

Volume 02 | Issue 10 | May 2020 | ₹250

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clean energy news and insights

India

**India's Solar
Market
Leaders in
2019**



Solis-110K-5G

Solis Commercial & Industrial PV Inverter



Efficiency

- ▶ High power tracking density 90MPPT/MW
- ▶ Maximum efficiency up to 98.7%
- ▶ Power generation revenue increased by 3.5% year-on-year



Safe

- ▶ Optional AC SPD level-I function
- ▶ Optional AFCI function can identify faults in the arc current to avoid 99% of the fire risk



Smart

- ▶ String-level monitoring to improve O&M efficiency
- ▶ I-V curve diagnostic technology could diagnosis the MW-power plant within 5 minutes
- ▶ Support night reactive power compensation



Economy

- ▶ Support up to 150% DC/AC ratio, reduce system LCOE
- ▶ Support PV "Y" connector
- ▶ Support 185mm² aluminum AC cable
- ▶ Optional PLC communication, save cable cost



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The overall share of renewables in the country's power mix (excluding large hydro) stood at 23.9% with solar installations accounting for 9.8% and wind power for 10.1%

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TENDERS & AUCTIONS

Major Tender and Auction Announcements in April

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

Foreword



Solar capacity addition in India in Q1 2020 was at its lowest since Q4 2016 with 1,080 megawatts (MW), down by 39% year-over-year (YoY) compared to 1,761 MW added in Q1 2019 as the effects of COVID-19 were in full display in the first quarter.

In light of the ongoing lockdown due to the coronavirus (COVID-19) outbreak, most solar project timelines have been extended to 2021. Accordingly,

Mercom is revising the 2020 solar demand forecast to approximately 5,014 MW from the earlier 8,583 MW forecasted before the COVID impact. But we are projecting the market to bounce back sharply in 2021 as almost 3-4 GWs of projects are postponed to next year.

Solar construction and production activity has started in most regions of the country, and it will take some time for activity in the sector to come back 100%.

Labor shortage is looming as a serious issue that the industry has to deal with, whether you are a manufacturer or developer, over the next several months. Most companies do not have the labor force to begin construction or production right away. It may take 4-6 weeks to get these workers back from their home towns. Once the transportation opens up, and the labor force gets back to work, shortages and pricing pressure should ease.

The lockdown due to the COVID-19 pandemic, policy uncertainty, and regulatory hurdles have slowed down the pace of rooftop installations.

The commercial and industrial (C&I) sector together make up 96% of the rooftop market. But the C&I is now the most significantly affected segment of the rooftop market as businesses and industries have been shut down. Most of the factories were closed during the lockdown, and several of them had their rooftop systems turned off as they feared electrical issues if the system kept generating power. The hospitality industry, auto sector, and others were all completely shut down and are in bad shape.

The lockdown has now been relaxed in most states, and several sectors like pharmaceuticals, FMCG, and textiles are seeing good demand and the value of solar. MSMEs are taking another look at solar after the crisis as a cheaper power source and also because of the resiliency and flexibility.

The country added a total power capacity of just 1.65 GW in Q1 2020. Of the total added capacity, solar power accounted for a majority of the installations with 1.1 GW and made up 65% of the installed capacity. Renewables accounted for over 95% of the power capacity added in Q1, which is incredible.

The next four weeks will be crucial as many parts of the country open up. If the cases spike and if there has to be a second round of lockdown, installations could be down 45-50%, which would put the installation in the 3-4 GW range.

Solar companies should be ready for either scenario and have a contingency plan ready.

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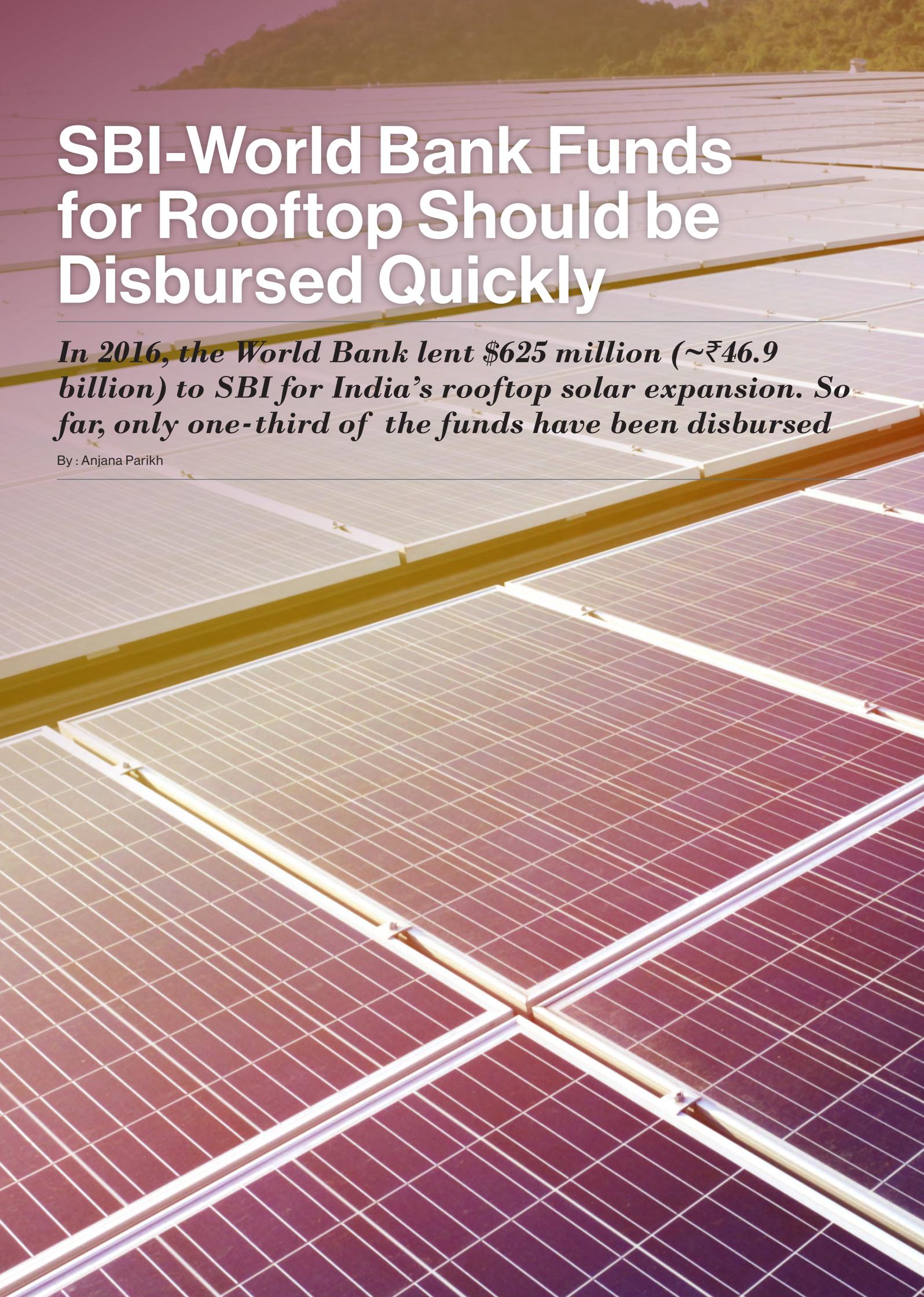
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SBI-World Bank Funds for Rooftop Should be Disbursed Quickly

In 2016, the World Bank lent \$625 million (~₹46.9 billion) to SBI for India's rooftop solar expansion. So far, only one-third of the funds have been disbursed

By : Anjana Parikh



The rooftop solar has struggled to catch on in India with just over 4 GW installed in 2019 compared to the government goal of developing 40 GW by 2022. The market declined by 33% in 2019, and 2020 is forecasted to be another tough year considering the difficulties posed by the COVID-19 pandemic.

The rooftop solar market has been challenging due to a lack of general awareness, financing woes, and the unwillingness of distribution companies to help. Financing has always been a challenge when it comes to rooftop projects, especially after the NBFC (Non-Banking Financing Companies) crisis. Financing will become even more challenging post COVID-19 as banks struggle to cope with tough economic conditions.

33% of the SBI-World Bank funds were disbursed in the first three years of the five-year program

In 2016, the World Bank came forward to help the government's rooftop solar program by lending \$625 million (~₹46.8 billion) to the State Bank of India (SBI).

Then in 2017, the government-owned SBI and the World Bank announced \$357 million (~₹23.2 billion) in credit facilities for seven Indian solar companies to develop grid-connected solar rooftop projects with an aggregate capacity of 575 MW. But most of these funds are still unutilized.

In these challenging times, we decided to explore the status of the World Bank funds, which could be critical in supporting the rooftop market.

According to the World Bank, despite the energy shortages and the high cost



of backup supply, rooftop solar PV systems have not yet become popular in India. The lender says that it is primarily due to the lack of adequate financing, unfamiliar technology, and

low awareness among the consumers.

The World Bank's Clean Technology Fund (CTF) loan supports several solar PV business models to expand the rooftop PV systems to a variety of



customer groups. A range of options are available to investors under the SBI Rooftop PV Program, including third-party ownership, leasing, rooftop rental, as well as direct end-user ownership.

Amit Jain, senior energy specialist, World Bank, said that the project includes a \$12.93 million (-₹981.4 million) technical assistance component, through which the World Bank, in

cooperation with the Ministry of New and Renewable Energy (MNRE), is supporting 17 states to build an ecosystem for a sustained rooftop solar market.

“It includes raising consumer awareness through several outreach programs such as media collaterals that are helping raise awareness about rooftop solar, its economic benefits, government incentive programs, and application process so that consumers can make informed decisions for installing rooftop solar,” he added.

However, the SBI has only disbursed approximately \$211.42 million (-₹15.99 billion) of the \$625 million (-₹46 billion) so far.

Asked if this is a satisfactory result when SBI has lent only one-third of the fund, Jain said, “33% of the project

It is easier for C&I customers with good credit ratings to access funds compared to smaller businesses

funds were disbursed in the first three years of the five-year program. We have seen a 91% compound annual growth rate (CAGR) in the rooftop solar capacity addition under the program during this period. There are around 210 loan accounts under the program, with up to 80% of the disbursed funds accessed by RESCO (Renewable Energy Service Company) players. The program has been instrumental in supporting new business models, for instance, RESCO/OPEX.”

Addressing the situation from a rooftop installer perspective, Vikram Dileepan, co-founder and director, residential and small commercial business at Sunedison Infrastructure Ltd, a rooftop solar development company said, “SBI - World Bank line

I believe has done a fairly good job of deploying debt against large-scale solar portfolios for rooftop thus far, but deploying debt over smaller portfolio would increase their transaction costs significantly higher. They find it prudent to fund either developers or NBFCs who have a 10 MW+ size of assets on their books towards rooftop solar for the next phase of deployment.”

C&I customers with good credit ratings would find it easier to access the fund compared to small businesses, which leaves a large segment unserved. In order to fast-track the growth and adoption of rooftop solar, the country needs to create avenues to tap into the micro, small, and medium enterprises (MSME) segment. But their low to non-existent credit rating makes it tough for a developer to raise debt from financial institutions.

According to one of the SBI officials managing the fund, “the regulatory hurdles and lack of interest from the distribution companies (DISCOMs) in creating a conducive environment have

certainly not helped. Payments from DISCOMs are a problem while Blue chip companies pay on time. If banks get payments on time, we are encouraged to lend more.”

The official also pointed out that the level of awareness among customers is less. At the same time, there is another

The C&I segment has been the worst affected due to the COVID-19 pandemic

set of customers who would want 100% assured supply and least interference from DISCOMs, which is not possible unless energy storage becomes affordable.

The cumulative rooftop solar installations in India has reached 4.4 GW, according to Q4 & Annual 2019 India Solar Market Update released by Mercom India Research.

Rooftop installations declined for the first time in five years. According to the report, the slowdown in the economy in 2019 was a significant factor along with liquidity issues in the market following the NBFC crisis, which made it difficult for installers to finance rooftop projects.

Jain pointed out that one of the results at the end of the program is 250 MW of rooftop capacity connected to the grid. Against this, the program has already achieved 218 MW. The capital cost of the rooftop systems has plummeted since the inception of the program in 2016. Hence, disbursements seem to be lower.

Speaking about this fund being disbursed by SBI, rooftop solar developers who have been beneficiaries of the fund commented that the interest rate of 8% is very attractive compared to the market rate of 10-10.5%. One of the



Image: EY418 / CC BY-SA (https://creativecommons.org/licenses/by-sa/4.0)



developers used the benefit of this low cost of borrowing to win government bids at extremely competitive rates.

On the other hand, solar companies think that despite the massive potential of rooftop solar, the adoption of rooftop solar in India has been slow, and one of the primary reasons is the lack of finance. They believe that though public sector banks such as Punjab National Bank (PNB) and SBI have tied up with the Asian Development Bank (ADB) and World Bank, the adoption on the ground has been extremely slow.

According to Jain, “It is a balancing act between the revenue impact on utilities due to the adoption of rooftop solar by higher tariff consumers and the transition to clean energy.”

“However, an energy transition to cleaner resources is the future; eventually, we will see distributed renewable energy gaining ground,” Jain opined.

He also pointed out that an attempt has been made to support the harmonization of the regulations

at the state level by providing clarity on specific parameters central to the spread of rooftop solar. For instance, new energy accounting and settlement mechanism, innovative business models, increased hosting capacity, and delinking of project capacity with sanctioned load, among others.

Installers said that, along with the interest rates being attractive, the procedures for securing a loan from SBI is far simpler. The bank officials understand the nuances of lending to clean energy, especially solar, as the bank is one of the largest lenders to solar projects.

Shyam Sharma, CFO, Amp Energy India, a renewable energy project developer, said, “SBI has been making a diligent effort as compared to other lenders. However, we believe as every scheme has its share of learnings. It could consider optimization measures in the future, including; treating a non-metered project as a grid-connected project to enable bigger projects to be covered in the line; allowing refinancing

of bridge loans from World Bank line taken to complete the projects; capital structuring to be left to the independent power producers.

Sharma added, Let the projects having government subsidy become eligible for funding under the line and allowing subsidy also to be funded in debt-equity ratio, treat behind the meter projects installed on factory surplus land to be covered in the credit line, and set targets for rooftop disbursements under the line for its branches and project finance teams to be incentivized through cash bonus for approvals.”

The C&I segment has been the worst affected segment in the solar industry owing to the lockdown, and the ripple effect of the pandemic as businesses are finding it extremely difficult to spend on solar when they are not sure what the future holds. Ramping up the World Bank SBI fund disbursement in these times, along with relaxing the funding criteria to match the current situation on the ground, will go a long way in helping the rooftop solar market. ☺



Focus on Leveraging Technology for Rooftop Solar

Mercom reached out to Gagan Vermani, Founder and CEO of MYSUN, to find out how solar technology can be leveraged for small and medium-scale enterprises in the country

In 2019, the market declined by 33%, while 2020 is expected to be even more challenging year due to the difficult times caused by the COVID-19 pandemic. Though most of the growth

in the rooftop segment comes from C&I, but residential rooftop has lagged due to the challenges related to financing, lack of awareness, unfriendly net metering policies, and less interest being shown by the distribution companies.

Even in these turbulent times, the Delhi-based MYSUN, a technology platform for rooftop solar energy solutions, raised ₹320 million (-\$4.2 million) from its existing investors recently.

MYSUN aspires to bring a change in the way solar energy is bought and sold in the country. The company's online marketplace platform coupled with strong engineering and technology infrastructure delivers end-to-end solutions for the customers' solar needs.

We reached out to Gagan Vermani, Founder and CEO of MYSUN, to find out how technology and financing could be used to unlock the potential of small and medium scale enterprises in the country.

Can you tell us more about your recent pre-Series A fundraising?

As a part of our pre-Series A round, we have raised ₹320 million (~\$4.2 million) from our existing investors. This funding will help us in ramping up our technology platform and tools as well as enter new markets and newer business models. Of course, as the name suggests, this is a precursor to larger funding round over the next few quarters. We had done a seed funding round of ₹187.7 million (~\$2.5 million) initially when we started.

The rooftop market has been weak since last year and is expected to face more challenges due to the COVID-19 pandemic. How were you able to raise funding in this environment?

The funding discussions had been

going on for a few months, and the closure happened during this pandemic period. The closure shows the trust of our investors in our business model as well as in our team. It's a testimony to our idea to use technology and financing to unlock the hugely underserved small and medium enterprises and the individual home market for solar.

Can you explain MYSUN's business model?

Our overall objective is to make the end consumer's relationship with solar easy and reliable, whether it is a B2B (like industry, institutions, or commercial establishments) or a B2C (homes, urban and rural consumers) client. Therefore, the company utilizes world-class engineering and equipment, global safe installation practices, and an elaborate service network to provide a hassle-free 25-year long solar journey to its clients. We plan to redefine the way solar energy is bought and sold in the country.

What makes MYSUN's business model compelling compared to your competitors?

MYSUN's business model is well placed to leverage the growing demand in the renewable energy space. We are committed to the vision to make solar energy access easy and reliable for consumers across the country, and the

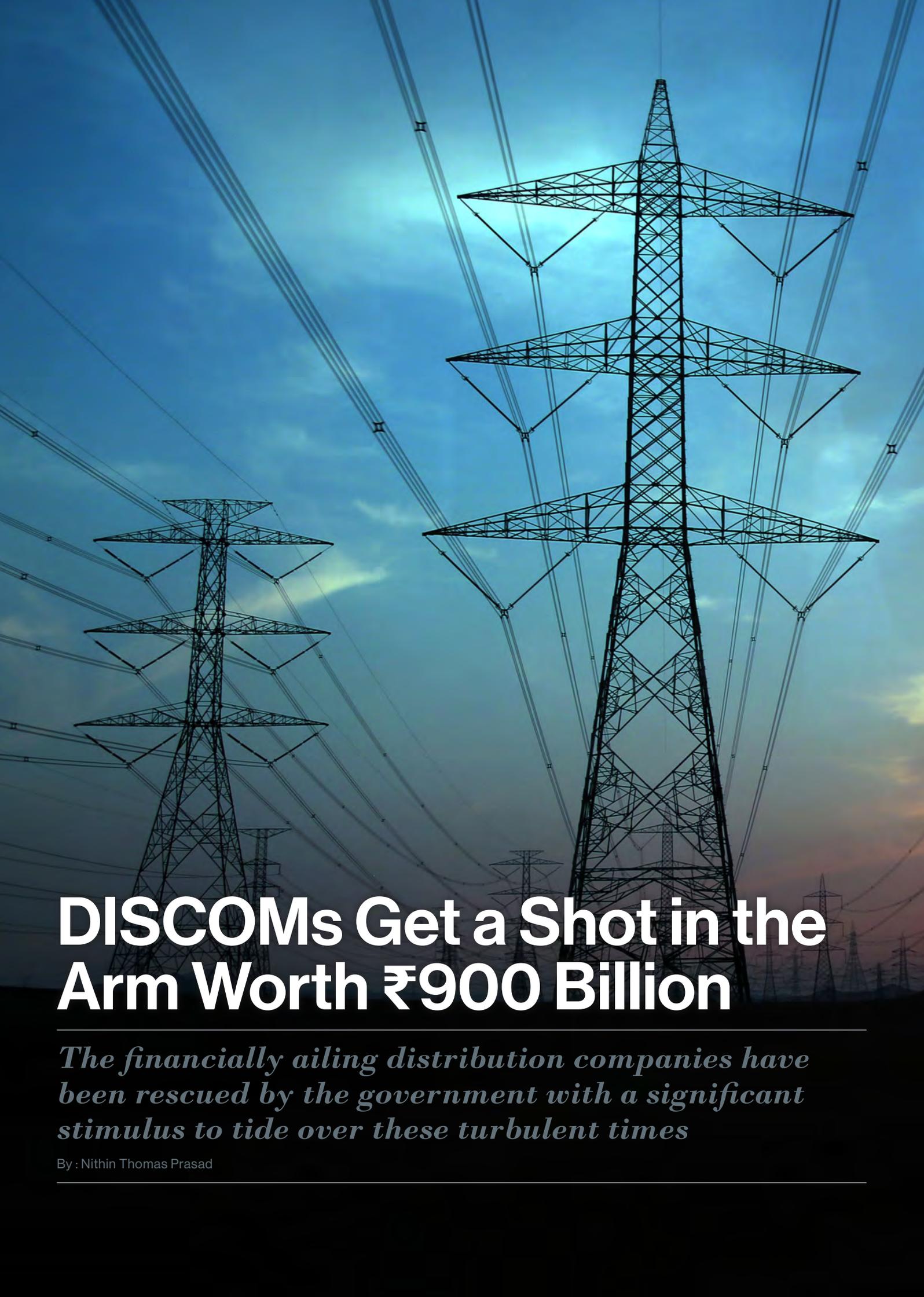
use of technology as the backbone of our business pushes the envelope in the solar space, and to break into the untapped consumer segments of SMEs and homes. As the energy landscape, as well as the overall economic landscape, are changing rapidly due to the recent global events, we foresee the need for more unique and customizable solar solutions, across the B2B and B2C consumer segments around the globe over the next many years.

What are your plans for future fundraising?

We are already working on plans to take our technology platform and proprietary tools to other countries in the Middle East, Asia Pacific, and Africa, making MYSUN a global rooftop solar technology company that enables millions to adopt solar. Our focus will be to continue to scale up the technology, customer acquisition, and financing. We are looking to raise ₹2.5 billion (~\$33.28 million) over the next few quarters.

As per our newly released - India Solar Market Leaderboard 2020 - at the end of 2019, cumulative rooftop solar installations in India reached 4,365 MW, making up 10.9% of the country's rooftop solar target of 40 GW by 2022. The top ten rooftop solar installers represented 43% of the market share in 2019. 📍





DISCOMs Get a Shot in the Arm Worth ₹900 Billion

The financially ailing distribution companies have been rescued by the government with a significant stimulus to tide over these turbulent times

By : Nithin Thomas Prasad

In a press conference in New Delhi, Finance Minister Nirmala Sitharaman announced that power distribution companies (DISCOMs) would receive ₹900 billion (-\$12.03 billion) as part of the Government of India's (GOI) stimulus package to help the Indian economy recover from the coronavirus crisis

This one-time liquidity injection will be infused through the Power Finance Corporation (PFC) and REC Ltd in two equal installments.

Central public sector power generation companies have also been ordered to give rebates to DISCOMs, which will, in turn, be passed on to the final consumers (industrial).

These funds are intended to help DISCOMs out of this unprecedented situation as their revenues have dropped

drastically, Sitharaman noted, adding that loans would be given against state guarantees solely for clearing liabilities to power generating companies.

Meanwhile, the REC, through a Bombay Stock Exchange (BSE) filing, announced that it had issued \$500 million (-₹37.4 billion) in 4.75% notes that are due in 2023. The notes were set to mature on May 19, 2023, and all principal and interest payments would be made in U.S. Dollars. The settlement date for the notes is expected to be May 19, 2020, it added. The net proceeds from the sale of the notes will be applied for lending to the power sector, the BSE filing added.

At the end of March 2020, DISCOMS owed renewable energy generators ₹68.37 billion (-\$914.5 million) in outstanding payments spread across 307 pending invoices, according to data

from the Ministry of Power's (MoP) payment ratification and analysis portal (PRAAPTI). This included dues of ₹311 million (-\$4.2 million) under dispute.

The government has been trying to assist ailing distribution companies in these trying times. For instance, power generators (including renewables) in the country have been ordered to maintain an uninterrupted supply of power across states even if the distribution companies deposit Letters of Credit for 50% of the cost of power they want to be scheduled. For payments delayed beyond 45 days (from March 24, 2020, and June 30, 2020), the late payment surcharge has now been reduced to 12% per annum from the earlier 18%.

Even with all the relief provided, many DISCOMs, including those in Uttar Pradesh, Madhya Pradesh, and Andhra Pradesh, have been refusing to pay the power generators claiming their inability to collect power dues from the consumers. On the other hand, the DISCOMs' claim of force majeure (coronavirus outbreak) for not paying generators has been rejected by the Solar Energy Corporation of India (SECI). ■

*At the end of March 2020,
DISCOMS owed renewable
energy generators ₹68.37 billion
(~\$914.5 million)*





April's REC Trading Volume Plummet

Besides the ongoing pandemic, the fact that April 2020 is the first month of compliance, is another reason for the low trade volume

By : Anjana Parikh

Due to the lockdown caused by the coronavirus pandemic, there was a significant decrease in the trade volume of both solar and non-solar renewable energy certificates (RECs) in April 2020.

In April 2020, the Indian solar market further witnessed a considerable dip in the trade volume. The non-solar clearing price touched as low as ₹1,000 (-\$14)/REC on both the exchanges, while solar RECs' cleared price was ₹2,400 (-\$34)/REC in IEX portal and ₹2,000 (-\$26.52)/

REC in PXIL.

The non-solar clearing price remained at ₹1,000 (-\$14)/REC on both the exchanges, while the solar REC clearing price was ₹2,400 (-\$34)/REC.

A cumulative sum of 20,842 solar RECs was traded on both the Indian

Solar REC Market Trading

Exchange	Buy Bid	Sale Bid	Trade Volume				Price Discovered					
							Apr-20		Mar-20		% of Change MoM	% of Change YoY
			Apr-20	Mar-20	% of Change MoM	% of Change YoY	₹/REC	~\$/REC	₹/REC	~\$/REC		
IEX	38,176	15,991	15,991	39,299	-59%	-75%	2,400	34	2,400	34	-	20%
PXIL	4,851	10,127	4,851	9,383	-48%	-76%	2,000	28	2,400	34	-17%	11%
Total	43,027	26,118	20,842	48,682	-57%	-75%						

Data: IEX, PXIL

Mercom India Research

Energy Exchange (IEX) and Power Exchange India Limited (PXIL). Out of the total, 15,991 and 4,851 solar RECs were traded on the IEX and PXIL, respectively.

Comparatively, March fared better with 48,682 solar RECs traded on the Indian Energy Exchange and Power Exchange India Limited. Out of the total, 39,299 and 9,383 solar RECs were traded on the IEX and PXIL, respectively.

On the IEX, the trade volume of solar RECs in April 2020 dropped 59% compared to March. On the PXIL, the trade volume dipped by 48%. Overall, the trade volume dropped 57% compared to the previous month.

On the IEX, the sale bid for solar RECs in April was at 15,991, and the buy bid was at 38,176. Whereas on PXIL, the sale bid for solar RECs was 10,127, and the buy bid was at 4,851.

On the IEX, the price discovered for solar RECs remained the same at ₹2,400 (-\$34)/ REC, but the REC price on PXIL was ₹2,000 (-\$26.52)/ REC as compared to ₹2,400 (-\$34)/ REC in March. Hence, there was a drop of 17% compared to the

previous month.

Compared to last year's April trading sessions, there was a 75% drop on IEX and a 76% decline on PXIL.

A senior official of PXIL said that there could be three reasons for the drop in REC trading in April 2020. He said, "Apart from the COVID-19 impact, April is the first month of compliance. So, the month will see mostly open access customers participating in

The trading of non-solar RECs also saw a drop of 73% when compared to March 2020

the trade, whereas big players like the distribution companies do not participate much."

The third reason, he pointed out, was the Central Electricity Regulatory Commission's (CERC) proposal for new forbearance prices.

"The CERC has proposed the forbearance price to be ₹1,000 (-\$14) each for solar and non-solar RECs for 2020, against the 2017's prices of ₹2,400 (-\$34)/REC and ₹3,000 (-\$39.60)/REC, respectively. It has also proposed to reduce the floor price to zero. So, the big players are waiting for the outcome," he added

The trading of non-solar RECs also saw a drop of 73% when compared to March. 217,093 non-solar RECs were traded on the IEX and PXIL compared to 789,766 in March

The volume of non-solar RECs traded on IEX stood at 172,488 as compared to 480,379 in March, whereas the volume of RECs traded on PXIL stood at 44,605 against 309,387 last month.

On the PXIL, the sale bid for non-solar RECs was 106,339, and the buy bid stood at 44,605. On the IEX, the sale bid stood at 439,233, and the buy bid stood at 172,488. 📌

Non-Solar REC Market Trading

For RECs Issued after April 01, 2017

Exchange	Buy Bid	Sale Bid	Trade Volume				Price Discovered					
							Apr-20		Mar-20		% of Change MoM	% of Change YoY
			Apr-20	Mar-20	% of Change MoM	% of Change YoY	₹/REC	~\$/REC	₹/REC	~\$/REC		
IEX	1,72,488	4,39,233	1,72,488	4,80,379	-64%	7%	1,000	14.05	1,000	14.05	0%	-23%
PXIL	44,605	1,06,339	44,605	3,09,387	-86%	-64%	1,000	14.05	1,000	14.05	0%	-33%
Total	2,17,093	5,45,572	2,17,093	7,89,766	-73%	-24%						

Data: IEX, PXIL

Mercom India Research

Power Sale Agreements and Long-Term Access

Power sale agreements are an important component in granting long-term access, the Central Commission has underlined

By : Anjana Parikh

Power Grid Corporation of India Limited (PGCIL) filed an instant application requesting the Central Electricity Regulatory Commission (CERC) to provide clarity on the exemption of construction phase bank

guarantee (BG) for an applicant who fulfills the exemption eligibility criteria for long-term access (LTA) of power.

This petition comes on the heels of an application filed by ACME Solar Holding Limited to exempt the bank guarantee for four separate LTA applications.

The application was for 300 MW each for its Fatehgarh-III & IV solar projects. ACME sought a review of the requirement to submit a construction phase bank guarantee by an LTA applicant, which already has a power purchase agreement (PPAs) in place.



Later, PGCIL sought clarification as to whether the requirement to provide the construction phase bank guarantee can be waived off for an applicant who signs a PPA after the submission of the LTA application.

PGCIL added that ACME had submitted the copies of two PPAs of 300 MW each against its LTA applications and requested the central utility to consider them for granting LTA.

Also, PGCIL submitted that the construction phase bank guarantee is mainly required to cover the risk of inter-state transmission licensee during the construction phase of generators (for which transmission system is being constructed) since the PPA is operative only after the project is commissioned. So, the signing of the PPA does not mitigate the risk of inter-

Construction phase bank guarantee helps cover the risks of inter-state transmission licensees

state transmission licensees during the construction phase of generators for its delay, failure, exit, abandonment, or relinquishment of LTA.

It further stated that in several cases of wind and solar projects awarded through competitive bidding, PPAs are signed with intermediary agencies such as Solar Energy Corporation of India Limited (SECI) or NTPC, who, in turn, enter into back-to-back PSAs with the beneficiaries. In such cases, where the PPA has been signed by an intermediary agency like SECI or NTPC with the LTA applicant, it should be supported by a back-to-back power sale agreement (PSA) with the beneficiaries so that a clear connection is established for the supply of power by the generating station to the beneficiaries. The signing of PSAs assumes greater significance because of the cancellation of PPAs on a few occasions due to the non-signing of PSAs.

The Commission observed that,



if the applicants who already have an entity to which the power is to be supplied or procured, the applicant will not be required to submit the construction stage bank guarantee with the application form. The same relaxation has been given to inter-state generating stations owned by the central government and ultra-mega power projects.

The provisions are subject to a few conditions:

Augmentation of the transmission system will be undertaken only after the agreement by the beneficiaries in the standing committee or regional power committee.

The long-term access agreement in such cases will be directly signed by the beneficiaries with PGCIL or tripartite agreement with PGCIL and an inter-state transmission licensee.

The Commission observed that despite PPAs having been signed

between generators and intermediary agencies, PSAs have not become a reality in several cases. Therefore, it stated that in the absence of PSAs between the intermediary agency with

ACME had filed a petition requesting for the exemption of construction phase bank guarantee in LTA application

beneficiaries, this benefit could not be availed.

Accordingly, the Central Electricity Regulatory Commission has directed the PGCIL that the construction phase BG cannot be waived off for ACME Solar since it did not fulfill the conditions. HSA Advocates appeared for the developers.

CERC ordered that, if PPA is signed between LTA applicant and beneficiaries or between LTA applicant and intermediary agency with back to back PSA with the beneficiaries, the construction phase BG doesn't have to be furnished for the quantity for which such PPA or PPA with back-to-back PSA has been signed with beneficiaries.

In case any application BG or construction phase BG is furnished by the LTA applicant, BG corresponding to the quantity, for which PPA or PSA with beneficiaries has been signed and submitted to central transmission utility, will be returned to such LTA applicant. ☐



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EV Sales Surged by 20% in 2019-20

The surge in the sale of electric vehicles seen in the past year was driven mostly from electric two-wheelers

By : Anjana Parikh

The sale of electric vehicles (EVs) in the country went up by 20% in 2019-20. The EV industry sold 156,000 electric vehicles in the financial year (FY) 2019-20. Out of the total, 152,000 were two-wheelers, 3,400 cars, and 600 buses, according to the Society of Manufacturers of Electric Vehicles (SMEV).

However, in FY 2018-19, 126,000 two-wheelers, 3,600 cars, and

In the electric four-wheeler segment, 3,400 units were sold in 2019-20

approximately 400 buses were sold totaling 130,000 units. The increase of 20% has mostly come from electric two-wheelers. However, it does not include electric rickshaws, which broadly fall under the unorganized sector with a reported sale of nearly 90,000 units. The corresponding figures of the electric rickshaws sold in the previous year have not been documented. In the electric four-wheeler segment, 3,400 units were sold compared to 3,600 units in the

previous fiscal year.

According to SMEV's report, "Of the electric two-wheelers that were sold in FY19-20, 97% were electric scooters, and a very small volume of motorcycles and electric cycles filled the rest of the 3%. Low-speed scooters that go at a maximum speed of 25km/hr and do not need registration with the transport authorities constituted a whopping 90% of all two-wheelers sold."

Sohinder Gill, director-general of SMEV, said, "The EV industry is taking shape, and we believe that despite the COVID-19, the FY 20-21 will be a defining year for all the EV segments. While the EV industry is surely going to face the brunt of COVID-19 like any other automotive business, the clearer skies and cleaner air in even the worst polluted cities, is certainly leaving a permanent impression in the minds of the customers about how they can breathe easy and remain healthy if the society moves towards e-mobility."

He pointed out that a pertinent factor that may work

in favor of electric wheelers post COVID-19 would be the choice of switching over from crowded mass transport to the sensibly priced electric two-wheelers with almost the same cost of

commuting as of public transportation.

"The decrease in numbers is attributed mainly due to the lack of bulk purchase of e-cars in FY19-20 and the discontinuation of one of the leading car models. The acceptability of electric cars in the premium segment in the second half of the year was a positive signal of a quantum jump of a much higher volume of E-cars in FY20-21," the report added.

The e-taxi segment is also beginning

Of the electric two-wheelers that were sold in FY19-20, 97% were electric scooters

to get some traction, though the range of E-cars and lack of charging spots in enough density are a deterrent in the growth of the E-taxi segment, it noted.

The report stated that the significant commitments by state governments on e-buses did not translate into buses.

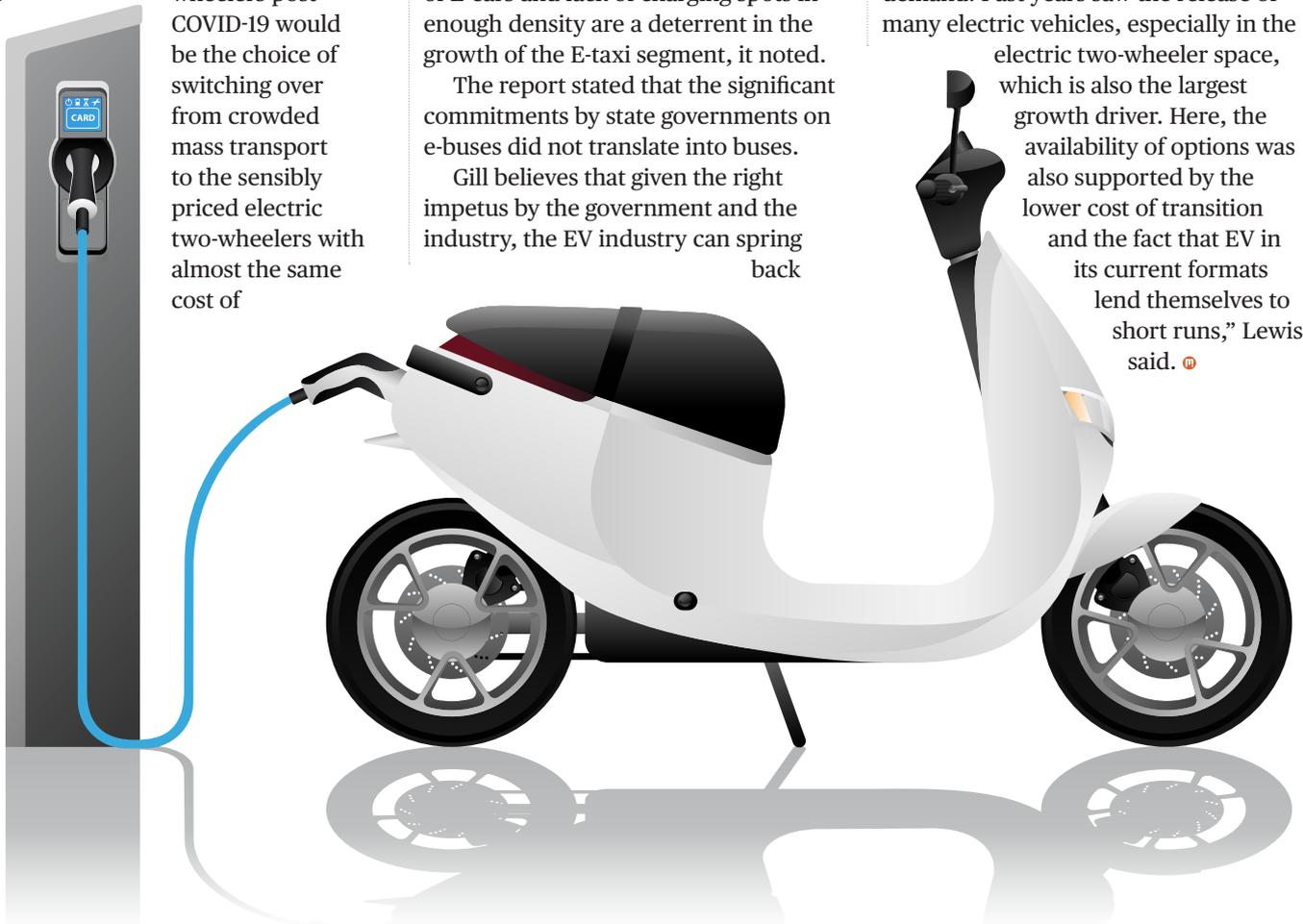
Gill believes that given the right impetus by the government and the industry, the EV industry can spring back

faster than the ailing internal combustion (IC) vehicles segment.

"Few experiments like electric two-wheelers being sold without the batteries and customer paying for the batteries as a fuel, e-commerce companies realizing the economic benefits of EVs and converting their fleets. E-carts are becoming a convenient and cost-effective means of short distance logistics. E-taxi fleets are beginning to make money due to lower operating costs that may bring around the inflection point in the EV industry in FY 21-22," he added.

Commenting on the SMEV's report, Maxson Lewis, the managing director of Magenta Power, said that there had been a surge in sales of EVs, which is a good trend.

"But this growth has to be seen from the lens of absolute numbers which show that there is a long way to go before EVs reach significant numbers to make a storyline as against ICE engines. These growth numbers showcase one important fact- availability will drive demand. Past years saw the release of many electric vehicles, especially in the electric two-wheeler space, which is also the largest growth driver. Here, the availability of options was also supported by the lower cost of transition and the fact that EV in its current formats lend themselves to short runs," Lewis said. 





India's Solar Market Leaders in 2019

Mercom India Research has released a data report, the India Solar Market Leaderboard 2020, which reveals the solar industry market leaders that emerged during the calendar year 2019

By : Ankita Rajeshwari

Mercom's latest report features the industry's leaders as well as their market share and shipment rankings across the Indian solar supply chain.

India installed 7.3 GW of solar

capacity in 2019 and maintained its spot as the third-largest solar market in the world. The country boasts of cumulative solar installations of about 35.7 GW at the end of December 2019.

"The solar market leaders have

changed in almost every category compared to 2018. With a tough year ahead, we expect strong, resilient, and innovative companies to continue to do well," said Raj Prabhu, CEO of Mercom Capital Group.



Utility-scale Solar

ReNew Power, NLC India, and Azure Power emerged as the top utility-scale solar project developers in India in terms of installed capacity in CY 2019, according to Mercom's recently released report. Together, these three developers accounted for nearly 35% of total large-scale installations in 2019.

The top ten utility-scale project developers in 2019 accounted for approximately 70% of installed capacity. Total large-scale capacity additions amounted to 6.2 GW, of which the top ten developers contributed about 4.3 GW. Large-scale solar installations represented 85% of total installations, and rooftop solar made up the remaining 15%.

While three companies installed more than 500 MW, none of the developers installed more than a GW in a year when utility-scale solar installations declined year-over-year (YoY) by 7%.

India's solar installations, including both rooftop and large-scale recorded in the calendar year 2019, stood at around 7.3 GW, a 12% decline YoY, and

Total large-scale capacity additions amounted to 6.2 GW, of which the top ten developers contributed about 4.3 GW

the country's cumulative installed solar capacity rose to 35.7 GW.

EPC

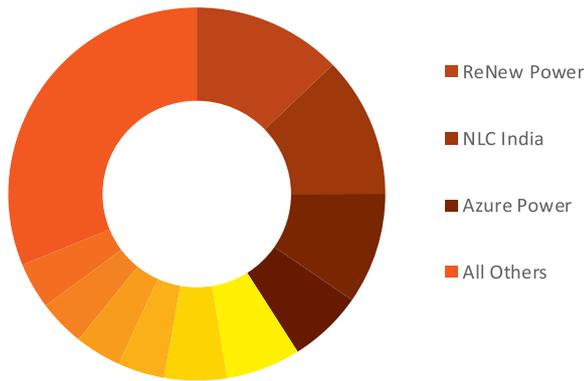
Companies offering Engineering, procurement, construction (EPC) services saw many of the projects moved to 2020 due to delays caused by general elections, land, and evacuation issues, among others. Mahindra Susten was the top EPC player for utility-scale solar installations during the year.

Rooftop Solar

Tata Power Solar, Fourth Partner Energy, and Azure Power emerged as the top solar rooftop installers in India in CY 2019, according to the report. Together, these three installers accounted for nearly 22% of total rooftop installations in 2019.

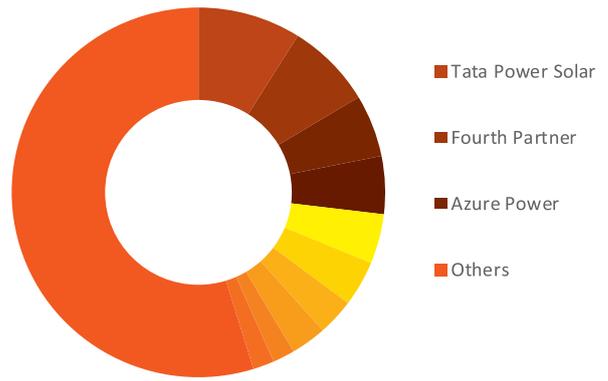
The top 10 solar rooftop installers together contributed 45% of the total rooftop solar capacity installed in 2019,

Leading Utility-scale Developers in India 2019 (CY)



Source: Mercom's India Solar Market Leaderboard 2020

Leading Rooftop Solar Installers in India 2019 (CY)



Source: Mercom's India Solar Market Leaderboard 2020

with the remaining installations spread among smaller installers in a fragmented market. In 2019, India added -1.1 GW of solar rooftop capacity, a 33% decline compared to 2018 installations. Rooftop solar installations in 2019 declined for the first time in five years, most of the decline in rooftop installations were in government and residential segments.

The report pointed to the slowdown in the economy in 2019 as a significant factor, along with liquidity issues in the market following the NBFC crisis, which made it extremely difficult for installers to finance rooftop projects in a tough economy. In a tough year (2019) for the rooftop solar segment, none of the companies installed more than 100 MW.

In terms of cumulative rooftop solar installations as of December 2019, Tata Power Solar, CleanMax, and Fourth Partner Energy were the top three rooftop solar installers. Cumulative rooftop solar installations in India stood at about 4.4 GW at the end of December 2019, according to the report.

According to the report, Azure Power was the top installer in the first half of 2019, followed by Tata Power Solar and Fourth Partner Energy.

Solar Inverter Suppliers

In 2019, Huawei, emerged as the lead supplier of inverters to the Indian solar market overall, followed by Sungrow and TBEA Energy. ABB and TMEIC rounded off the top five.

The top five suppliers of inverters accounted for approximately 65% of the total market share.

Central inverters continued to be the choice of large-scale solar projects because of lower costs and developers, considering it a proven technology. Still, string inverters are making inroads in the market among consumers because of their flexibility in terms of size and usage. In terms of yearly shipments, string inverters are gaining market share quickly over central inverters.

Huawei was the leading string inverter supplier, followed by Growatt and Sungrow. GoodWe and Solis rounded off the top five.

In the central inverter segment, TMEIC was the top supplier, followed by Sungrow. ABB (acquired by FIMER), TBEA, and Sineng Electric rounded off the top five.

MERCOM INDIA RESEARCH 2019 INDIA SOLAR MARKET SHARE LEADERS	
	Top Utility-scale Solar Project Developer
	Top Solar Rooftop Installer
	Top Utility-scale Solar EPC Service Provider
	Top Solar Inverter Supplier
	Top Solar Module Supplier
	Top Solar Mounting Structure Supplier
	Top Solar Tracker Supplier
Source: Mercom India Market Share Leaderboard	



Solar Module Suppliers

Waaree Energies, Adani Solar, and Risen Energy emerged as the top three suppliers of solar modules in India in terms of shipments in CY 2019. These three manufacturers accounted for approximately 25% of the total market share.

None of the module suppliers to the Indian solar market exceed 1 GW in shipments in 2019.

In 2019, the top 10 solar module suppliers represented 62% of the total market share. Last year, Mono PERC modules made up around 10% of the module market in India, while the remaining 90% came from polycrystalline modules. Even though the Indian market is last to the game, the shift to Mono PERC is definitely on the way.

In a tough year for the rooftop solar segment, none of the companies installed more than 100 MW in 2019

With support from safeguard duty and domestic content requirement (DCR) tenders, large Indian manufacturers competed aggressively with Chinese suppliers and managed to

secure a significant share of the market. According to Mercom India’s analysis, larger Indian domestic manufacturers are faring better after the safeguard duty imposition by offering competitive prices to capture business while smaller manufacturers are still struggling

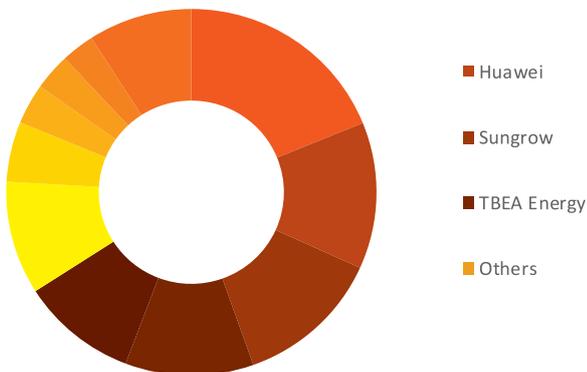
In terms of the cumulative shipments as of December 2019, the top three companies were Trina Solar, Canadian Solar, and JA Solar. Three companies have cumulatively supplied over 3 GW each, and seven companies have supplied over 2 GW each to the Indian solar market.

Solar Trackers and Mounting Structures

In 2019, Scorpius Trackers was the top supplier of solar trackers.

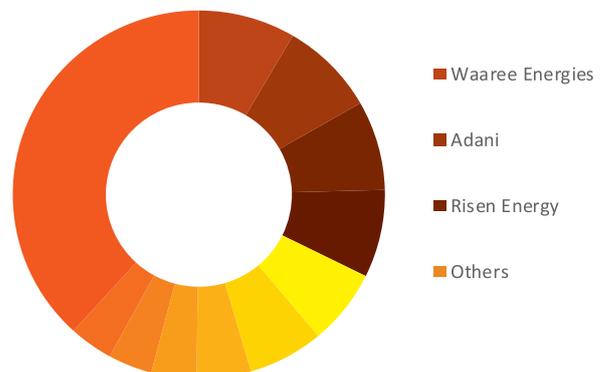
Ganges Internationale was the top supplier of solar mounting structures

Leading Solar Inverters Suppliers in India 2019 (CY)



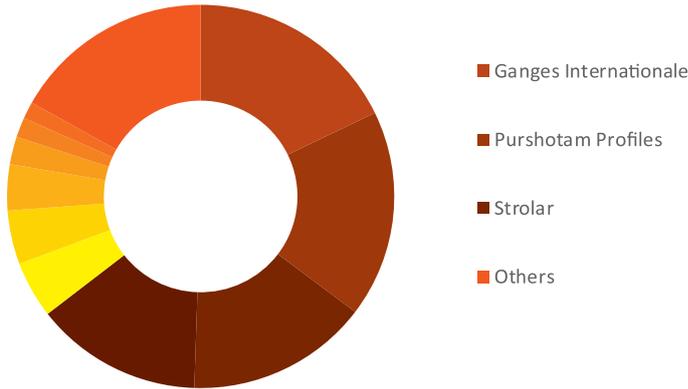
Source: Mercom's India Solar Market Leaderboard 2020

Leading Solar Module Suppliers in India 2019 (CY)



Source: Mercom's India Solar Market Leaderboard 2020

Leading Solar Mounting Structure Suppliers in India 2019 (CY)



Source: Mercom's India Solar Market Leaderboard 2020

In 2019, the top 10 solar module suppliers represented 62% of the total market share

during the year, followed by Purshotam Profiles and Strolar.

Recently, the Directorate General of Trade Remedies (DGTR) recommended the imposition of anti-dumping duty on aluminum and zinc coated flat products from China PR, Vietnam, and Korea RP to protect the domestic industry. In solar projects, the panels are placed on the module mounting structures, which are made up of aluminum and zinc-coated flat products

Open Access Solar

Rays Power Experts and CleanMax Solar were the top open access developers as of December 2019.

The open access solar market in India has been offering parallel opportunities

for stakeholders, including large corporates, solar project developers, investors, and power distribution companies, to participate in the solar growth story. There is a growing demand for serious players to develop open access projects and sell power to multinational companies (MNCs) that are choosing group captive solar to go green.

The solar sector is currently reeling with issues like delays in DISCOMs' payment to developers, PPA renegotiations, power curtailment, difficulty in forecasting and scheduling power, access to financing, reimbursement delays, and the looming fear of the coronavirus derailing the supply schedules.

Solar Robotic Cleaning

Ecoppia was the top supplier of robotic cleaning systems in India as of December 2019.

Robotic cleaning of solar panels is gaining traction in India amid water scarcity. Along with this, cleaning robots eliminate the need for extensive manual labor and increases electricity generation. Most of the major developers have deployed the robotic cleaning systems installed on large solar parks such as REWA, Bhadla, Pavagada. The MNRE has also recommended the use of robotic cleaning technology, which uses less water for cleaning solar projects. ☺



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Type II SPD, AFCI Optional



Easy Maintenance

Online Smart Service



MAC 30-70KTL3-X LV/MV



MIN 2500-6000TL-X



Growatt New Energy



DISCOM Dues Pile Up Amid Pandemic

At the end of March 2020, total outstanding amount to power generators from DISCOMs stood at ₹905.77 billion, of which ₹68.37 billion was due just to renewable power generators

By : Nithin Thomas Prasad

Distribution companies (DISCOMs) owed renewable energy generators ₹68.37 billion (-\$914.5 million) in outstanding payments spread across 307 pending invoices at the end of March 2020, according to data from the Ministry of Power's (MoP) payment ratification and analysis portal (PRAAPTI). This included dues of ₹311 million (-\$4.2 million) under dispute.

Overall, power generators were owed about ₹905.77 billion (-\$12.11 billion) in overdue outstanding payments at the end of March 2020. Overdue outstanding payments, excluding payments under dispute, stood at ₹798.29 billion (₹10.67 billion) by the end of the month. Overdue outstanding amounts are payments that have been delayed by over six months.

Data from the portal showed that 65 DISCOMs had over 12,783 overdue invoices with 89 participating generating companies. This is an increase from 64 DISCOMs and 11,598 overdue invoices

to 87 generators at the end of January 2020. The outstanding amount at the beginning of March stood at ₹928.91 billion (-\$12.42 billion)

Tata Power Company Limited (TPCL) and Adani Green Energy Limited (AGEL) were the two non-conventional power generators that were owed the highest amount at ₹17.42 billion (-\$232.9 million) and ₹12.59 billion (₹168.4 million), respectively.

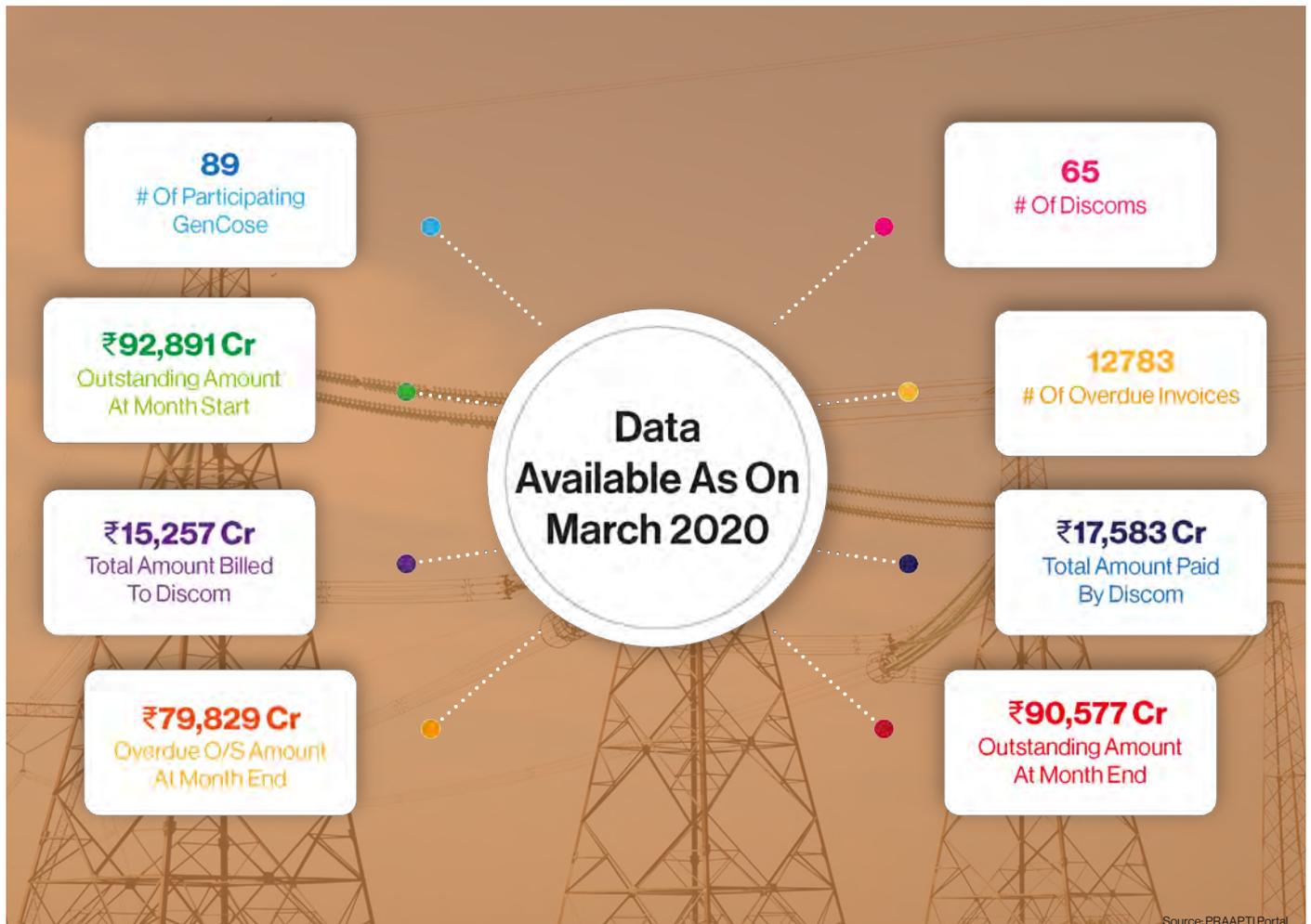
65 DISCOMs had over 12,783 overdue invoices with 89 participating generating companies

In a recent filing on its operational and financial highlights for the quarter and year, Adani Green said it has outstanding dues of ₹4.37 billion (-\$58.12 million) from the Tamil Nadu Generation and Distribution Corporation (TANGEDCO) as of March 31, 2020.

The PRAAPTI data also showed that DISCOMs had paid all non-conventional power generators ₹5.54 billion (-\$74.1 million) by the end of March 2020, compared to just ₹1.70 billion (-\$22.7 million) in the previous month.

Rajasthan, Uttar Pradesh, and Tamil Nadu had racked up the most outstanding dues, overall. DISCOMs in Rajasthan had the highest overdue outstanding amounts at around ₹228.40 billion (-\$3.05 billion), of which ₹198.48 billion (-\$2.65 billion) have been overdue for over 60 days.

Tamil Nadu had the second largest number of pending dues amounting to about ₹138.29 billion (-\$1.85 billion), of which ₹122.26 billion (-\$1.64 billion) has been overdue for more than 60



days. Uttar Pradesh was a close third with ₹136.89 billion (-\$1.83 billion), comprising ₹110.37 billion (-\$1.47 billion) of overdue older than 60 days.

Haryana, Rajasthan, Delhi, Uttarakhand, Uttar Pradesh, Madhya Pradesh, Chhattisgarh, West Bengal, Odisha, Arunachal Pradesh, Nagaland, Manipur, Meghalaya, Telangana, Andhra Pradesh, Goa, Karnataka, Kerala, Tamil Nadu, and Puducherry were rated “Worst” in terms of ease of payments to DISCOMs, according to the portal.

Gujarat, Maharashtra, Himachal Pradesh, Punjab, Bihar, Sikkim, and Mizoram were rated “Good” in terms of ease of payments to DISCOMs, while Jharkhand, Assam, and Tripura were rated “Best.” Jammu & Kashmir was rated one stage below “Worst” with ₹54.65 billion (-\$730.9 million) in overdue payments.

Mercom recently reported that despite all the relief provided considering the ongoing pandemic, many DISCOMs, including those in Uttar Pradesh, Madhya Pradesh, and Andhra Pradesh, have been refusing to pay the power generators claiming their inability to collect power dues

from the consumers. On the other hand, the DISCOMs’ claim of force majeure (Coronavirus outbreak) for not paying generators has been rejected by the Solar Energy Corporation of India (SECI).

To help ailing generators during the COVID-19 crisis, the Ministry of Power also issued a clarification regarding letters of credit (LoC) to be given by DISCOMs. It stated that DISCOMs are

Rajasthan had the highest overdue outstanding amounts at around ₹228.40 billion

expected to deposit LoCs for 50% of the cost of power they want to be scheduled, while the remaining 50% will

have to be paid within 45 days of the presentation of the bill or as specified in the power purchase agreement (PPA). If the payment is not made as specified, the late payment surcharge will apply.

Further, the Central Electricity of Regulatory Commission (CERC) reduced the rate for late payment surcharge payable by distribution companies to power generators. The LPS is now reduced to 12% per annum from the earlier 18% if the due date falls between March 24, 2020, and June 30, 2020. According to the CERC, if there’s any delay in the payment to the generating companies and inter-state transmission licensees beyond 45 days from the date of presentation of the bills (between March 24, 2020, and June 30, 2020), then the DISCOMs can make the payment of LPS at a reduced rate of 1% per month instead of 1.5%.

At the end of January 2020, DISCOMs owed renewable generators ₹62.19 billion (-\$856.2 million) in overdue outstanding payments. Excluding payments under dispute, overdue payments stood at ₹61.88 billion (-\$851.9 million) or 8.12%, of all overdue outstanding amounts. 



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India's Power Supply Deficit Slides Marginally

In FY 2020, things didn't change much as the power supply deficit stood at 0.5% compared to 0.6% in the previous year

By : Rakesh Ranjan Parashar



India's power supply deficit stood at 0.5% at the end of March for the financial year 2019-20, and the peak power deficit stood at 0.7%, according to the data published by the Central Electricity Authority (CEA).

During the same period last year, India's power supply deficit stood at 0.6%. Per the released data, the total power supplied during March 2020 was 98,404 million units (MUs), which was less than the required energy target by 421 MUs.

Like last year, the northeastern region recorded the highest power supply deficit of 3.7%, followed by 1.4% for the northern region. In 2018-19, the deficit for the northeastern region was 3.9%, and the southern region had registered a power supply deficit of 0.1%.

The northern region recorded a peak power supply deficit of 694 MW, whereas the eastern region recorded a peak power deficit of 22 MW. The northeastern region recorded a peak power deficit of 111 MW.

In the northern region, the union territory of J&K and Ladakh reported the peak power supply deficit of 681 MW, which was the highest in the northern region. In the southern region, Kerala recorded a peak power supply deficit of 186 MW, whereas, in the eastern region, West Bengal reported a peak power supply deficit of 175 MW. In the northeastern states, Assam recorded a peak power supply deficit of 237 MW.

For the financial year 2019-20, 1,283,690 MUs were supplied against the

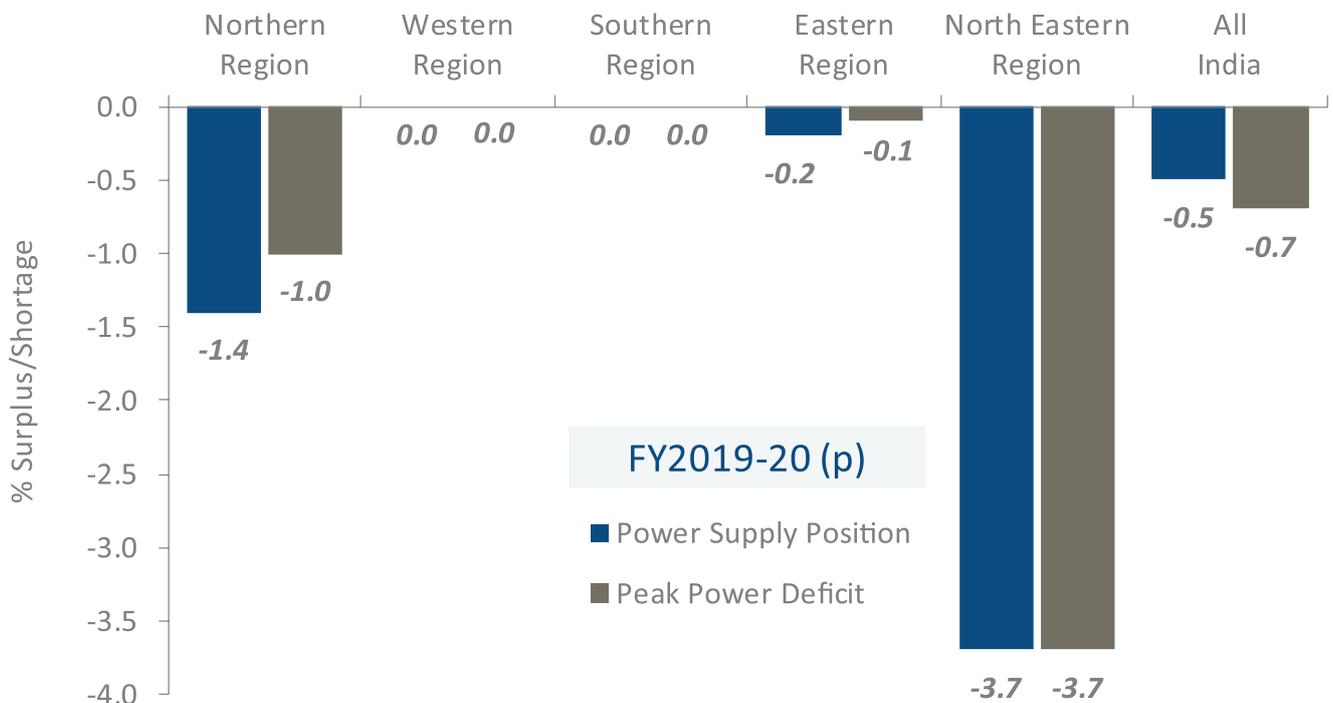
requirement of 1,290,247 MUs of energy. The amount of power supplied was 6,557 MUs lesser than the target energy requirement, as per the data provided by the CEA.

In the northern region, 389,192 MUs of energy was supplied as against the requirement of 394,758 MUs of energy, whereas, in the western region, 388,346 MUs of energy was supplied as against the requirement of 388,351 MUs of energy. In the southern region, 344,450 MUs of energy was supplied as against the 344,550 MUs of energy required. Similarly, in the eastern region, 145,717 MUs of energy was supplied as against the requirement of 145,997 MUs of energy. In the northeastern region, 15,985 MUs of energy was supplied as against the requirement of 16,592 MUs of energy.

In December last year, in its load generation balance report (LGBR), the CEA had projected that India's anticipated power supply position for the year 2019-20 would reflect a surplus of 5.8% (80.38 billion units) and a

Northeastern region recorded the highest power supply deficit of 3.7%

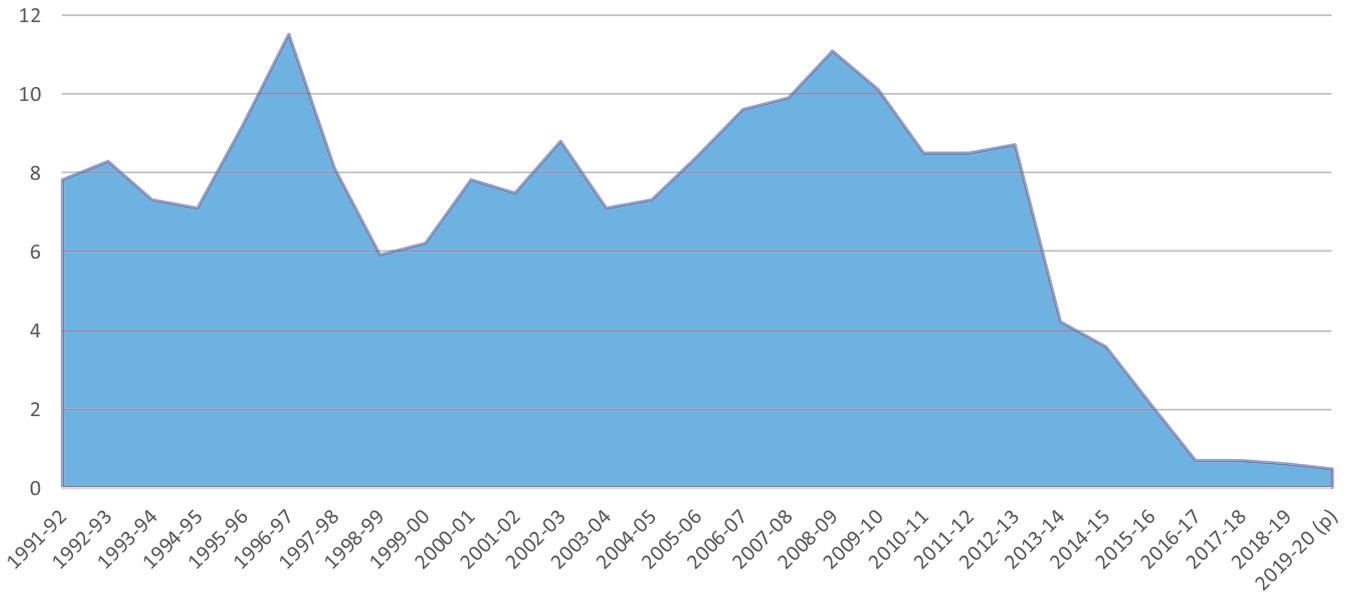
Region-wise Power Supply Position and Peak Demand for FY 2019-20 (Apr-Mar) (Provisional)



Data from CEA

Source: Mercom India Research

India Power Deficit % (FY 1991-92 to FY 2019-20)



Data from CEA

Mercom India Research

peak surplus of 8.4% (15.9 GW). In the previous financial year, India recorded marginal demand-supply gaps in terms of energy and peaking, according to the report. During the year, the country's energy requirement registered a growth of 5%, and peak demand rose by 7.9%, compared to the CEA's projections of 10.2% and 10.1%, respectively. The CEA said the demand-supply gaps were not due to the non-availability of power, but because of transmission and distribution

constraints. It noted that there were short-term surpluses in most of the states at some point in time and that this surplus power was sold to deficit states or neighboring countries through bilateral contracts, power exchanges, or traders.

India's power supply deficit stood at 0.5% for the nine months between April 2019 and December 2019, while India's peak power deficit stood at 0.7%.

Power cuts are a common occurrence

in many parts of India. Most utilities prefer to cut off power supply rather than supplying power at a loss. It is surprising that even with the economy slowing down last year, supply was still not able to keep up. The difference between CEA projections compared to actual figures is substantial. Unless transmission infrastructure keeps up with generation, this issue will continue. Ⓜ





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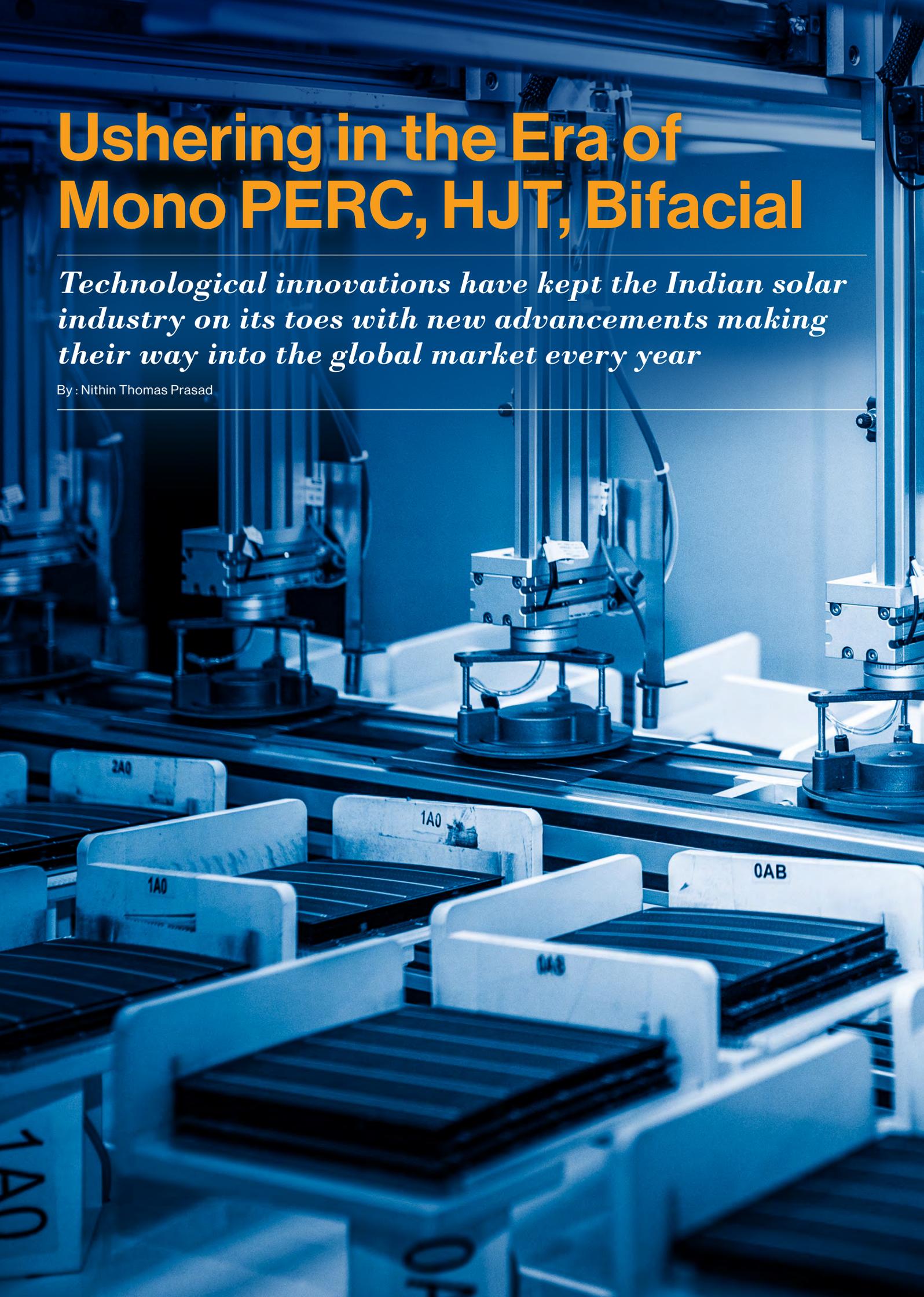


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Ushering in the Era of Mono PERC, HJT, Bifacial

Technological innovations have kept the Indian solar industry on its toes with new advancements making their way into the global market every year

By : Nithin Thomas Prasad





Technology shift in the solar industry has been taking place rapidly across the globe, but India, a notoriously cost-sensitive market, has been slow to adapt and accept newer products.

Higher efficiency products are gaining market share, and costs are dropping quickly. The newer products are not only more efficient, but their benefits include longevity and the ability to reduce BoS (balance of system) costs. In India, the price differential between polycrystalline and monocrystalline continues to decline, and the shift is well underway.

Here is a look at the latest technological developments in solar cells and modules, and the factors that are holding India back from adopting them quickly.

Solar Cells and Modules:

The solar industry has almost entirely moved away from the polycrystalline, and polycrystalline passivated emitter and rear cell (PERC) based cells to more efficient monocrystalline cells, and more recently, monocrystalline PERC, also called Mono PERC.

Solar industry has almost entirely moved away from the polycrystalline based modules

“The fundamental nature of PV technology is such that higher efficiencies ultimately result in lower costs, so, eventually, with mass volumes and competition, high-efficiency modules will be priced at the same level or even lower than the conventional ones,” said George Touloupas, Director of Technology & Quality at Clean Energy Associates, a U.S.-owned, global consultancy, and quality assurance firm for solar and storage.

“About three years ago, radical

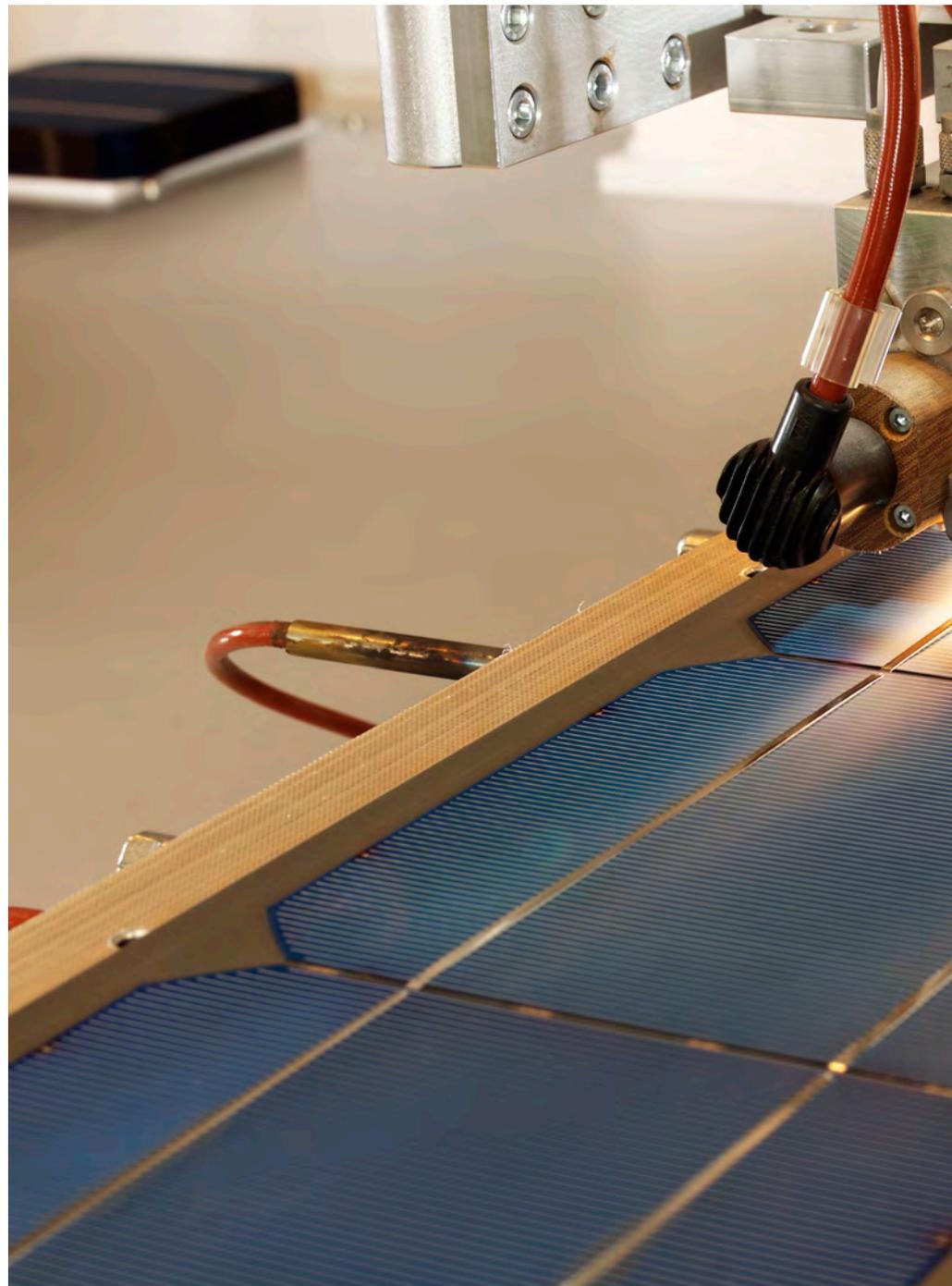
technology changes started being introduced, initially gradually, like PERC cells and bifacial modules, and currently at a breathtaking rate, where all major suppliers are announcing big wafers, half-cut cells, multiple busbars, and dense interconnection technologies, like shingling or tiling, as well high-efficiency cells, such as TOPCon and heterojunction, frequently at the same time,” Touloupas noted.

One factor that hindered the adoption of monocrystalline cells in India was their high price. However, mono PERC

cells have become significantly more affordable and have nearly taken over the Indian market. Experts say that there is no longer any need for consumers to use polycrystalline cells and that they expect it to be completely phased out by the end of the year.

“2020 will see the demise of polycrystalline cells. Mainstream polycrystalline and polycrystalline PERC will be out,” said Ponselkar P, Vice President at Risen Energy, a China-based solar module manufacturer.

He explained that polycrystalline cells



have peaked in terms of their achievable theoretical efficiency. Mono PERC cells have a much higher theoretical efficiency threshold, and there is still a long way to go before it is maxed out.

“We are also seeing much higher jumps in terms of power output increases annually. Cell efficiency used to increase, on average, around 5 watts per year, but now we see jumps of around 50 watts annually, and because of this, the life cycle of any new cell technology will be around five years, going forward. No technology can

afford to remain stagnant,” according to Ponselkar.

The next step up for solar cells would be n-type heterojunction technology (HJT) silicon solar cells, according to experts. These cells have attracted a lot of attention because they can achieve conversion efficiencies up to 25%. They are still very complicated and expensive to manufacture and will continue to remain a niche or premium product until improvements in manufacturing processes to bring down prices.

“Out of the 140 GW of global capacity

available in the market, more than 95-98% of demand is for existing p-type kind of technology. N-type is restricted to 2-2.5 GW capacity across the globe, currently,” said Sai Charan Kuppili,

Indian developers have just started to accept bifacial modules

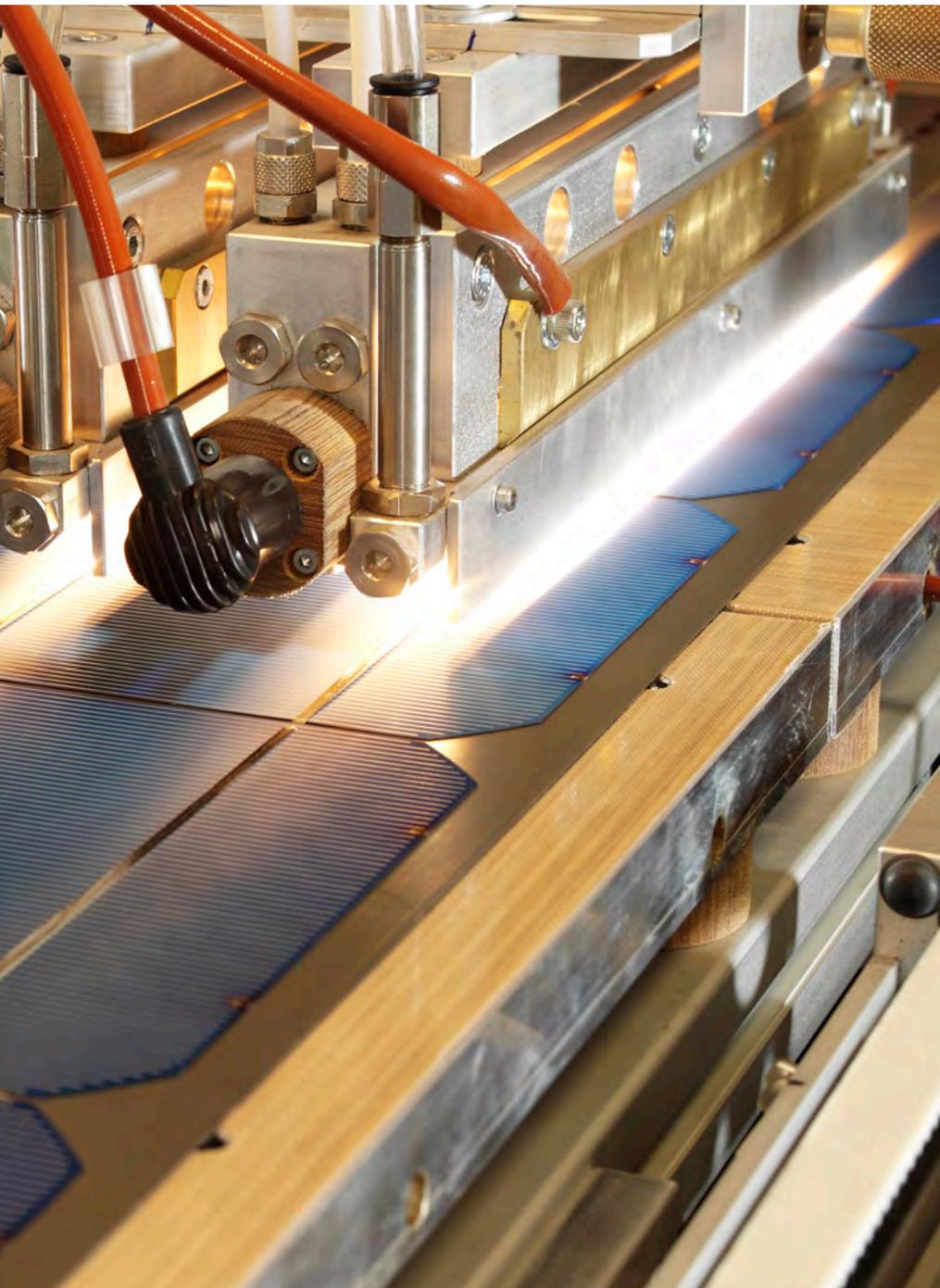
Technical Director at Jinko Solar, a China-based solar panel maker.

India has, on average, been at least two years behind in adopting the latest technology. Experts believe that the country will take at least two years longer than others before it moves from the existing p-type cells to n-type HJT cells.

Speaking about HJT technology, Rohit Kumar, Head of Indian Subcontinent at REC India, said, “Heterojunction cell technology combines the advantages of crystalline silicon cells and thin-film technology within a single cell structure. This means efficiency levels of over 25% are now within reach. Where a conventional crystalline solar cell uses a single material, silicon, in an HJT cell, the junction is formed between two different materials: crystalline and amorphous silicon, with the junction, therefore referred to as a heterojunction. This creates numerous performance benefits compared to conventional cells.”

Kuppili believes that going forward, we can expect existing p-type Mono PERC cells to dominate the Indian market for at least the next eight quarters, as this is the same amount of time it took for India to move from polycrystalline to monocrystalline cells.

Bifacial solar modules produce power from both sides of the module using power reflected off the ground, increasing overall power generation. These modules are more expensive than monofacial modules, but the added power generation capacity makes up for



the additional cost.

These modules have only been slowly proliferating the Indian market recently, whereas they have been adopted widely abroad. India, being a cost-sensitive market, has always lagged when it comes to adopting new technology. Since most developers in the country operate on the CAPEX model, they try to keep costs down.

“The whole approach of India is to keep capital expenditure as low as possible. It will take some time to adjust. As far as India is concerned, there is no demand for bifacial because developers want cheaper products,” according to Ponselkar.

In addition to being able to generate more power, they also degrade slower

and have an additional lifespan of five years compared to traditional backsheet based solar modules. One of the very

Heterojunction cell technology combines the advantages of crystalline silicon cells and thin-film

few downsides of bifacial modules is that they require approximately 10-15% more area for installation as there needs to be enough space for sunlight to hit the downward facing side.

“Indian developers have just started to accept bifacial modules. Once the technology is optimized and prices come down, adoption rates will be much faster,” according to Kuppili.

“India is not yet leading innovation as this needs to happen at an early stage. India hasn’t started ingot or wafer manufacturing so far. There are only cell or module assemblers in the country. Cell manufacturers source the wafers from outside. If innovation is to happen, it has to start at the ingot level and not from the cell level. All you can work



on is, optimization of materials - it's only material management. This is the reason why Indian players have been technology followers, not technology leaders," added Kuppili.

What is hindering the adoption?

The biggest hurdles for the Indian market still lie in the policy and regulatory environment and the fact that India is a cost-sensitive market. Redundant processes, certifications, and approvals add to the overall costs, slowing down innovation and adoption of new technology and leaving the country lagging behind others in terms of technology acceptance.

Developers and manufacturers have almost unanimously agreed that

processes and certifications like BIS (Bureau of Indian Standards) have only served to slow down technological innovation and adoption in the country. Mercom has previously talked about the grievances of solar industry stakeholders have with BIS and ALMM (Approved Lists of Models & Manufacturers). Industry players believe that these requirements create unnecessary delays and expenses.

Large manufacturers with multiple product lines will end up paying a hefty fee to enlist under ALMM. The fee structure also punishes innovation by charging fees if companies constantly release new models with increased efficiency or better technology. The fee structure does seem to be fair in

its current form and must be further reviewed to encourage innovation and new technologies.

"New technology acceptance and innovation in the country is next to impossible because of the existing guidelines. They are highly restrictive toward new technology," explained Kuppili.

Additionally, the high initial costs of new technology have also kept India a step behind. New technology is always expensive upon arrival, and it takes a while before technology optimization can bring costs down. These high costs have been a deterrent for developers and manufacturers, preventing the latest technology from going mainstream.

Rohit commented, "At first, India comes off as a market where the price is the prime driver for decision making. Outside the utility segment, our experience over the years has been quite the contrary - with substantial demand for innovation, advanced technologies, quality, and performance offered at a justifiable premium. With a value-driven approach from manufacturers and industry stakeholders, we are confident that more and more customers will be keen to invest in advanced PV technologies."

"Markets like Europe, US, and Japan, where labor and land costs and power purchase agreement (PPA) prices are higher were the first to adopt these technologies, but all markets, including India, are eventually catching up, as the cost gaps and price premiums between these advanced technologies and the conventional ones are quickly shrinking," Touloupas added.

India's first of its kind manufacturing-linked solar tender, which successfully concluded earlier this year, shows the intent of the country to boost manufacturing. The COVID-19 induced supply chain disruption has pushed the government to seriously promote domestic solar manufacturing capacity starting from modules and cells to ingots, wafers, and ancillary components like back sheets, inverters, transformers, and others. Domestic manufacturing is just the start, but bringing in new and advanced technologies is what would make all the difference. ☺



Industry News and Policy Briefs

The **Reserve Bank of India** announced the second round of monetary measures to help boost the economy, which has come to a standstill during the lockdown. The RBI governor Shaktikanta Das said that the fixed reverse repo rate under the liquidity adjustment facility had been reduced by 25 basis points (bps) from 4% to 3.75% with immediate effect. However, the policy repo rate remains unchanged at 4.40%, and the marginal standing facility rate and the bank rate remain unchanged at 4.65%.

Adani Power Limited, India's largest private power generator, reported that its consolidated loss after tax widened to ₹22.75 billion (₹301.1 million) in the financial year 2019-20, up significantly (around 131%) from ₹9.84 billion (-\$130.2 million) the previous year. The company stated that the losses included an exceptional item of ₹10.03 billion (-\$132.8 million) after it wrote off certain receivables and advances following the acceptance of a resolution plan submitted by the company.



In a recent shuffle of top bureaucrats of India, the central government appointed **Indu Shekhar Chaturvedi** as the new **secretary of MNRE**. According to the order issued by the Appointment Committee of Cabinet, Chaturvedi will replace Anand Kumar, who will now be the secretary of the Ministry of Culture.

AleaSoft, an energy forecasting solutions company, announced that it has collaborated with the **Power Grid Corporation of India Limited** as a provider of solar and wind energy forecasting. The Barcelona-based forecasting company said that April marked the first quarter of its collaboration with India's central transmission utility.



In response to MNRE's notice to states and ports asking them to earmark land with potential for setting up renewable hubs, the **Tuticorin Port Trust** and the states of Madhya Pradesh and Odisha have so far expressed interest in setting up **renewable energy manufacturing parks**.

In April, Mercom reported that **wind power installations** in India rose to **2.07 GW** in the financial year 2019-20, a 31% increase as compared to 1.58 GW in the FY 2018-19. The cumulative installations stood at **37.69 GW** as compared to 35.63 GW for the FY 2018-19. Wind power represents 10.1% of the total installed power capacity in India as of Q1 2020.

Mercom also reported that the share of renewable energy (including large hydro) in India's overall **power generation mix** rose marginally to **36.2%** at the end of the first quarter of 2020, from 35.9% at the end of the calendar year 2019, according to the data from the Central Energy Authority (CEA), and the **Ministry of New and Renewable Energy** (MNRE.)



MYSUN, a Delhi-based technology platform for rooftop solar energy solutions, raised ₹320 million (-\$4.2 million) from its existing investors in a structured equity deal. It was a part of its pre-series A round. As the company plans to venture into new markets and business models to step up its technology, it is also looking to raise another ₹2.5 billion (-\$35 million) over the next few quarters.

REC Limited announced that its board of directors had approved a proposal to incorporate seven project-specific **special purpose vehicles** as wholly-owned subsidiaries of REC Transmission Projects Company Limited (RECTPCL) to develop transmission projects.



Tata Power announced that its wholly-owned subsidiary Khopoli completed the sale of the company's entire stake in **Cennergi Private Limited** to **Exxaro Resources Limited** for ZAR 1,550 million (-\$84.25 million) and normal working capital and other adjustments. Cennergi Private Limited was a 50:50 joint venture between Exxaro, a coal producer in South Africa, and Khopoli, a 100% subsidiary of Tata Power.

Sterling and Wilson Solar Limited announced that it received **₹5 billion** (-\$66.8 million) towards the outstanding loans from its parent company, Sterling and Wilson Private Limited, and its subsidiary, Sterling and Wilson International FZE. The funding was facilitated by **Shapoorji Pallonji** and Company Private Limited and Khurshed Daruvala, as per the revised schedule of repayment approved by the board of directors of Sterling and Wilson Solar.

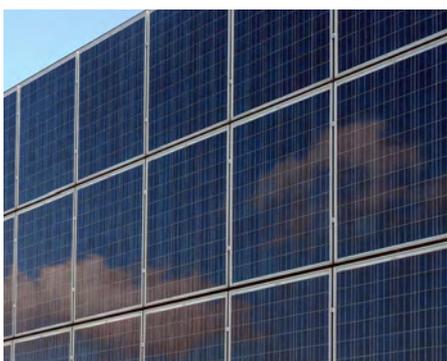
Shapoorji Pallonji Infrastructure Capital (SP Infra), a part of the Shapoorji Pallonji Group and KKR, a global investment firm, signed an agreement under which the SP Infra will sell five of its operational solar energy assets to **KKR for ₹15.54 billion** (-\$204 million). The portfolio comprises 169 MW of solar assets in Maharashtra and 148 MW in Tamil Nadu, totaling 317 MW capacity.

Sungrow announced that the company signed a 650 MW strategic agreement with **Avaada Energy** to supply 1,500 V inverter solutions for its upcoming solar PV projects in 2020. Sungrow has over 10 GW of 1500V inverter solutions installed across the globe.



Policy Updates Center

The **CERC** also reduced the rate for late payment surcharge (LPS) payable by distribution companies to power generators. The LPS was reduced to **12% per annum** from the earlier 18% if the due date falls between March 24, 2020, and June 30, 2020. According to the CERC, if there's any delay in the payment to the **generating companies** (GENCOs) and inter-state transmission licensees beyond 45 days from the date of presentation of the bills (between March 24, 2020, and June 30, 2020), then the DISCOMs can make the payment of LPS at a reduced rate of 1% per month instead of 1.5%.



The **MNRE** with the approval of the Union Minister of Power, decided to extend the deadlines for approved list of models and manufacturers (**ALMM**) List 1 (solar PV modules) and ALMM List-II (solar PV cells) by six months from March 31, 2020, to September 30, 2020. To ensure the reliability of solar PV manufacturers and protect the consumers' interests, the MNRE had issued Approved Models and Manufacturers of Solar Photovoltaic Modules Order 2019.

Earlier in the month, the Ministry also issued a clarification regarding the payment to renewable energy generating stations during the **moratorium** provided to distribution companies by the Ministry of Power. In the clarification notice, the MNRE granted a **'must-run'** status to renewable energy generating stations and said that this status would remain unchanged throughout the lockdown period.

Also, the **Central Electricity Regulatory Commission** (CERC) decided to defer implementing the real-time power market until **June 1, 2020**. India's power sector is currently in a transitional phase, shifting from long-term generation contracts to a greater reliance on short-term contracts and electricity spot markets. According to the Commission, the energy trade for the first half an hour (00:00 hours to 00:30 hours) of the day would start at 22:45 hours of the previous day and would be repeated every half an hour after that.

News in Brief

The MNRE issued a **blanket commissioning time extension** for all renewable energy projects under construction in the country on account of the nationwide lockdown due to the COVID-19 outbreak. The Ministry directed renewable energy implementing agencies to grant an extension of time for projects amounting to the total period of the lockdown plus 30 days for normalization.

The **Ministry of Power** also issued a clarification regarding **letters of credit (LoC)** to be given by distribution companies. It stated that **DISCOMs** are expected to deposit LoCs for 50% of the cost of power they want to be scheduled, while the remaining 50% will have to be paid within 45 days of the presentation of the bill or as specified in the power purchase agreement. If the payment is not made as specified, the late payment surcharge will apply.

The **Ministry of Shipping** issued a notice directing all major ports of the country to allow **free storage** time to all port users for the lockdown period. Under the remission of charges to port users, the Ministry has directed the ports to allow deferment of annual lease rentals or license fees on a pro-rata (proportionate) basis without any interests for April, May, and June. However, this can be availed only on request from the lessee or licensee.

States

Following the CERC's order, many states have reduced the late payment surcharge. These are:

The **Chhattisgarh Electricity Regulatory Commission** reduced the payment of the late payment surcharge to **0.75%** per month.

Similarly, the **West Bengal Electricity Regulatory Commission** reduced the rate of late payment surcharge at **1% per month**.



The **Punjab State Electricity Regulatory Commission** extended the validity of the CERC's Renewable Energy Tariff Regulations, 2017, and the Levelized generic tariffs for renewable projects for FY 2019-2020 for another three months. The Commission also noted that the generic tariff issued by the Commission in the order dated March 19, 2019, will continue to remain in force until June 30, 2020.

For **Goa and union territories**, the Joint Electricity Regulatory Commission reduced the LPS from **2% to 1%** per month.

Also, the **Delhi Electricity Regulatory Commission** reduced the rate LPS from **18% to 12%** per annum for bills that are raised between March 24, 2020, and June 30, 2020. The rebate will apply to the net amount to be paid by the consumer.

The **Madhya Pradesh Electricity Regulatory Commission** reduced the rate of current LPS to be paid by the state's distribution companies to power generators and inter-state transmission licensees by **0.50%** per month.



The **Punjab State Electricity Regulatory Commission** provisionally reduced the rate of **late payment surcharge** to 6% per annum if the due date falls between March 24, 2020, and June 30, 2020.

Meanwhile, the **MNRE** has directed the state **government of Haryana** to honor all the allocations made to the solar power projects and solar parks and treat them as **sacrosanct**. This latest directive comes on the heels of a letter submitted by Connect Solar on February 14, 2020, in which it had stated that since the last two years, renewable energy developers are being asked to invest in open access solar projects in Haryana and then the new projects are being canceled with newer conditions imposed on them, leading to considerable losses for the developers.

The **Rajasthan Electricity Regulatory Commission** issued an order directing stakeholders to adopt measures to ease the burden on power consumers, generators, transmission licensees, and distribution companies in the state amidst the ongoing coronavirus crisis. The Commission stated that to make things easier for all parties in these difficult times, a normative rate equivalent to the interest rate on working capital should be adopted in place of the current penal rate of late payment surcharges.



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Global Battery Storage VC Funding Rises in Q1 2020

Energy storage deployment in emerging markets is rapidly increasing with global battery storage VC funding rising 20% YoY in the first quarter of 2020

By : Utsav Sinha



Battery storage systems are emerging as a potential solution for integrating solar and wind renewables in power systems across the globe. The systems have the unique capability to absorb quickly, hold, and then reinject electricity.

Battery storage, smart grid, and energy efficiency companies received \$252 million in venture capital (VC) funding in the first quarter (Q1) of 2020, a 20% increase from the \$210 million raised in Q1 2019, according to a new report released by Mercom Capital Group.

The global battery storage sector

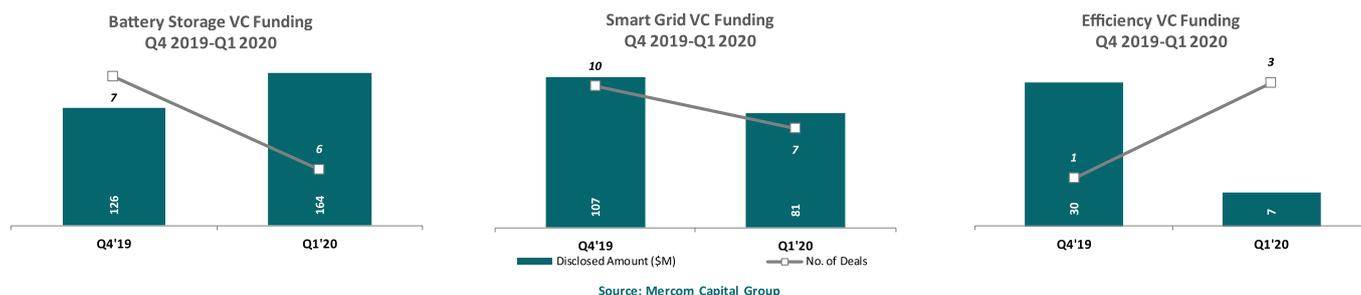
Behind-the-meter batteries are being increasingly installed globally

attracted corporate funding (including VC, debt, and public market financing) worth \$244 million in nine deals in Q1

2020 compared to \$130 million raised from nine deals in Q1 2019, an 88% increase.

VC funding (including private equity and corporate venture capital) raised by battery storage companies in Q1 2020 increased to \$164 million from six deals compared to the \$78 million raised in seven deals in Q1 2019.

The top VC funded battery storage companies this quarter were: Demand Power Group, which raised \$71 million from Star America; Highview Power that raised \$46 million from Sumitomo Heavy Industries; Advano raised \$19 million from Mitsui Kinzoku SBI Material Innovation Fund, Future Shape,



PeopleFund, Thiel Capital, DCVC, Y Combinator; ZincFive raised \$13 million from 40 North Ventures, and TWAICE raised \$12 million from Creandum.

Fourteen investors participated in battery storage funding this quarter

There were four M&A (merger and acquisition) transactions in the battery storage category in Q1 2020, all with the undisclosed transaction amounts.

Smart Grid

Corporate funding in smart grid companies came to \$86 million raised in nine deals compared to \$32 million in 15 deals in Q1 2019.

VC funding for smart grid companies increased by 153% in Q1 2020 with \$81 million in seven deals compared to \$32 million in 15 deals in Q1 2019.

The top 5 VC funded smart grid companies included: Smart Wires, which secured \$43 million; GridBeyond raised \$14 million from Energias De Portugal, Act Venture Capital, Electricity Supply Board, and Total Carbon Neutrality Ventures; Driivz raised \$11 million from Gilbarco Veeder-Root and Centrica Innovations; Leap raised \$8 million from Union Square Ventures, Silicon Valley Bank, Congruent Ventures, National Grid Partners, Powerhouse Ventures, Elemental Excelsior, and FJ Labs; and BluWave-ai raised \$4 million from Sustainable Development Technology Canada and OCE.

Twenty-two investors participated in smart grid VC funding rounds this quarter with the grid optimization company raising the most.

There were five M&A transactions (none disclosed) in the smart grid sector in Q1 2020.

Efficiency

Corporate funding in energy efficiency came to \$7 million in Q1 2020 in three deals compared to \$345 million in two deals in Q4 2019. In a YoY comparison, \$155 million was raised in two deals in Q1 2019.

VC funding raised by energy efficiency companies in Q1 2020 dropped significantly to \$7 million in three deals compared to \$30 million in one deal in Q4 2019. However, if we compare the figures YoY, the Q1 of 2020 failed to catch up with the \$100 million raised in one deal in Q1 2019.

Eight investors participated in VC funding this quarter.

There was one M&A transaction for \$1.4 billion in Q1 2020.

The International Renewable Energy Agency recently published a report showing how electricity storage technologies can be used for several applications in the power sector, ranging from e-mobility and behind-the-meter (BTM) applications to utility-scale. According to the study, utility-scale batteries can enable a greater feed-in of renewables into the grid by firming renewable energy output.

Battery Storage and Smart Grid Top VC Funded Deals in Q1 2020

Company	Amount (\$M)
Demand Power	71
Highview Power	46
SMART WIRES REIMAGINE THE GRID	43
ADVANO	19
GridBeyond	14
ZincFive	13

Source: Mercom Capital Group



Bailing Out DISCOMs Not the Best Solution

The government's recent ₹900 billion recovery package may not be enough to fix the deeper problems underlying the power distribution sector in India

By : Nithin Thomas Prasad

Distribution Companies (DISCOMs) have been a significant strain on the Indian power system. Their poor financial performance has been weighing down the entire sector with their inability to pay power generators on time, manage their losses, and iron out other inefficiencies.

In the past, the Indian government has come up with ways to bail out struggling DISCOMs from their mountains of debt. Programs like the Ujwal DISCOM Assurance Yojana (UDAY) were tailored specifically to provide much needed financial assistance but to no avail.

In recent months, a global pandemic brought the Indian economy on its knees. The unprecedented slowdown was exacerbated with the already inefficient DISCOMs, making matters worse for power developers. The Government of India once again set

aside funds to the tune of ₹900 billion (-\$11.94 billion) to help DISCOMs get back on their feet amid the ongoing coronavirus crisis.

The government has initiated a few other measures to assist ailing distribution companies in these trying times. For instance, power generators (including renewables) in the country have been ordered to maintain an uninterrupted supply of power across

Regulatory commissions urgently need to rationalize tariffs in many states

states even if the distribution companies deposit Letters of Credit for 50% of the cost of power they want to be scheduled. For payments delayed beyond 45 days (from March 24, 2020, and June 30, 2020), the late payment surcharge has now been reduced to 12% per annum from the earlier 18%.

Mercom recently reported that despite all the relief provided considering the ongoing pandemic, many DISCOMs, including those in Uttar Pradesh, Madhya Pradesh, and Andhra Pradesh, refused to pay power generators claiming their inability to collect power dues from the consumers. On the other hand, the DISCOMs' claim of force majeure (Coronavirus outbreak) for not paying generators was rejected by the Solar Energy Corporation of India (SECI).

Apart from internal inefficiencies within DISCOMs, there are other issues like delays in subsidy reimbursements



from the government, billing and revenue collection inefficiencies, inadequate tariff hikes, aging power distribution infrastructure, average technical and commercial (AT&C) losses, and power theft, among others that need to be tackled.

Tariff

Tariff hikes have been few and far between in the power sector. The tariffs charged for certain consumer categories do not match the actual cost of power generation. Unless tariffs are revised and regulated, DISCOMs will continue to run on losses no matter how much financial aid is provided.

“It is imperative that DISCOMs charge customers prices that are reflective of the cost to serve. The proposed reforms of calculating tariffs without taking subsidies into account will help DISCOM regain its financial health to a large extent. We hope that these reforms

are expedited to execution,” said Ranjit Gupta, CEO, Azure Power.

Another executive, at an independent power producer (IPP), agreed. He stated that regulatory commissions urgently need to rationalize tariffs in many states as it has not been done so in many years. Unless it is done, DISCOMs will continue to have losses regardless of how much financial stimulus is injected.

As of the end of March 2020, DISCOMs owed Adani Green over ₹12.59 billion (-\$166.9 million) in overdue

*Focus should be
on modernizing
the aging
distribution
infrastructure*

payments, one of the largest dues to renewable energy generators in the country. DISCOMs also owed Tata Power Company Limited (TPCL) over ₹17.75 billion (-\$235.4 million) in overdue payments, but the companies did not respond for comment.

“Tariffs have increased for commercial and industrial categories but have not been increased sufficiently for agricultural and domestic consumers. It is primarily driven by political compulsion at the state level as successive governments announce freebies and lack the will to fix the issues,” according to a spokesperson for the Solar Power Developers Association (SPDA).

Subsidy Issues

Delays in receiving the subsidy reimbursements from the government have weighed down distribution companies for a long time. Setting aside



the fact that tariffs have so far been calculated based on promised subsidies, which are seldom reimbursed, how subsidies have been reimbursed has also led to new issues. The new financial stimulus package promised to DISCOMs by the central government may not work unless the funds are utilized in the right way.

The executive at a major independent power producer (IPP) explained that the current strategy involves using the funds to pay developers on behalf of DISCOMs against a guarantee from state governments. However, the funding will be restricted to the extent of the overall subsidies due by the government to DISCOMs. This only accounts for a small part of the overall outstanding dues of DISCOMs in the state and will not make much of a difference in the long run.

Newer business models through which DISCOMs can be privatized need to be explored

Instead, the government should provide funds based on whatever amount the respective states can guarantee towards the entirety of its DISCOMs' dues and pass the amount on to generating companies on behalf of distribution licensees, he added.

Lack of technology

The ongoing COVID-19 crisis has further exacerbated internal inefficiencies, like the collection of dues on electricity bills. Social distancing restrictions have left DISCOMs unable to collect payments from customers physically. The lack of investments in technologies has also been exposed during this crisis.

Smart meters have been installed in the country, but not at a rapid pace or



scale. Recently, the Energy Efficiency Services Limited (EESL) said its smart meters have helped DISCOMs generate a billing efficiency of 95% during the ongoing nationwide lockdown due to the coronavirus, resulting in a 15-20% average increase in monthly revenue per consumer.

“Focus should be on modernizing our aging distribution infrastructure. There have been many innovations over the past decade, particularly smart and prepaid meters, that allow us to significantly enhance reliability, reduce costs, drastically enhance payment timeliness and detect electricity theft. This investment will more than pay for itself over the long run,” said Gupta.

DISCOMs in India have to deal with the adverse effects of increasing AT&C losses, primarily sparked by power theft

and inefficiencies in payment collection, which can be solved by installing smart meters.

“We should make DISCOMs accountable for improvement as well. Limits on AT&C losses for the determination of tariffs is a positive reform that has been proposed and would help ensure the customer is protected,” Gupta noted.

Privatization

The privatization of loss-making government entities has proven to be an effective strategy across sectors all over the world. There is no reason for this not to be applied to Indian DISCOMs as they are one of the most significant factors holding down the power sector.

Mercom has discussed the topic of the privatization of DISCOMs in the past.



Newer business models through which DISCOMs can be privatized have to be explored immediately.

Recently, the Ministry of Finance (MoF) proposed to privatize DISCOMs in the union territories of the country. DISCOMs in the regions come under the administration of the central government while the respective state governments govern those in the states.

Privatizing some DISCOMs could provide significant impetus to implantation of lasting reforms, for the better, according to Azure's Gupta.

Conclusion

While privatizing DISCOMs with the highest losses would be a good long-term move, there are some other efforts the government can take to help utilities function more efficiently.

“Increasing the monitoring of losses, timely increase in tariffs, focus on operational efficiency and motivation programs for DISCOM employees are some good initiatives state governments can take under the existing infrastructure,” according to the SPDA spokesperson.

However, in the long run, the government must consider private sector participation through innovative models. A serious engagement is needed between central and state governments to solve the problem effectively. Private sector players should also be consulted in this regard, explained the SPDA spokesperson.

While the Ministry of Finance has said that the government is working on a new tariff policy that addresses limiting cross-subsidies, penalizing DISCOMs

for unnecessary power cuts, preventing them from passing their losses to the consumers, among other issues, it must also focus on formulating a long term plan to address issues across the board.

“DISCOMs have always been the weakest link in the Indian power sector, and the COVID-19 has exposed what is already known. Resilient utilities are a must for the economic security of the country, and it is time for a change if utilities cannot survive two months without a government bailout. Investments in the renewable sector have been stymied because of the counterparty credit risk from DISCOMs. The time is here to look at privatizing high-risk DISCOMs as the status quo is untenable,” said Raj Prabhu, CEO of Mercom Capital Group. 📌

COVID-19 Impact: Solar Streetlights Program Rolled Back

Projects that have already been sanctioned will require approval from district authorities to receive funding from the Member of Parliament Local Area Development Scheme (MPLADS)

By : Nithin Thomas Prasad





The Ministry of New and Renewable Energy (MNRE) has issued a notice stating that it is shutting down Phase II of the Atal Jyoti Yojana (AJAY) program due to the global COVID-19 outbreak.

Under the program, 12 W LED solar streetlights were being supplied in parliamentary constituencies with 75% of the cost being borne by the MNRE and the remainder coming from the Member of Parliament Local Area Development Scheme (MPLADS).

In 2018, the MNRE received approval to launch phase II of AJAY during the financial year 2018-19 and 2019-20. Under phase II of the AJAY program, 304,500 solar street lights were to be installed in Uttar Pradesh, Bihar, Jharkhand, Odisha, Assam, Jammu and Kashmir, Himachal Pradesh, Uttarakhand, North Eastern states including Sikkim, Andaman & Nicobar, Lakshadweep, and parliamentary constituencies covering 48 aspirational districts.

In its notice, the MNRE said that the government has decided not to operate MPLADS for two years financial years - 2020-21 and 2021-22 - citing a circular issued by the Ministry of Statistics and Program Implementation (MoSPI) on April 8, 2020, and that it has decided to close Phase II of the AJAY program, with effect from April 1, 2020.

It added that solar streetlights,

304,500 LED solar streetlights were to be installed under phase-II of the program

which were sanctioned before this date, would only be granted permission for installation under the program once a confirmation is acquired from district authority regarding the availability of MPLADS funds.

A little earlier, Mercom had reported that the Uttar Pradesh Small Industries Corporation Limited invited bids for the supply and installation of lithium Ferro phosphate battery solar streetlights for District Rural Development Agency (DRDA) in Sultanpur and Varanasi.

The Urban Development Department of Assam had also floated a tender earlier to install standalone solar light-emitting diode (LED) street lighting systems with seven-meter galvanized octagonal poles in the city. The lighting systems were to be installed across four zones under the local urban bodies of Assam. ■





MNRE Readies Blueprint for Solar Inverter Technical Standards

The solar inverter segment of the Indian renewable industry is strong albeit rapidly increasing which makes it crucial for technical guidelines to be in place

By : Anjana Parikh

The Ministry of New and Renewable Energy (MNRE) has issued draft guidelines for standards regarding the technical specifications for solar grid-tied inverters.

Solar inverters must be tested for safety, efficiency, environmental tests, and grid inter-connection aspects to ensure their quality and reliability. Keeping this in mind, the Ministry has introduced relevant standards covering safety, efficiency, environmental, and islanding prevention measures tests for utility-interconnected photovoltaic inverters.

Further, to make the process of testing simple and consistent, the focus has been laid on developing an inclusive standard for photovoltaic grid-tied inverters for complete performance evaluation for grid-interactive applications for quality and reliability assurance in the Indian conditions.

The draft has laid out a detailed interconnection between technical specifications and requirements along

with environmental test specifications. The Ministry said that the purpose of the standards is to lay down the requirements for the interconnection of PV systems and inverters to the utility distribution system.

The standards also provide a test procedure to evaluate utility-interconnected PV power systems that operate in parallel with the utility and for utilizing static non-islanding

Currently, there aren't enough labs and testing facilities to streamline the production of solar inverters

inverters for the conversion of DC to AC. Islanding is the condition in which a distributed generation system continues to power a location even when grid power is not available. So, an anti-islanding inverter will cease to energize a utility system that is out of its regular operation specifications after a specified amount of time.

The draft added that the MNRE series guidelines should be referred to for selecting the samples from a single family of inverters. In August 2019, the MNRE had approved the series guidelines for grouping solar inverters. These guidelines were for conducting tests in laboratories for the implementation of quality control order that was introduced in 2017. As per the guidelines, the manufacturers will have to submit a declaration about the series of their products while submitting the samples of a particular series for testing.

The draft has proposed routine tests that should be performed by the manufacturer on all inverters, and a test report should be included with each



inverter. These tests are:

- Protection against abnormal voltage
- Protection against abnormal frequency
- Response to utility recovery

These tests assume that the equipment has met the applicable requirements of this standard and may be conducted as a factory test or performed as part of a commissioning test, the draft guidelines added.

For the Harmonic test, the MNRE has suggested shifting from the Institute of Electrical and Electronics Engineers (IEEE) standard to the International Electrotechnical Commission (IEC) standard. Solar PV systems incorporate power electronic interfaces, which generate a level of harmonics. These harmonics have a great influence on the operational efficiency and reliability of the system.

Regarding the grid interconnection test, the draft states that the PV system will not inject DC higher than 0.5% of the continuous maximum rated inverter output current into the utility interface

when tested at 25%, 50%, 75%, and 100% of rated output power.

“The requirement is not applicable for an inverter that interconnects through a line frequency isolation transformer located between the output of the inverter and the utility system,” the MNRE added.

Regarding the grid management, the MNRE has suggested that the PV system, which is connected to the low voltage (LV) and medium voltage (MV) lines, will be capable of remaining connected to the grid during low and high voltage conditions.

Previously, it has been reported about the struggles of inverter manufacturers

The deadline for the self-certification of solar inverters is June 30, 2020

in gaining clarity on the ambiguous BIS certification process. The unavailability of labs, lack of testing facilities and workforce, unreasonable costs of testing, absence of series guidelines, and confusion regarding MNRE notifications were some of the issues that have made the compliance of the order “Solar Photovoltaics Systems, Devices and Component Goods Order 2017” extremely difficult. Through several interviews with inverter suppliers,

In January 2020, the Ministry issued a notification extending the deadline for the self-certification of solar inverters by six months from December 31, 2019, to June 30, 2020. Realizing the need for quality components in solar projects, the government had mandated that laboratories must conduct the tests for compulsory registration with the Bureau of Indian Standards (BIS) for the implementation of the quality order. Considering various issues related to testing fees, and the lack of test labs available, the industry has been seeking more time for compliance since the introduction of the policy. 



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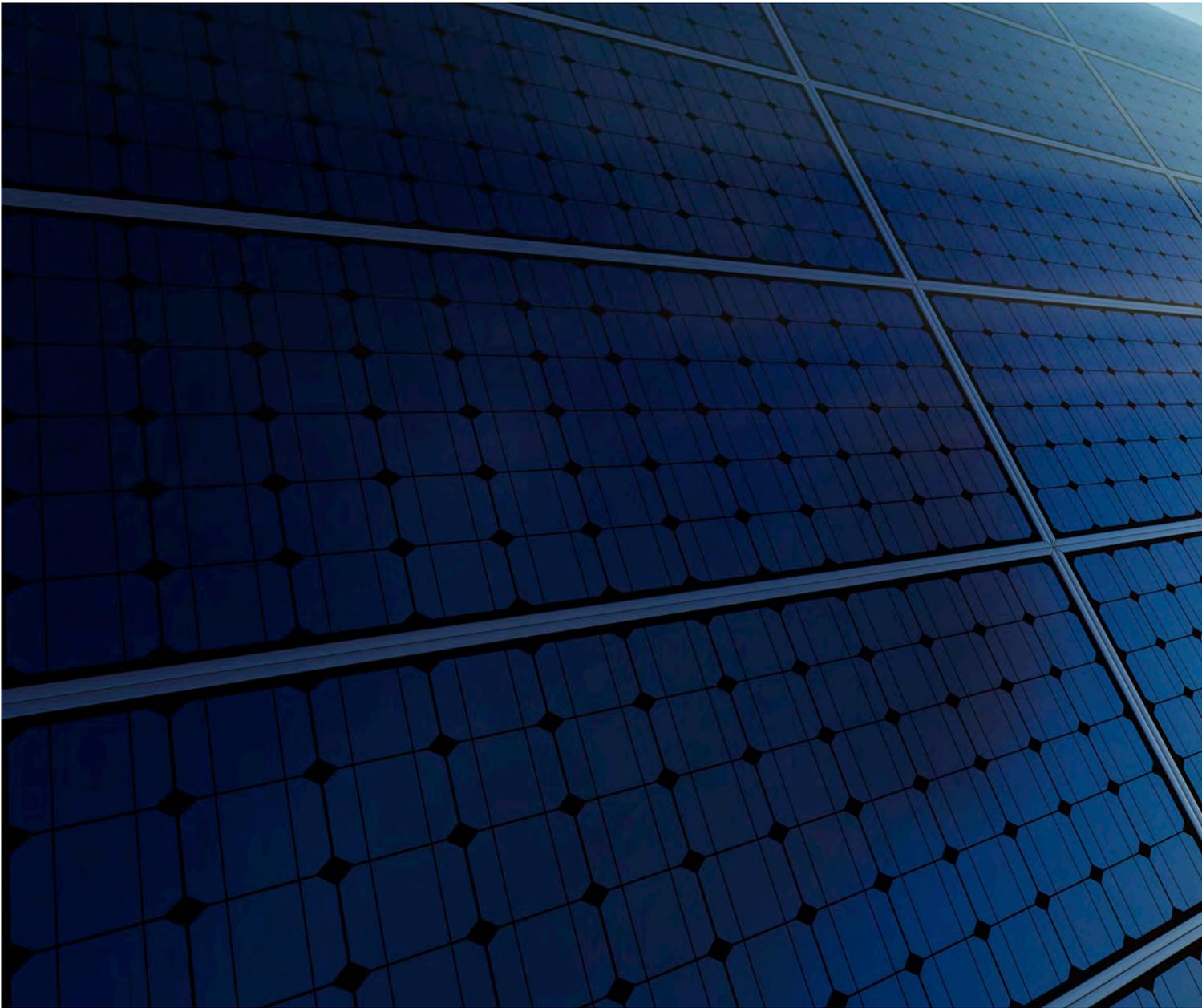
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Punjab Likely to Reduce RPOs Amid COVID-19 Crisis

The state government also asked for the exemption of fixed charges for medium and large supply consumers for two months to help reduce the financial burden on consumers and DISCOMs

By : Nithin Thomas Prasad



The Punjab State Electricity Commission (PSERC) invited comments, objections, and suggestions for a proposal by the state government to lower the renewable purchase obligations (RPOs) of power establishments for the year to alleviate the financial burden on distribution companies (DISCOMs) and consumers due to the ongoing COVID-19 crisis.

The Punjab government, on April 7, 2020, wrote a letter to the state commission asking it to reduce RPOs by 1.5% and 2% for the years 2019-20 and 2020-21, respectively, to help the power sector operate smoothly in these difficult times.

The Punjab government asked the PSERC to reduce RPOs by 1.5% and 2% for 2019-20 and 2020-21

In its response, the Punjab State Power Corporation Limited (PSPCL) shed light on the shortages caused by delays arising due to the COVID-19 pandemic and said that these delays would continue.

The PSPCL listed out some delayed projects which included 30 MW of solar rooftops projects commissioned

in August 2019, 300 MW of large-scale solar, and 200 MW of wind power projects assigned by the NTPC in March 2019.

It also added that the delayed commissioning of 40 MW of cogeneration projects would only be done in the financial year (FY) 2021-22. There are nearly 110 MW of solar



projects which are under litigation due to the pandemic, it further added. It also noted that the commissioning of 26 MW of a 150 MW wind project has not been completed and may get extended further.

The DISCOM said that because of these issues, the shortfalls of solar and non-solar RPOs were by 140.71 million units (MU) and 495.67 MU, respectively, for the FY 2019-20. The renewable energy certificates (RECs) for these shortfalls would cost ₹1 billion (-\$13.15 million), it added.

Reducing RPOs for these two years would lead to savings of ₹3.2 billion

The tentative shortfall in FY 2020-21 is expected to be around 899.26 MUs and would lead to ₹2.2 billion (-\$28.93 million) in corresponding REC expenditure. Overall, reducing RPOs for these two years would lead to savings of ₹3.2 billion (-\$42.08 million).

The DISCOM noted that unless RPO targets are reduced, the financial burden on PSPCL's consumers will increase.

The state government had also asked the Commission for the exemption of fixed charges for medium supply (MS) and large supply (LS) industrial consumers for two months, starting March 23, 2020, and for energy charges to be fixed only to the extent of the amount reduced by waiving fixed charges (single rate).

The proposal implies that medium supply and large supply consumers would only be billed based on the actual meter reading (AMR). Adding to this proposal, the PSPCL said that after two months of exemptions, fixed charges for the period could be recovered from

medium and large supply consumers through arrears paid over ten months. The DISCOM noted that the financial relief consumers would receive on account of the exemptions would amount to ₹2.47 billion (-\$32.48 million).

The PSPCL also recently introduced an innovative plan and called on all its consumers to make payment in advance towards their estimated electricity bills up to March 2021. The customers can pay to the extent they can through digital modes and earn interest @1% per month on the advance payment. The DISCOM has stated that it has received an advance payment of ₹350 million (\$4.61 million) in less than a week.

The Punjab State Electricity Regulatory Commission also provisionally reduced the rate of late payment surcharge to 6% per annum if the due date falls between March 24, 2020, and June 30, 2020, to mitigate hardships faced DISCOMs and consumers due to the lockdown as a result of the Coronavirus outbreak. 📌

Punjab: Proposed Renewable Purchase Obligation (RPO)



Source: PSERC

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Solar Accounts for 9.8% of India's Power Mix

The overall share of renewables in the country's power mix (excluding large hydro) stood at 23.9% with solar installations accounting for 9.8% and wind power for 10.1%

By : Nithin Thomas Prasad



The share of renewable energy (including large hydro) in India's overall power generation mix rose marginally to 36.2% at the end of the first quarter of 2020, from 35.9% at the end of the calendar year (CY) 2019, according to the data from the Central Energy Authority (CEA), and the Ministry of New and Renewable Energy (MNRE).

As of March 31, 2020, the country's total installed power capacity stood at about 372 GW, up from 358.6 GW during the same time last year. Of this, the power generated from renewable sources (including large hydro) accounted for about 134.7 GW, up from about 125.5 GW as of Q1 2019. Solar installations accounted for about 27.2% of the overall renewable capacity.

Renewable Power

Excluding large hydro projects, the contribution of renewables accounted for 23.9% of the country's total power mix. This includes power generated from solar power (9.8%), wind power (10.1%), bio-power (2.7%), small hydro projects (1.3%), and waste-to-energy projects (0.04%).

MNRE's data also showed cumulative

India added about 1,080 MW of solar capacity in Q1 2020

wind power installations were higher than solar installations with about 37.7 GW of installed capacity, as of March 31, 2020, up from 35.6 GW last year. Large hydro projects were still the leading source of renewable power, with about 45.7 GW of installed capacity, up slightly from 45.4 GW, previously.

Data from Mercom's India Solar Project Tracker showed India added about 1080 MW of solar capacity in Q1 2020, and cumulative solar installations in India stood at around 36.6 GW by the end of Q1 2020. Solar power represents 9.8% of the total installed power capacity in India as of Q1 2020.

Small hydro installations contributed a lower share than the same time last year at 1.26%, down from 1.28% last year. Installed capacity, however, was up at 4.68 GW from 4.59 GW the previous year.

Non-Renewables

Thermal power continued to hold a significant share of India's power generation mix. This includes power generated from coal (53.36%), gas (6.71%), lignite (1.78%), and diesel (0.14%) stood at about 230.6 GW up from 226.3 GW in the same period last year. However, the overall share of thermal power fell to about 62%, down from 63.1% percent last year, highlighting the progress made by renewable energy.

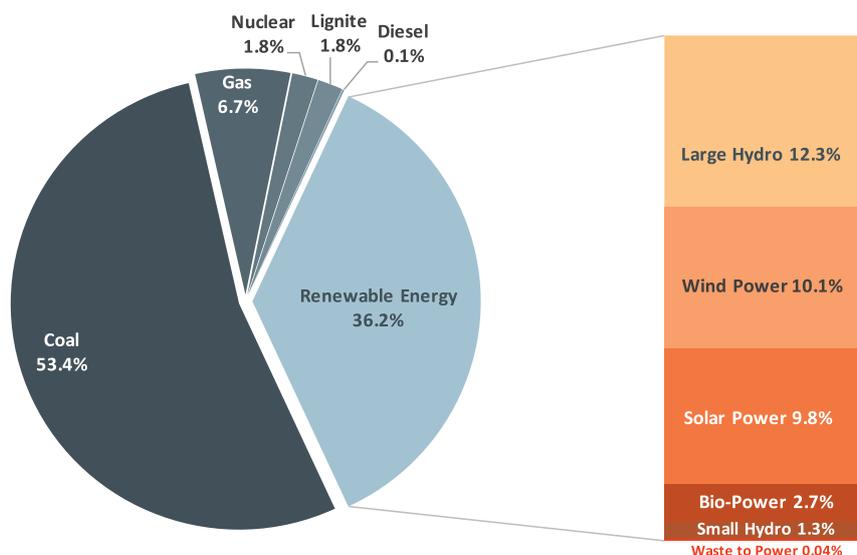
Coal-based power continued to be the dominant source of energy in India, with about 198.5 GW of capacity, up from 194.4 GW at the same time last year. Gas-based power installations rose marginally to 24.96 GW from 24.94 GW, previously. Lignite-based power installations rose marginally to 6.61 GW from 6.26 GW, previously.

The share of diesel-based power, however, fell to 509.7 MW from 637.6 MW as of Q1 2019. Nuclear power capacity remained unchanged from last year at 6.78 GW.

From the installation target of 175 GW of renewable capacity by the end of 2022, India aims to raise its renewable capacity to 450 GW by 2030. 

India - Cumulative Installed Power Capacity Mix (%)

Renewables (including Large Hydro) comprise ~36.2% of India's total installed capacity, with solar accounting for ~9.8%. Among renewables, solar accounts for ~27.2% of the installed capacity



Data from CEA, MNRE, Mercom India Solar Project Tracker (Installed Capacity as on 31 Mar 2020)

Source: Mercom India Research

Major Tender and Auction Announcements in April

This is a list of major tenders and auctions from the month of April.

A comprehensive list can be found in Mercom's Tender and Auction Tracker and Alerts. Please contact info@mercomindia.com for more information

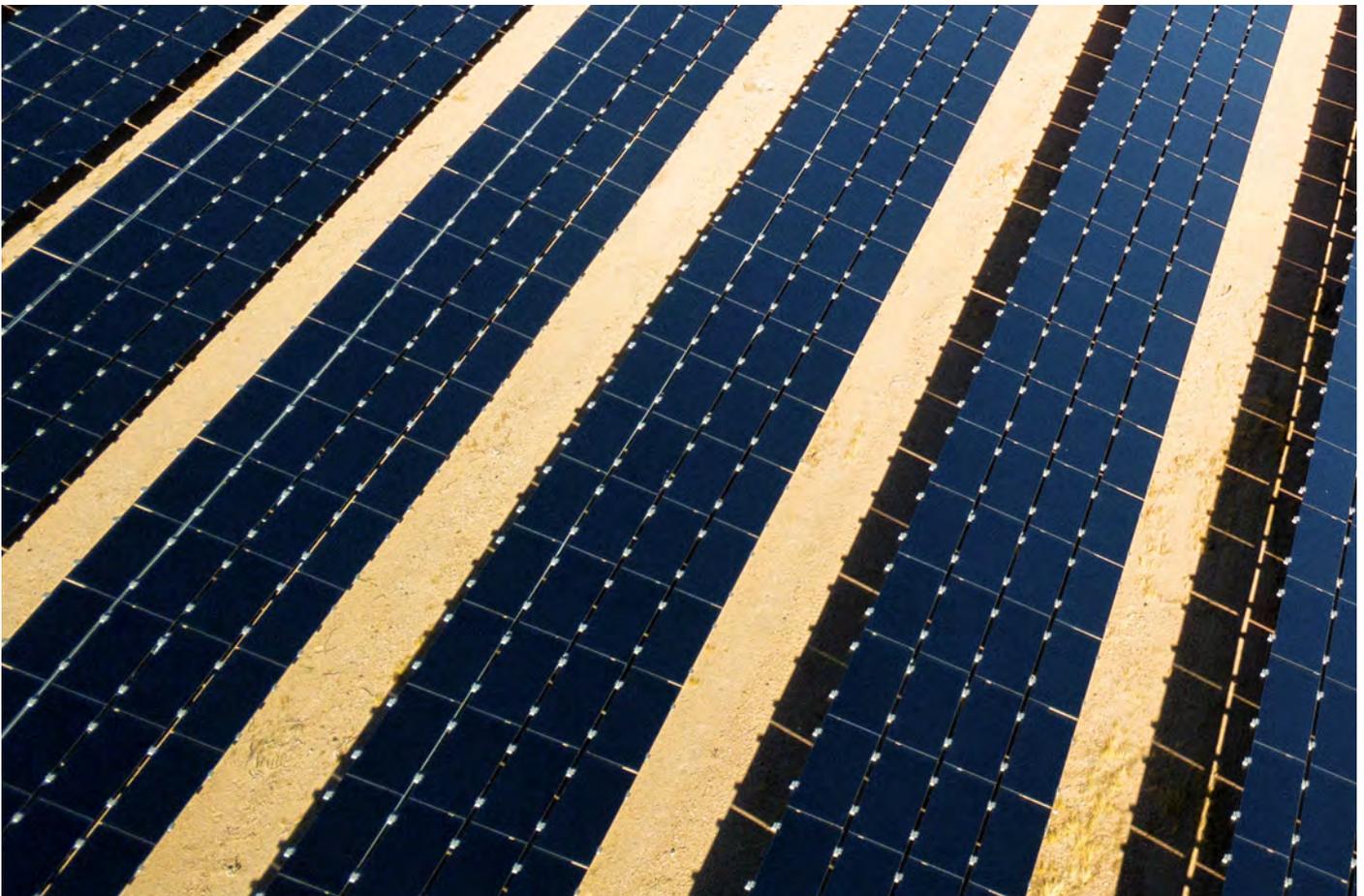
Top Large-Scale Solar Tenders:

The Solar Energy Corporation of India (SECI) issued a Request for Selection (RfS) for 2.5 GW of interstate-connected solar projects under Tranche X (ISTS-X) at the Ultra Mega Renewable Energy Power Park (UMREPP) in Koppal district of Karnataka.

RITES Limited, an engineering consultancy company that specializes in transport infrastructure, has floated a tender for setting up 1 GW of land-based solar photovoltaic

power projects on various zonal railways land across India.

SECI invited bids for 15 MW of floating solar projects at Singareni Collieries Company Limited in the state of Telangana. The projects are to be implemented at two different sites - a 10 MW project at the STPP storage reservoir, and a 5 MW system at the Dorli site on the company premises.





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Tender Deadline Extensions:

SECI once again extended the deadline for the submission of bids for its mega solar tender of 7.5 GW capacity. These grid-connected solar power projects are slated to be developed in Leh-Kargil districts.

The Rewa Ultra Mega Solar Limited (RUMSL) extended the deadline to submit bids for 1,500 MW of grid-connected solar projects to be developed across three solar parks in the state of Madhya Pradesh.

SECI also extended the deadline for the submission of

bids to set up 1.2 GW of wind-solar hybrid power projects in the country under Tranche III of the ISTS program.

NTPC extended the last date to submit bids for the selection of solar power developers to set up 1.2 GW of ISTS-connected solar PV power projects in India.

SECI extended the bid submission deadline for its three-part 81 MW tender for solar projects at Singareni Collieries Company Limited in Telangana.

Major Auction:

SoftBank, Axis Energy Ventures India Private Limited, O2 Power, EDEN Renewables, and Avaada Energy, were the winners in the 2 GW ISTS connected solar projects auctioned by the National Hydroelectric Power Corporation (NHPC). Softbank, Axis Energy, O2 Power, and EDEN quoted the lowest (L1) tariff of ₹2.55 (-\$0.0335)/kWh in the auction. They were awarded 600 MW, 400 MW, 380 MW, and 300 MW, respectively. Avaada Energy, who had placed bids for 600 MW, was awarded 320 MW at a tariff of ₹2.56 (-\$0.0337)/kWh.

Top Rooftop Solar Tenders:

The Madhya Pradesh Madhya Kshetra Vidyut Vitaran Company Limited invited bids for 45 MW of grid-connected solar power projects in various capacities for the residential consumers of the state. Bids have been invited from eligible bidders in various capacities (1 to 3 kW, above 3 kW and up to 10 kW, above 10 kW and up to 100 kW, and above 100 kW and up to 500 kW).

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