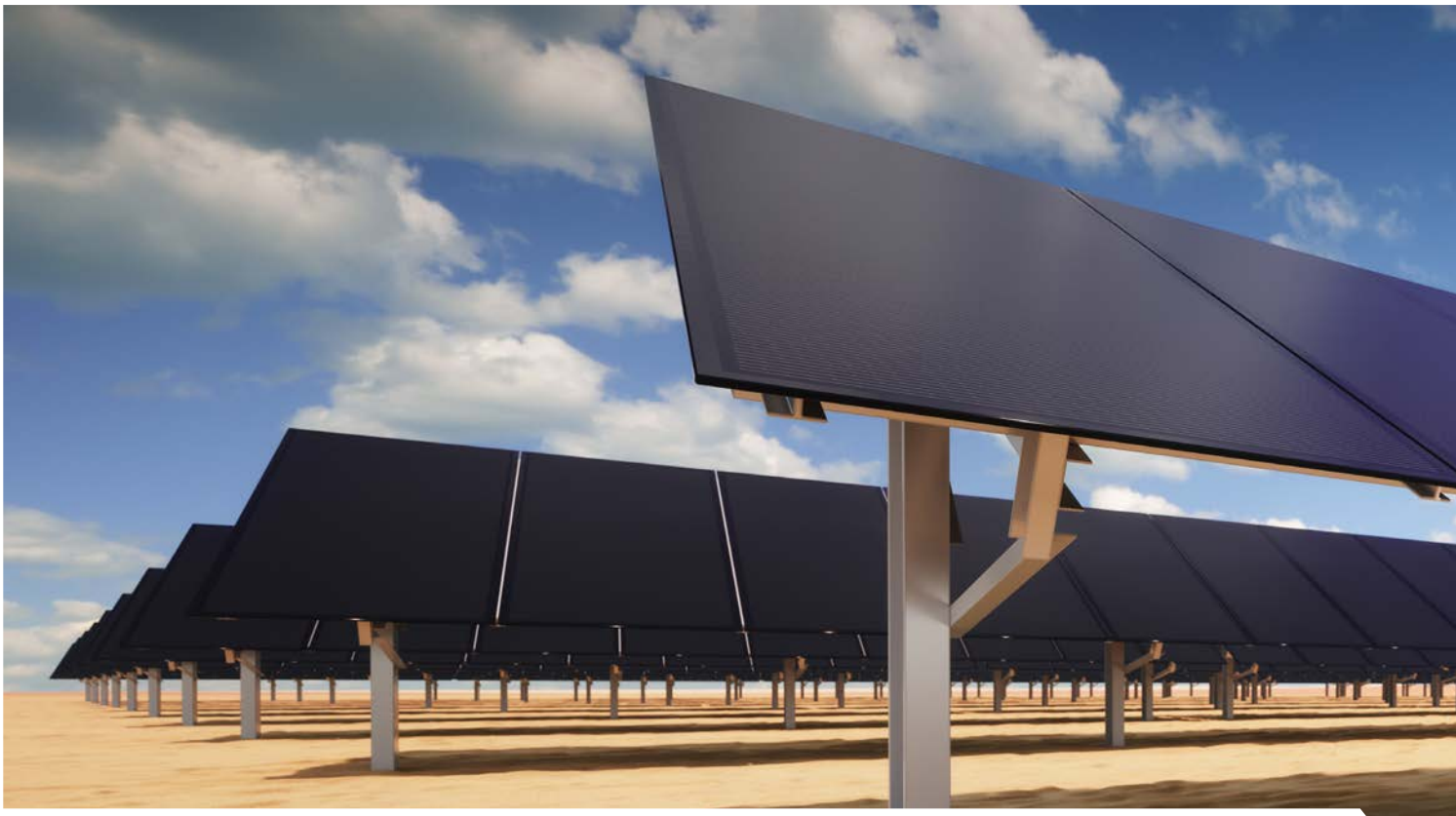
India has a utility-scale projects development pipeline of over 54 GW.

India added 4.6 GW of total power capacity during the quarter, with most

India Solar Installations (MW)



Source: Mercom India Research (Mar 2022)



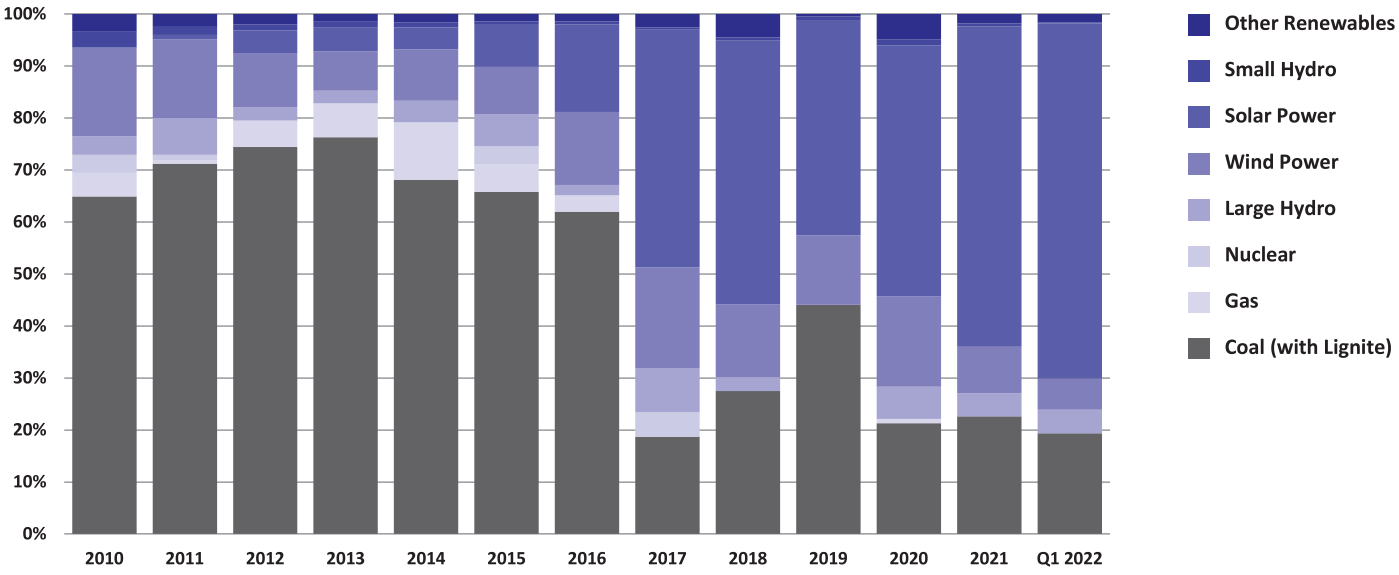
new installations coming from solar power. Solar accounted for 68% of new power capacity during the quarter, the largest share of new power generation captured by solar in any given quarter.

Rajasthan became the first state to cross 10 GW of cumulative large-scale solar installations at the end of March 2022. The state accounts for 24% of the total installations in the country.

Rajasthan and Gujarat were the top states for solar during the quarter, accounting for 52% and 18% of installations, respectively, followed by Karnataka with 6%.

Share of New Power Capacity Additions in India (2010-Q1 2022)

Solar accounts for 68.3% of New Power Capacity Additions during Q1 2022



MNRE's revised cumulative Bio-Power figures not included
Data from CEA, MNRE, Mercom India Solar Project Tracker

Source: Mercom India Research (Mar 2022)

There is still a lot of ambiguity around projects impacted by the Great Indian Bustard (GIB). To protect the critically endangered bird, the Supreme Court said that transmission lines running through the priority areas of the GIB need to be either underground or have bird diverters installed.

A committee has been formed to review cases individually and provide feedback to the apex court. This process is taking time and will likely affect project development this year.

"The uncertainty around the Great Indian Bustard case in Rajasthan is the only issue standing in the way of 2022 being another record year for solar installations. Everything depends on the Supreme Court ruling and how quickly it is resolved. A little push from the government can help India surpass the 60 GW large-scale solar installation target set for 2022, which will be a great achievement," said Raj Prabhu, CEO of Mercom Capital Group.

According to the report, while 2021 was the most significant year for the Indian solar industry, with over 10 GW of installations, 2022 is slated to be an even stronger year.

Rajasthan became the first state to reach 10 GW of cumulative large-scale solar installations

Key Highlights from Mercom India Research's Q1 2022 India Solar Market Update:

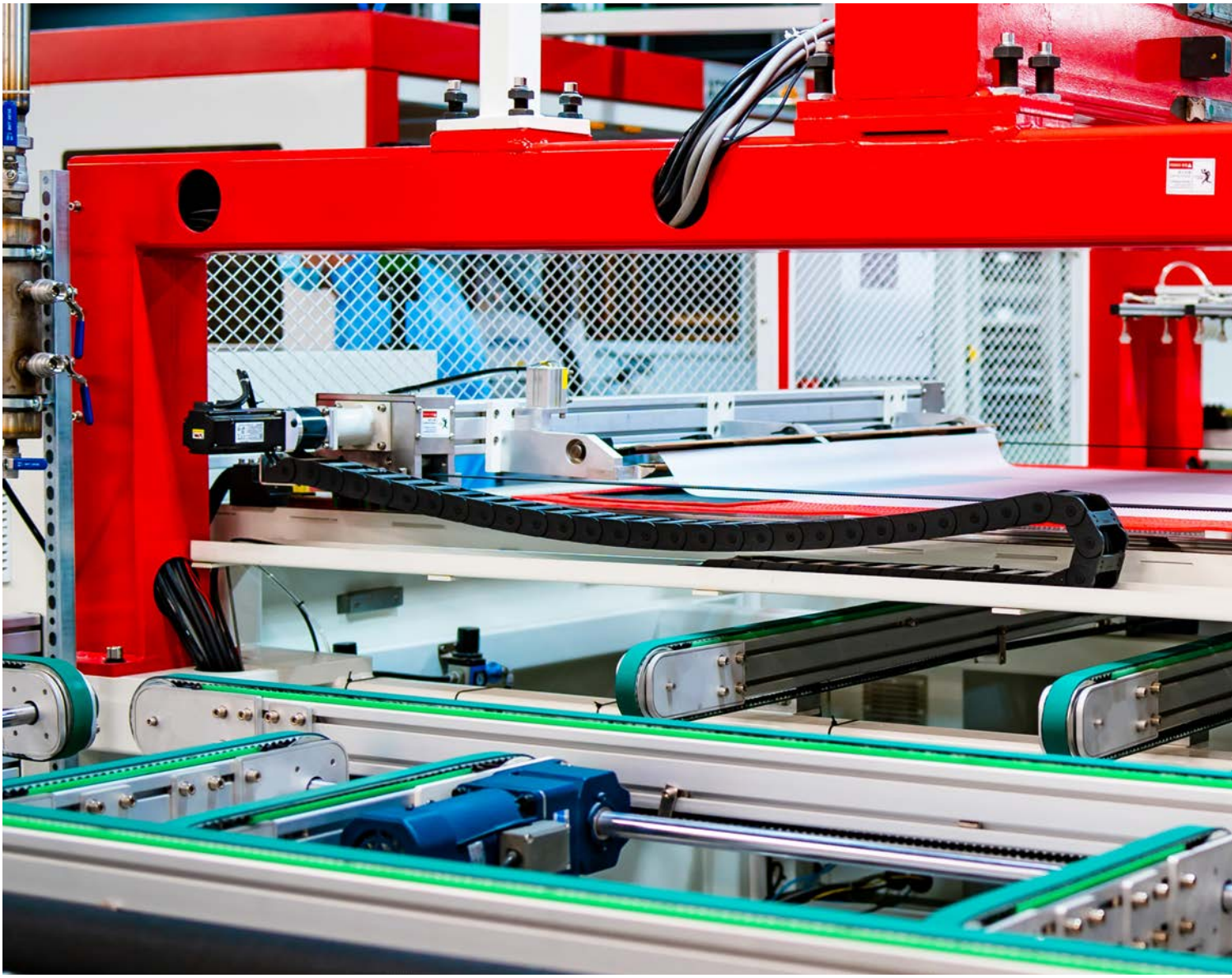
- In Q1 2022, India added over 3 GW of solar capacity, a 21% increase compared to 2.6 GW installed in Q4 2021.
- Large-scale solar accounted for 86% of the installations, and rooftop solar for the remaining 14%.
- India's cumulative installed solar capacity now stands at 52 GW.
- In Q1 2022, renewable energy sources accounted for about 81% of new power capacity additions.
- Solar made up for 68% of new power capacity added during the quarter.
- In Q1 2022, Rajasthan and Gujarat were the top states for solar installations.
- Rajasthan became the first state to cross 10 GW of cumulative large-scale solar PV installations.

Mercom's India Solar Q1 2022 report is 116 pages and covers all facets of India's solar market. For the complete report, visit: https://mercomindia.com/product/q1-2022-india-solar-market-update.

PLI Program for Solar Module Manufacturing Revamped

The MNRE drafted guidelines for second phase of the production-linked incentive program for solar module manufacturing capacity, detailing the eligibility criteria, capacity requirements and penalties

By : Arjun Joshi



The Ministry of New and Renewable Energy (MNRE) has issued draft guidelines to implement the second phase (Tranche II) of the Production-Linked Incentive (PLI) program under the 'National Program on High-Efficiency Solar Modules' to achieve gigawatt-scale high-efficiency solar modules manufacturing capacity.

The program aims to promote India's domestic manufacturing of high-efficiency solar modules and reduce the renewable energy sector's import dependence.

According to the draft guidelines for Tranche II, ₹120 billion (-$1.54 billion) has been reserved for companies setting up vertically-integrated capacities of polysilicon, wafers, cells, and modules. An allocation of ₹45 billion (-$580.84 million) has been made for those setting up wafers, cells, and modules capacity, and ₹30 billion (-$387.23 million) for cells and modules capacity.

Solar Energy Corporation of India is now responsible for the PLI program implementation

Along with the initial allocation of $45 billion ($617 million), an additional allocation of ₹195 billion (-$2.51 billion) was announced in the Budget 2022-23 to establish a larger manufacturing base for solar modules by fully integrating manufacturing units from polysilicon to solar modules.

In February this year, the Indian Renewable Energy Development Agency (IREDA) announced an updated list of successful bidders to set up manufacturing capacities for a minimum of 10 GW of vertically-integrated high-efficiency solar modules under the PLI program.

Implementing Agency

The implementation of the PLI program (Tranche-II) is now handed over to the Solar Energy Corporation of India (SECI) from Indian Renewable Energy Development Agency (IREDA). SECI will be responsible for providing secretarial, managerial, and implementation support and carrying out other responsibilities assigned by MNRE. SECI will be eligible to have 1% of the PLI amount disbursed as

PLI Program (Tranhce II): Performance Matrix Based on Module Efficiency and Modules Tempreture Coefficient of Pmax

Parameter & integration category		Minimum values required at commissioning, i.e at beginning of 1st year	Minimum values required at beginning of 2nd year	Minimum values required at beginning of 3rd year	Minimum values required at beginning of 4th year	Minimum values required at beginning of 5th year
Module Efficiency* & Module's temperature co-efficient of P_{max}	P+W+C+M	Minimum module efficiency of 21.00% with a temperature coefficient of P_{max} equal to or better than -0.40%/°C OR Minimum module efficiency of 20.50% with temperature coefficient of Pmax better than -0.30%/ °C				
	W+C+M					
	C+M					
Local Value Addition (LVA)	P+W+C+M	75%	78%	82%	86%	90%
	W+C+M	60%	66%	73%	81%	90%
	C+M	40%	50%	62%	75%	90%

Note: P-Polysilicon; W-Wafer; C- Cell; M- Module

Source: MNRE

Mercom India Research

administrative charges annually.

SECI will have the right to inspect the applicant's manufacturing units and offices. It may take the help of the National Institute of Solar Energy to measure the efficiency and temperature co-efficient of modules. MNRE may also designate National Accreditation Board for Testing and Calibration Laboratories (NABL)-as accredited labs for such measurement. A project management unit will be established to assist MNRE and SECI in implementing the program.

Greenfield & brownfield projects

Greenfield or new solar module manufacturing units will be eligible for PLI. Brownfield projects will also be allowed to participate subject to meeting the criteria. However, brownfield projects will only receive 50% of the PLI receivable for greenfield projects.

The applicant manufacturer will have to commit to a minimum level of integration across solar cells and modules to qualify for the bid. Based upon the extent of integration proposed, the bidder can opt for bidding for any of the three baskets.

Manufacturing Capacity

The applicant will have to set up a minimum 1 GW manufacturing unit to qualify for the bid. The maximum capacity to bid is 10 GW for polysilicon, wafer, cell, and module; 6 GW for wafer plus cell and module; and 6 GW for cell and module categories. However, the maximum capacity awarded to one bidder under the PLI program would be 50% of the bid capacity. The maximum bid capacity includes any capacity bid for earlier, against which PLI has been awarded.

Bidders eligible for PLI

The bidder can be a single company or a joint venture/consortium of more than one company. In the case of a joint venture/consortium, a partner/company will be allowed to tie up their manufacturing capacity (of any stage) with another partner/company for one bid only.

The selection of the beneficiaries will be by the bucket-filling method, keeping in view the overall PLI limit of ₹195 billion (~$2.51 billion) and the PLI requirements quoted by the bidders. The bidder getting the highest marks/inter se position will get PLI amount for five years as quoted, followed by the second bidder, and so on until the PLI amount is exhausted.

Manufacturing units that have availed any benefit under MNRE's tenders for solar power purchase agreements linked to PV manufacturing or special incentive package scheme (SIPS)/modified SIPS program of the Ministry of Electronics & Information Technology will not be eligible under this program.

Calculation of PLI

PLI will be calculated as follows:

PLI (₹) to manufacturers = yearly sales volume (Wp) × local value addition expressed in a fraction of one × tapering factor × Integration Factor (corresponding to the stated level of integration) × base PLI rate (₹/Wp as per position in performance matrix).

Performance matrix

Manufacturers will have to fulfill specific minimum values of module performance (combination of module efficiency and module's temperature coefficient of Pmax) and local value addition to be eligible for PLI, as mentioned in the table above.

Commissioning timelines

Facilities integrating polysilicon, wafer, cell, and module manufacturing must commission the unit within three years after approval. Wafer, cell, and module integrated manufacturing units must commission within two years. Cell and module manufacturing units must start operations within one and a half years from the approval date.

Disbursement of PLI

The manufacturing units under the program will be eligible for PLI annually on sales of high-efficiency solar modules for five years from commissioning or five years from the scheduled commissioning date, whichever is earlier.

A team constituted by MNRE or SECI will visit the manufacturing unit immediately after its commissioning to verify the extent of integration, manufacturing capacity, efficiency, and temperature coefficient of modules.

Penalties

A selected manufacturer failing to meet the promised integration or capacity, or minimum module performance will not get any PLI until the deficiencies are overcome. If the manufacturer achieves the promised levels subsequently, PLI will be applicable from the following month. However, in such cases, the manufacturer will not be able to get PLI for the full five years.

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因上海疫情防控，原定于2022年5月24-26日举行的
SNEC光伏展延期至2022年12月27-29日举行。

According to the anti-epidemic measures in Shanghai, SNEC PV POWER EXPO, originally scheduled on 24-26 May 2022, is now postponed to December 27-29, 2022.

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SNEC 16th (2022) International Photovoltaic Power Generation and Smart Energy Conference & Exhibition

时间：展览：2022年12月27-29日
地点：中国·上海新国际博览中心
(上海市浦东新区龙阳路2345号)

December 27-29, 2022
Shanghai New Int'l Expo Center
(2345 Longyang Road, Pudong District, Shanghai, China)

http://www.snec.org.cn

Large-Scale Solar Project Cost Continue to Rise

According to Mercom's Q1 2022 India Solar Market Update, the average cost to develop large-scale solar projects was up to ₹43.5 million/MW as the module prices continue to rise

By : Arjun Joshi

The average cost of large-scale solar projects in the first quarter (Q1) of the calendar year (CY) 2022 was approximately ₹43.5 million (-$560,512)/MW, according to Mercom's recently released Q1 2022 India Solar Market Update.

The average cost increased by 19% compared to the same period last year when it was ₹36.6 million (-$471,603)/MW and a 1.4% rise from the previous quarter when the cost was about ₹42.9 million (-$552,899)/MW.

India installed 2.7 GW of large-scale solar in the first quarter of 2021, a quarter-over-quarter (QoQ) increase of 23% compared to 2.2 GW installed in the previous quarter and up 53% year-over-year compared to 1.75 GW installed in the same period last year. Large-scale solar accounted for 85% of the installations, and rooftop accounted for 15% during the reporting period.

Project costs varied between ₹40.6 million (-$523,256)/MW and ₹45.9 million (-$591,563)/MW, depending on the modules used.

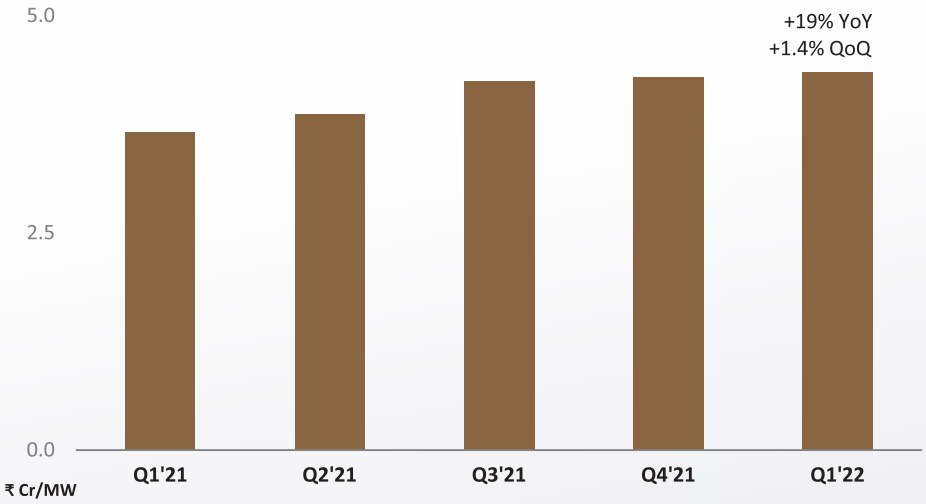
According to the report, the average selling price (ASP) of polycrystalline modules from China increased by 25% compared to last year. Similarly, the ASP of Chinese mono PERC modules increased by 20% compared to Q1 2021.

The ASP of Indian polycrystalline modules increased by 26% compared to last year, and the Indian mono PERC module ASP also increased by 20% compared to Q1 2021.

With the basic customs duty (BCD) coming into effect from April 1, 2022, many developers have stockpiled 10

Q1 2022 Average Large-scale Solar Project Cost per MW

Large-scale project costs have increased by 19% YoY



Source: Mercom India Research (Mar 2022)

GW of modules in the first quarter alone. This is expected to keep the project costs relatively stable until these modules are utilized.

However, the industry expects the overall project cost to increase significantly as Indian module manufacturers mainly rely on Chinese cells for their modules.

Another move that could potentially increase the cost of solar projects is the Directorate General of Trade Remedies (DGTR) recommendation of extending the anti-dumping duty on imported textured tempered glass (solar glass) from China by two more years.

DGTR has also recommended imposing anti-dumping duty on the imports of fluoro backsheet originating in or exported from China for five years. If the recommendations are accepted, the cost of modules that use imported solar glass and fluoro backsheet will increase, eventually adding up to the overall project cost.

Mercom's India Solar Q1 2022 report is 116 pages and covers all facets of India's solar market. For the complete report, visit: https://mercomindia.com/product/q1-2022-india-solar-market-update.

DISCOMs to Supply 24/7 Uninterrupted Power to Mid-Sized Cities

The Ministry of Power issued a legal mandate for DISCOMs to supply uninterrupted electricity to cities with 100,000 or more residents, provide temporary connection options and defined interruptions

By : Arjun Joshi

The Ministry of Power issued a gazette notification that distribution licensees must ensure 24/7 uninterrupted power supply to all the consumers residing in cities with 100,000 or more residents to prevent the need for polluting diesel generators.

The ministry notified the Electricity (Rights of Consumers) Amendment Rules, 2022, by exercising its powers under Section 176 of the Electricity Act, 2003. The amended rules introduce key additions and revisions to the Electricity (Rights of Consumer) Rules, 2020.

Accordingly, the State Commission must give the trajectory of the system average interruption frequency index

and system average interruption duration index for such cities.

Diesel to cleaner technologies

According to the new sub-clause (6), consumers using diesel generators as essential backup power must attempt to shift to cleaner technology such as renewable energy with battery storage within five years from the date of commencement of these rules or as per the timelines given by the state commission for such replacement based on the reliability of supply in that city under the DISCOM jurisdiction.

Power supply reliability

Under the new sub-clause (4), the state commissions can consider the customer average interruption duration index, customer average interruption frequency index, and momentary average interruption frequency index as additional indicators of supply reliability. The minimum interruption time for calculating additional reliability indicators must be as specified by the state commissions. If the state commission does not specify the interruption time, three minutes will be considered interruption time for calculating the additional reliability indicators.

Charges to ensure reliable power supply

The new sub-clause (5) notifies that the state commissions must have an online mechanism to review distribution licensees' reliability indices. State commissions can consider a separate reliability charge for the distribution company if they require funds for investment in the infrastructure to ensure a reliable power supply to the consumers.

Temporary connections

The new sub-clause (7) details the process of granting temporary connections to the consumers for construction activities or any provisional usage. The clause adds that distribution licensees must simplify such processes. These connections must be given on priority and not later than 48 hours. The limit can be extended to seven days in case augmentation of the distribution system is required.

The temporary connection must be through a prepayment meter or consumer meters per Central Electricity Authority (Installation and Operation of Meters) Regulations.

Interruptions defined

The Amended Rules have new sub-clauses defining the customer average interruption duration index, customer average interruption frequency index, the momentary average frequency interruption frequency index, system average interruption duration index, and the system average interruption frequency index.

In October, the Ministry of Power issued a draft proposal for amending the Electricity Act, 2021, to ensure that distribution companies provide round-the-clock uninterrupted power supply to all consumers and prevent the need for diesel generators.

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Telangana Issues Renewable Purchase Targets

The Telangana regulator has issued the renewable power purchase obligation targets and regulations for the state DISCOMs, captive and open access consumers

By : Rakesh Ranjan Parashar

The Telangana State Electricity Regulatory Commission (TSERC) has issued the 'Renewable Power Purchase Obligation Regulations, 2022.'

The regulations came into force on April 1, 2022.

The state regulatory body had earlier passed the 'Renewable Power Purchase Obligation Regulations' in 2018, which expired on March 31, 2022.

RPO target

The renewable purchase obligation (RPO) target set by the Commission ranges from 8.5% for the financial year (FY) 2022-23 to 13% in FY 2026-27.

If solar RPO compliance is above 85%, the shortfall can be met by the excess non-solar energy purchased beyond specified non-solar RPO.

On achieving non-solar RPO compliance above 85%, the shortfall can be met by the excess solar energy purchased beyond the specified solar RPO for that particular year.

Rooftop solar systems

The quantum of electricity generated by the consumer from the rooftop solar systems under the net metering arrangements will, if such consumer is not an obligated entity, qualify towards meeting the solar RPO of the distribution licensee.

The distribution licensee should install, at its own cost, a solar generation meter to measure the energy generated from the rooftop solar system if it desires that such energy be counted towards meeting its RPO.

The purchases made from rooftop solar projects (gross metering), the unutilized banked energy deemed to have been purchased by the distribution licensee from renewable energy projects under open access regulations and all other transactions for which the generator does not claim RECs will also be considered for the fulfilment of the RPO.

Other points

The distribution companies (DISCOMs) should purchase power from renewable energy sources at the tariff determined by the Commission. The purchase of renewable power by a DISCOM from other DISCOMs in the state will also be considered for computing the fulfilment of RPO.

The purchase of renewable energy certificates (RECs) will also be

considered for RPO compliance.

The DISCOMs should compulsorily procure 100% power produced from all waste-to-energy plants in the state. The renewable power procured by the obligated entity from renewable energy generating stations bundled with coal or lignite-based thermal generation will be considered as fulfilment of RPO.

Obligated entities

DISCOMs

Every DISCOM should submit the details of the estimated quantum of purchase from renewable energy sources for the ensuing year before March 15.

Despite the availability of power from renewable energy sources and certificates, if the DISCOM fails to fulfil its commitment toward a minimum purchase from renewable energy sources, it will be liable to deposit an amount into a separate fund.

Captive users and open access consumers

Every captive user and open access consumer will have to submit the details regarding the estimated consumption of electricity and the quantum of power proposed to be purchased from renewable energy sources for fulfilling its RPO.

The captive user and open access consumer may also fulfil their RPO by purchasing RECs. If the captive user or open access consumer cannot fulfil the minimum purchase criteria, it will have to deposit an amount into a separate fund.

Eligibility and registration for certificates

The CERC Regulations 2010 will govern the eligibility and registration of certificates.

The DlSCOMs should submit a petition for computation of pooled cost of power purchase to the Commission by April 30. The Commission will issue an order relating to the pooled power purchase cost for the particular year.

After the issue of the Commission's order for the pooled cost, the difference between the provisional pooled cost and the final pooled cost of power purchase will be paid or recovered in equal instalments in the bills for the next two months.

Where there is a general power purchase agreement (PPA), and such PPA involves or extends the situation of payment of the pooled cost of power purchase, then the DISCOMs should endeavor to prepare a draft amendment to such agreement on a generic basis and submit the same for the Commission's approval.

If the obligated entity does not fulfil the RPO requirements during any year, the Commission may direct the obligated entity to deposit an amount into a separate fund to be created and maintained by the state agency.

This year, TSERC revised the additional surcharge to ₹1.15 (-$0.015)/kWh for consumers sourcing power through open access from April 1, 2022, to September 30, 2022. This is a 20% increase from the additional surcharge of ₹0.96 (-$0.013)/kWh, which was applicable from January 1, 2022, to March 31, 2022.

Recently, Karnataka Electricity Regulatory Commission issued amendments to the KERC (Procurement of Energy from Renewable Sources), Regulations 2011 to specify the RPO target for 2022-23 to 2029-30.

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Telangana's Renewable Power Purchase Obligation (RPO) Trajectory up to FY 2026-27

Financial Year	Long-Term RPO Trajectory		
	Non-Solar (%)	Solar (%)	Total (%)
2022-23	1.00	7.50	8.50
2023-24	1.25	8.00	9.25
2024-25	1.50	9.00	10.50
2025-26	1.75	10.00	11.75
2026-27	2.00	11.00	13.00

Source: TSERC

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Renewable Energy Certificates Trading Gets a Makeover

The new regulations issued by the CERC expands the list of eligible entities to issue RECs and lays out guidelines on the issuance procedure

By : Rakesh Ranjan Parashar

The Central Electricity Regulatory Commission (CERC) has issued 'Terms and Conditions for Renewable Energy Certificates for Renewable Energy Generation Regulations, 2022.'

According to the new regulations, renewable energy generating stations, captive generating stations based on renewable energy sources, distribution licensees, and open access consumers are now eligible to issue renewable energy certificates (RECs).

The national load despatch center (NLDC) has been designated the agency to implement these regulations.

In February this year, CERC had issued draft REC regulations and invited comments and suggestions from stakeholders.

Eligibility

A renewable energy generating station will be eligible to issue the certificates if it meets the following requirements:

The tariff of such renewable energy generating station has not been either determined or adopted, or the electricity generated is not sold directly or through an electricity trader or in the power exchange for renewable purchase obligation (RPO) compliance by an obligated entity

The renewable energy generating station has not availed any waiver of concessional transmission charges or concessional wheeling charges

A captive generating station will be eligible to issue certificates if issued for self-consumption.

An obligated entity being a distribution licensee or an open access consumer that purchases electricity from renewable energy sources above the RPO requirements, will be eligible to issue certificates to the extent of purchase of such excess electricity from renewable energy sources.

Grant of accreditation for certificates

The state agency will grant the accreditation to the eligible entities connected to the intrastate transmission system. Entities granted accreditation before these regulations will be deemed to have been granted accreditation until the validity of their accreditations.

Accreditation to the eligible entities connected to the interstate transmission system (ISTS) will be granted, provided that they were granted accreditations before these regulations came into force.

Issuance of RECs

An eligible entity that has been granted registration or deemed to have been granted registration may apply for the issuance of certificates to the central agency.

The application for issuing RECs can be made by a renewable energy generating station or a captive generating station based on the energy sources to the central agency within six months from the corresponding generation by the entity.

The application should be made by the distribution licensee or an open access consumer within three months from the end of a financial year.

Within fifteen days from receiving the application, the central agency should issue certificates or reject the application.

Exchange and redemption of certificates

The certificates must be exchanged through power exchanges or electricity traders. The eligible entities must inform the central agency about the number of certificates intended to be sold through electricity traders.

The trading margin for the exchange of certificates through electricity traders will be governed by the Trading Licence Regulations, 2020, treating one certificate representing one MWh of electricity.

Once exchanged through power exchanges or electricity traders and used for compliance with RPO by the obligated entities, the certificates will be considered redeemed. Upon redemption, the central agency will remove the certificates from the registry.

Denomination of certificates

Each certificate issued under these regulations will represent one MWh of electricity generated from renewable energy sources and injected or deemed to be injected into the grid.

Certificate multiplier

The central agency has also introduced the certificate multiplier, set at 1 for onshore wind and solar, 1.5 for hydro, 2 for municipal solid waste and non-fossil fuel-based cogeneration, and 2.5 for biomass and biofuel for three years.

The applicable certificate multiplier will be assigned to the renewable energy generating stations and captive generating stations based on renewable energy sources commissioned after coming into force of these regulations.

Once assigned to a renewable energy generating station, the certificate multiplier will remain valid for 15 years.

Pricing of certificates

The price of certificates should be as discovered in the power exchanges or as mutually agreed between eligible entities and the electricity traders, provided that the power exchanges and the electricity traders report all transactions to the central agency monthly.

Validity of certificates

The certificates issued will remain valid until they are redeemed.
If an eligible entity has obtained accreditation or registration based on false information and the accreditation or registration of such entity is revoked later, the certificates already issued but not redeemed will stand extinguished from their issue date.

The Commission may, based on the proposal from the central agency, determine the charges payable by the eligible entities for accreditation, registration, issuance of certificates, and other connected matters.

IEX traded 249,000 RECs in April, including 171,000 non-solar RECs and 77,000 solar RECs. The exchange discovered a price of ₹2,200 (-$29) per certificate for solar RECs and ₹1,000 (-$13) per certificate for non-solar RECs.

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Industry News and Policy Briefs

Indian Renewable Energy Development Agency, a non-banking financial company under the Ministry of New and Renewable Energy, recordedan all-time high annual profit after tax (PAT) of ₹6.34 billion (-$82.84 million) in FY 2021-22, an 83% YoY growth compared to ₹3.46 billion (-$45.21 million) in the previous year.

Solar developer and engineering, procurement, and construction (EPC) company **Rays Power Infra** sold its solar projects in Tamil Nadu, Karnataka, and Telangana to two global investors with a significant presence in India for an aggregate enterprise value of over ₹7 billion (-$90.55 million).

Waaree Energies announced the approval from the National Company Law Tribunal to acquire solar cells manufacturer–**Indosolar**. The national body approved Waaree's request for the acquisition under the corporate insolvency resolution process (CIRP)–which the lenders of Indosolar initiated following the regulations under the Insolvency and Bankruptcy Code 2016.

REC Limited reported a total income of ₹392.30 billion (-$5.05 billion) for the financial year (FY) 2022, an 11% increase compared to ₹354.10 billion (-$4.56 billion) in FY 2021. The company's net profit in FY22 recorded a 20% YoY growth to ₹100.46 billion (-$1.3 billion) from ₹83.62 billion (-$1.08 billion) in FY21.

Inverter manufacturer **Sungrow** announced that it would be supplying its storage solutions to **Tata Power Solar Systems'** 60.56 MWh battery energy storage system (BESS) project at Phyang, in the Leh district of Ladakh. Sungrow said that all equipment and devices would be installed swiftly as the plant is located at an altitude of 3,400 meters above sea level.

Gujarat-based power company **Torrent Power** announced the Q4 and full-year financial results for FY 2021-22. The company recorded a revenue of ₹37.44 billion (-$484.63 million) in Q4 FY 2022, an increase of 21% compared to ₹30.84 billion (-$399.20 million) registered in the same period last year.

BluSmart, an electric ride-hailing platform, announced a Series A1 round closing to raise $25 million. This was a follow-up to the Series A round in September last year, bringing the Series A investment to $50.7 million.

Revoh Innovations, a startup that manufactures sub-components for electric vehicles (EV), raised $150,000 in a seed round from angel investors Vel Kanniappan and Ravi Renganathan to build a motor controller production facility in Tamil Nadu.

Indian multinational conglomerate **JSW Group** signed an agreement to buy renewable energy producer **Mytrah Energy India** in a deal expected to be worth $1.8 billion to $2 billion. Hyderabad-based Mytrah has over 1.8 GW of operational assets in the renewable energy sector.

Azure Power Global announced that **Harsh Shah would be joining as the Chief Executive Officer, effective July 1, 2022**. Shah was previously the Chief Executive Officer of IndiGrid and served as the Chief Financial Officer for Sterlite Power and IndiGrid.

Policy Briefs

States

The **Karnataka Electricity Regulatory Commission** issued amendments to the KERC (Procurement of Energy from Renewable Sources), Regulations, 2011 to specify the Renewable Purchase Obligation (RPO) target for 2022-23 to 2029-30.

The **Telangana State Electricity Regulatory Commission** issued the **'Renewable Power Purchase Obligation Regulations, 2022.'** The state regulatory body had earlier passed the 'Renewable Power Purchase Obligation Regulations' in 2018, which expired on March 31, 2022.

The **West Bengal Electricity Regulatory Commission** issued the draft **'Open Access Regulations, 2022.'** The regulations will apply to any form of open access for the use of an intrastate transmission system or distribution system in conjunction with the interstate transmission lines.

The **Odisha Electricity Regulatory Commission** allowed a net metering facility for rooftop solar systems up to 500 kW or up to the sanctioned load, whichever is lower, as long as it is within 75% of the transformer capacity.

Center

The **Ministry of Power** issued a gazette notification that **distribution licensees** must ensure 24/7 uninterrupted power supply to all the consumers residing in cities with 100,000 or more residents to prevent the need for polluting diesel generators.

The **Ministry of Finance** notified the extension of the time limit to complete the **anti-dumping investigation** concerning the imports of solar cells originating in or exported from China, Thailand, and Vietnam until August 31, 2022.

The **Ministry of Power** announced that it is working on a program to mitigate the financial woes of **Distribution Companies (DISCOMs)** by liquidating their dues. The proposed program enables payment of these financial dues in easy installments by the DISCOMs.

The **Ministry of Finance** (Department of Revenue) **imposed a duty of 15% on the export of steel**. The move will likely bring down the prices of solar mounting structures, providing some relief to mounting structure manufacturers and solar project developers.

The **Ministry of New and Renewable Energy** issued draft guidelines to implement the second phase (Tranche II) of the Production-Linked Incentive (PLI) program under the **'National Program on High-Efficiency Solar Modules'** to achieve gigawatt-scale high-efficiency solar modules manufacturing capacity.

Major Tender and Auction Announcements in May

This is a list of major tenders and auctions from May. A comprehensive list can be found on Mercom's Tender and Auction Tracker and Alerts. Please contact info@mercomindia.com for more information.

Annulled Tenders

Solar Energy Corporation of India announced the annulment of the tender it had issued to develop a **5 MW grid-connected ground-mounted solar power project at V. O. Chidambaranar Port Trust in Tuticorin, Tamil Nadu**.

Other Tenders

The Gujarat Urja Vikas Nigam invited bids to purchase power through a competitive bidding process from **500 MW** of grid-connected **wind** power projects (**Phase-III**) with the **greenshoe** option for an additional capacity of up to **500 MW**.

Maharashtra State Electricity Distribution Company issued a tender to procure **325 MW** of power from intrastate wind projects with a ceiling tariff of **₹2.65** (-$0.034)/kWh.

Gujarat State Electricity Corporation invited bids for the EPC of **100 MW** of **wind** power projects at two sites on a turnkey basis.

NTPC Renewable Energy released a tender to set up **100 MW** of state transmission utility-connected wind energy projects in **Madhya Pradesh**.

Kerala State Electricity Board issued a request for selection to set up **65 MW** of grid-connected wind power projects in **Kerala** under tariff-based competitive bidding.

The Bhopal Municipal Corporation issued a request for proposal for the installation of a **15 MW wind** power

project in **Madhya Pradesh**.

The Ministry of New and Renewable Energy invited **proposals** under the **'Renewable Energy Research and Technology Development Program, 2022'** to promote the competitive development of indigenous technologies for the widespread deployment of new and renewable energy.

REC Power Development and Consultancy issued four global tenders to build interstate transmission systems (ISTS) on a build, own, operate, and transfer basis at Khavda **pooling station** under Phase II- (Part A-D) in **Gujarat**. The transmission infrastructure is to evacuate **18 GW** of renewable energy.

Bihar State Power Generation Company issued a request for proposal to select consultants to develop **200** to **250 MW solar** power projects with **battery** energy storage systems at Kajra and Pirpainti in **Bihar**.

Kerala State Electricity Board invited bids to procure **150 MW** of **solar** power on a **short-term** basis to meet its Renewable Purchase Obligations target for June 15, 2022, to March 31, 2023.

Coal Lignite Urja Vikas invited bids to select a consultant to provide project management **consultancy** services to develop **40 MW** of **solar** projects at Bishrampur and Bhatgaon in the Surajpur district of **Chhattisgarh**.

Municipal Corporation Bhopal invited bids to provide consultancy services to set up **20 MW** of **solar** projects to supply power to its high tension (HT) consumers.

Mormugao Port Authority, **Goa**, floated a tender to provide project management **consultancy** services for the purchase of **1.4 MW** of **solar** power through open access.

Rewa Ultra Mega Solar invited bids to select a project management **consultant** to conduct technical studies and develop the request for proposal.

SJVN invited bids from **consultants** to prepare detailed project reports to develop solar power projects and parks across **India**.

Bharat Heavy Electricals invited bids to procure **monocrystalline modules** for Gujarat State Electricity Corporation's **42.53 MW** solar project at the **Raghanesda Solar Park**.

Rajasthan Electronics and Instruments invited bids to procure **180,000** monocrystalline or multicrystalline **solar cells** of 5.64 W capacity.

Central Electronics announced a tender to supply **1.8 million** polycrystalline **solar cells**.

Convergence Energy Services issued a request for proposal to install **electric vehicle** charging stations in eight cities across India on a build, own, and operate basis.

NTPC Vidyut Vyapar Nigam issued an invitation for bids for the supply of **electric vehicle** chargers for the public charging infrastructure in cities under the Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (**FAME II**) program.

Bharat Heavy Electricals issued a notice inviting tender for the design, supply, installation, and commissioning of the balance of systems (BoS) for a **5 MW** grid-connected **solar** power project at BHEL-Bhopal, **Madhya Pradesh**.

Bharat Heavy Electricals invited bids for the supply of **650,000 kg** of galvanized **steel** structures for **9 MW** of solar projects across **India**.

Indian Oil Corporation invited bids for providing **consultancy** services to set up a **2.25 MW solar** project at its LPG bottling plant in **Jabalpur**.

Coal India issued a request for expression of interest to **empanel owner's engineers**-cum-project management **consultants** for solar projects by Coal India and its subsidiaries.

Top Large-Scale Solar Tenders

Madhya Pradesh Urja Vikas Nigam invited bids to set up **1,250 MW** of grid-connected solar power projects under Component C of the Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyan (KUSUM) program at various locations in Madhya Pradesh.

Hindustan Salts issued a tender to develop **1 GW** of solar projects at Kharaghoda in the Surendranagar district of **Gujarat**. The power generated from the projects will be sold in the market.

Maharashtra State Electricity Distribution Company invited bids to procure 431 MW of solar power from decentralized solar projects of 500 kW to 2 MW capacity under Component-A of the KUSUM program.

Uttar Pradesh New and Renewable Energy Development Agency floated tender to set up **98 MW** of solar projects of 0.5 MW, 1 MW, 1.5 MW, and 2 MW capacity on agricultural land, pasturelands, and marshlands of farmers in Uttar Pradesh under the KUSUM program.

Uttar Pradesh New and Renewable Energy Development Agency invited bids to develop **75 MW** of projects at the **UP Solar Park**. The projects will be developed in Makrecha village (25 MW), Banghauli (20 MW), and Tikar 1 & Tikar 2 (30 MW) in the Jalaun district of Uttar Pradesh.

Gujarat State Electricity Corporation released a tender for the engineering, procurement, and construction (EPC) of a 45 MW and a 14 MW grid-connected solar project near Gujarat Energy Transmission Corporation substation at Badeli in the Bhavnagar and Morbi district, respectively.

REMC, a joint venture of **Indian Railways and RITES**, invited bids to select solar project developers to set up 50 MW of ground-mounted solar projects on private owners or farmers' land near the traction substations at 25 kV connectivity in Uttar Pradesh and Madhya Pradesh.

Solar Energy Corporation of India (SECI) issued tender for the EPC a 22 MW overburden (OB) dump-based solar project at the Ramagundam site of the state-owned Singareni Collieries Company, Telangana.

Renewable Power Corporation of Kerala, a joint venture of Kerala State Electricity Board (KSEBL) and Solar Energy Corporation of India (SECI), issued a request for proposal to install a 5 to 10 MW ground-mounted captive solar project. The project must be installed at Nellithadam under Kasaragod Solar Park in Kerala on a build, own, and operate basis.

Kerala State Electricity Board invited bids for the installation of a **6 MW** grid-connected solar power project and its remote monitoring system in the Palakkad district of Kerala under the KUSUM program.

Surendranagar Mahila and Bal Vikas Mandal issued a notice inviting tender for the survey, installation, testing, and commissioning of a **2.5 MW** grid-connected ground-mounted solar power project in the Surendranagar district of Gujarat.

NTPC issued a notice inviting tender for comprehensive operation and maintenance (O&M) of five 50 MW blocks of its 250 MW Mandsaur solar project for three years and another tender for the O&M of its 50 MW NTPC Rajgarh solar project in Madhya Pradesh for three years.

Bharat Heavy Electricals issued a notice inviting tender for the O&M of NTPC's 22 MW floating solar power project at Kayamkulam in Kerala for three years and another tender for the O&M of NTPC's 20 MW grid-connected solar power project at Gandhar in Gujarat for three years.

NTPC invited bids for a biennial O&M contract for the 10 MW solar power project at its facility in Ramagundam, Telangana.

GAIL (India) issued an invitation for bids to operate and maintain a 5 MW solar power project in Ramgarh, Jaisalmer, for three years.

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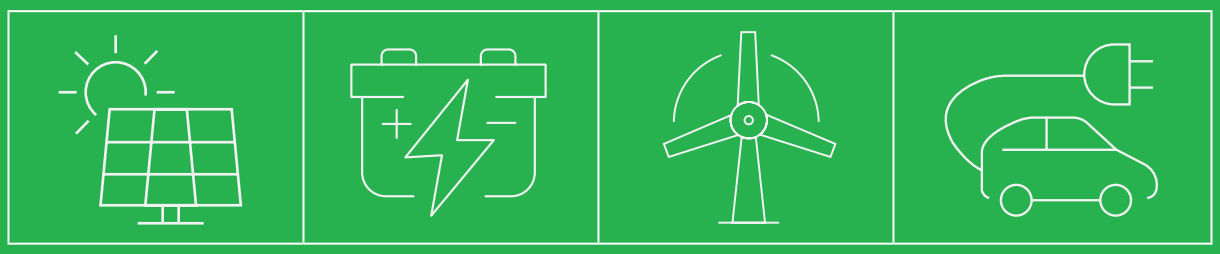

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Auctions

Tata Power, **Amp Energy**, **NTPC**, and **SJVN** were winners in Solar Energy Corporation of India's auction to set up **1,200 MW** interstate transmission system-connected **wind-solar hybrid** projects **(Tranche-V)** across India.

NTPC Renewable, Halvad Renewables (**EDF Renewables**), **JSW Neo Energy**, and **Torrent Power** were winners in Solar Energy Corporation of India's auction for the **1.2 GW** interstate transmission system-connected **wind** power projects **(Tranche-XII)**.

NHPC awarded EPC contracts worth ₹66.04 billion (-$851.72 million) to develop **1 GW** of grid-connected **solar** projects. The contracts have been awarded to the three bidders, including **Adani Infra** (India), which won a contract worth ₹42.96 billion (-$554.05 million) to develop 600 MW capacity in Gujarat.

SJVN announced that it had awarded the **EPC** contract for its **1 GW** solar project in Bikaner, **Rajasthan**, to **Tata Power Solar Systems**.

Amp Energy, **NHDC**, and **SJVN** won Rewa Ultra Mega Solar's auction for the **600 MW floating solar park** at the Omkareshwar reservoir in **Madhya Pradesh**.

Jakson Group emerged as the winner in **NTPC's** auction for the comprehensive **O&M** of a **250 MW** solar project in **Andhra Pradesh** and a **5 MW solar** project in **Andaman and Nicobar Islands**.

Rooftop Solar Tenders

West Bengal Renewable Energy Development Agency invited bids to install 10 MW of rooftop solar systems in the state.

Mangalore Special Economic Zone invited proposals to install 4 MW of grid-connected rooftop solar systems to supply power for 25 years on a fixed tariff basis through a third-party-owned model.

The **Eastern Railway** issued a tender to install 1.5 MW of grid-connected rooftop solar systems without battery energy storage across multiple sites.

Indian Oil Corporation invited bids for the EPC of a 1.2 MW grid-connected captive solar project with a net metering facility at its LPG bottling plant at Sanand in the Ahmedabad district of Gujarat.

Odisha Renewable Energy Development Agency released a tender for the installations of 1.058 MW of rooftop solar systems and 44 solar street lighting systems at government buildings.

Sabarkantha District Cooperative Milk Producers' Union invited bids to install a 1 MW grid-connected rooftop solar system at its facility in Himmatnagar, Gujarat.

Chandigarh Renewable Energy and Science & Technology Promotion Society floated a tender for the O&M of 1.045 MW of grid-connected rooftop solar systems at different sites in Chandigarh for five years.

Indian Oil Corporation invited bids for the annual O&M of distributed solar systems of 1.001 MW capacity installed at the Paradip refinery and township in Odisha.

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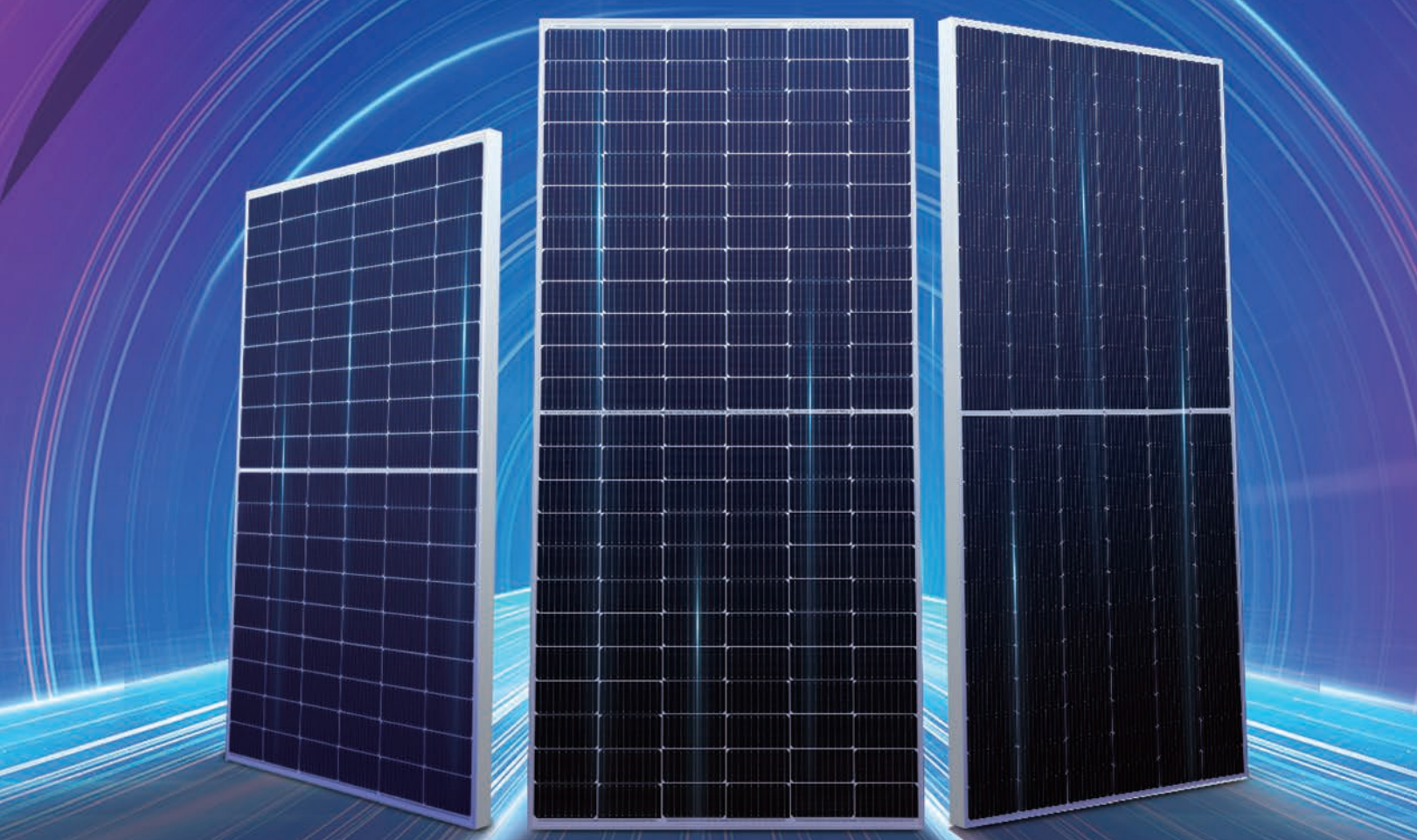

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