

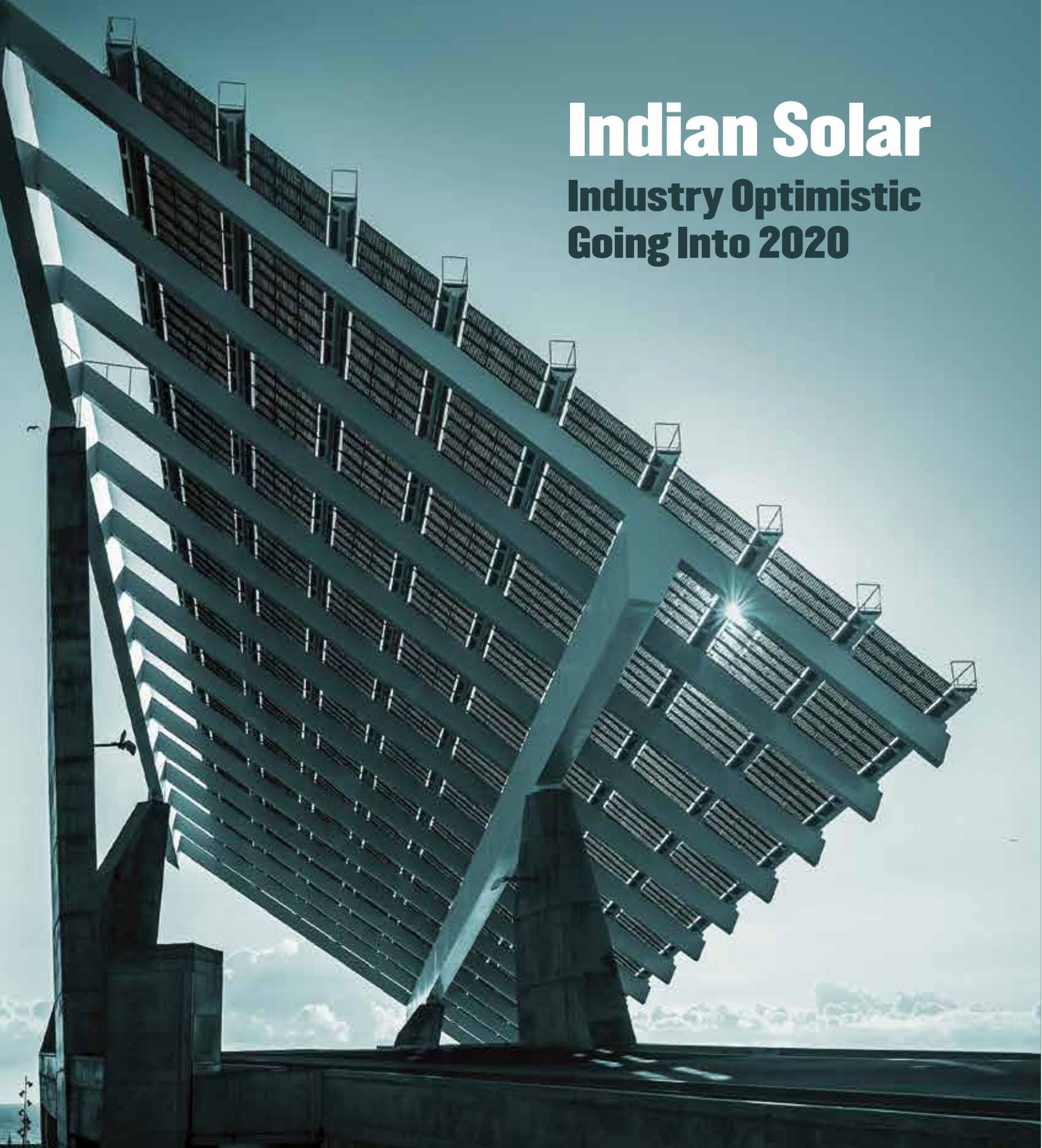
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India

Indian Solar Industry Optimistic Going Into 2020



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Foreword



After a dismal 2019, the solar industry is a bit more optimistic going into the calendar year 2020. Though the economy is yet to tick upwards and market fundamentals remain the same, the optimistic outlook is primarily due to a stronger large-scale project pipeline.

While the government is working to stabilize the economy, it can increase the renewable purchase

obligation enforcement and shore up the finances of power utilities along with facilitating lending to get the solar market moving in the right direction again. Putting the solar market back on a growth path will not just help the environment but will help create much needed jobs and economic activity.

Rooftop solar continues to face hurdles resulting in a decline in installations in 2019 after several years of positive growth. The state of Maharashtra, in particular, has been guilty of trying to kill net metering and, consequently, the rooftop solar market. The state has now proposed a grid support charge for net-metered rooftop systems to discourage rooftop solar installations under the pretext of protecting consumers. In Karnataka, rooftop solar installers are up in arms against a new rooftop order which makes the DISCOMs the sole arbiter when it comes to consumers choosing their suppliers. The Karnataka Renewable Energy Systems Manufacturers Association has alleged that the shift from net metering to gross metering will deal a fatal blow to the viability of rooftop solar installations.

Even though distributed generation and especially rooftop solar have multiple benefits from reducing air pollution, T&D losses, meeting RPO goals, and providing freedom for consumers to generate their own power, states have been discouraging net metering and making it very difficult for rooftop solar installations for fear of losing revenues.

We have seen utilities around the world attempt to shut down net metering policies. But the energy transformation is happening with or without the utilities. Unless utilities take the lead and embrace the shift of power generation from fossil fuel to renewables, they will eventually become obsolete as solar and battery storage costs continue to come down.

The city of Delhi took a positive step with a new policy that encourages electric vehicles and eliminates road taxes and registration fees for all EVs. Delhi may be the only city in India that is coming up with policies primarily to fight air pollution.

The overall outlook for renewables in 2020 remains mostly positive. Desperate hope remains on the ambitious government target of 100 GW of solar capacity by 2022, but it can only happen if the government works in tandem with the industry to create a more conducive and consistent policy environment.

The demand in 2020 looks better than 2019, and we should see the solar market resume year-over-year growth again. But a lot will depend on the economy getting back on track, which will affect both lending and power demand.

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Uttar Pradesh's New Open Access Regulations

While open access is an attractive proposition for consumers, it comes with its share of policy constraints, which is impeding its wider adoption. Several states have now started announcing new regulations which could make it more cumbersome to install open access going forward

By : Rakesh Ranjan Parashar

The primary rationale behind the idea of open access is to promote competition in the power sector and allow customers a wide range of options to choose from. With the rising share of renewable power in the country's energy mix, an increasing number of states are formulation and revising their open access policies to favor government agencies as they fear losing customers.

In one such move, the Uttar Pradesh Electricity Regulatory Commission (UPERC) recently announced its open access regulations, termed as the Uttar Pradesh Electricity Regulatory Commission (terms and conditions for open access) Regulations, 2019.

As per the regulations, long-term open access customers will have the highest priority, followed by medium-term open access customers and then short-term open access customers.

As for the eligibility criteria, open access will be permissible to the consumers seeking open access for a contracted demand of 1 MW and above connected at 11 kV and above.

The regulations apply to:

- Eligible licensees;
- A power generating company, including a captive power plant;
- A consumer with a contracted demand of 1 MW and above; and
- Distribution franchisee

The UPERC has specified that in addition to the transmission and wheeling charges, an open access

Long-term open access customers will have the highest priority

consumer other than a captive consumer will have to pay a surcharge. Consumers availing the interstate transmission system exclusively will also pay cross-subsidy surcharge.

The customer, whose capacity has been surrendered, should pay 25% of open access charges on surrendered



capacity in addition to full open access charges on revised capacity during the remaining period of the transaction.

A medium-term open access customer may relinquish rights, fully or partly, by giving at least three months' prior notice to the nodal agency. Such a customer has to pay applicable transmission/wheeling charges in full for the notice period.

A long-term open access customer may relinquish rights, fully or partly, by giving at least 1-year prior notice to the nodal agency.

Charges for Open Access

The commission will determine the transmission and wheeling charges payable by an open access customer in its tariff order.

In case an intrastate transmission system or distribution system is used by an open access customer in addition to the interstate transmission system, transmission charges and wheeling charges should be payable for the use of intrastate transmission and distribution system in addition to payment of transmission charges for inter-state transmission.

Open access will be awarded to consumers having a capacity above 1 MW connected to 11 kV and higher

A consumer utilizing open access and receiving power from a person other than the distribution licensee of his area of supply will have to pay an additional surcharge to the distribution licensee. The additional surcharge will be determined by the commission, in its tariff order and will be payable in addition to wheeling and cross-subsidy surcharge.

The regulations list reactive energy charges payable by open access consumers as per the Uttar Pradesh Electricity Grid Code.

If an open access customer is not a consumer of the DISCOM, then standby power arrangement should be provided by the DISCOM for a maximum period of 60 days in a year, subject to load shedding and on payment of 1.5 times the demand and energy charge for that category of consumer.

The imbalance between scheduled and actual injection or power drawl of generator or distribution licensee or

transmission network connected open access consumer will be settled as per the deviation settlement mechanism (DSM) charges per DSM regulations notified by UPERC.

Open access consumers who consume electricity procured from conventional fossil fuel-based generation will have to meet their RPO either through power purchase from renewable energy sources or the purchase of renewable energy certificates. In case such an open access consumer fails to meet RPO through the above means, it will have to pay an RPO surcharge.

Intrastate open access transactions for all customers and generating stations, irrespective of the capacity, will be scheduled by the state load despatch center (SLDC) per the provisions of the Uttar Pradesh Electricity Grid Code or applicable regulations. However, scheduling of interstate open access transactions will be as directed by the CERC. 



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Investment Opportunity in Green Buildings

A recent report by the International Finance Corporation sheds light on the enormous potential of green buildings in emerging markets and how it can pave the way for sustainable development

By : Rakesh Ranjan Parashar

Cities all across the globe are expanding at a rapid pace with an increasing number of people migrating to the cities, and the existing infrastructure is finding it very hard to cope with this sudden influx of people and the rapid urbanization.

Given the situation, green buildings assume greater significance as they can help in fostering low-carbon economic growth and creating jobs in the emerging markets.

Global sustainability goals have led to a sudden spur in the green building movement. The green building movement is slowly but surely gaining momentum, and it has had some real success in emerging markets as it provides a quantifiable metric to people's efforts towards sustainable development.

The International Finance Corporation (IFC), a member of the World Bank Group, has come out with its latest report that sheds light on the enormous potential of green buildings in emerging markets.

Green buildings reduce or eliminate negative impacts on the environment and climate. They can be tied to carbon and energy objectives such as net-zero emissions, as well as considerations for people's health and well-being.

Investing in green buildings allows market players to manage potential risks that stem from the global

transition to low-carbon economies. Globally, the buildings sector consumes more than half of all electricity for heating, cooling, and lighting and accounts for 28% of energy-related greenhouse-gas emissions, according to the IFC.

The report, titled "Green Buildings: A Finance and Policy Blueprint for Emerging Markets," notes that by 2030, in emerging markets alone, green buildings will offer a \$24.7 trillion investment opportunity, which will spur economic growth and accelerate sustainable development.

The report highlights the financial benefits that the investors, banks, developers, and owners, including governments, can expect when entering the green building market.

The estimated \$24.7 trillion investment potential in green buildings between 2018 and 2030 in emerging market cities will be mainly due to the sharp increase in building construction expected over the next few decades and the opportunity to ensure that these buildings are built green.

The report notes that there is a strong business case for growing the green buildings market. Emerging evidence indicates that green buildings, or buildings that use energy and water more efficiently, are a higher-value, lower-risk asset than standard structures. While building green could range from savings of 0.5 to 12% in additional costs, green buildings can decrease operational costs by up to 37%, achieve higher sale premiums of up to 31% and faster sale times, have up to 23% higher occupancy rates and have higher rental income of up to 8%.

As per the report, more than half of the 4.1 billion people projected to live in urban areas by 2030 are expected to be in South Asia and the East Asia Pacific regions, and their accommodation will require additional residential and commercial building floor space. The East Asia Pacific region alone will present an investment opportunity of \$16 trillion in green buildings.

In India, the situation is no different, as it alone will need an estimated 60 million additional housing units to be

Globally, buildings consume more than half of all electricity for heating, cooling, and lighting and account for 28% of energy-related greenhouse-gas emissions

built between 2018 and 2022 to meet the existing shortfall. To meet the demands, the Indian government has launched “Housing for All” by 2022, a policy that aims to bridge the gap in urban housing with increased private sector participation.

It is important to note here that since December 2015, 194 countries have submitted national plans that highlight the governments’ framework for reducing emissions through climate solutions, including renewable energy and low-carbon cities.

The report adds that India’s National Development Council is focused on the building sector based on energy conservation, pledging to make its Energy Conservation Building Code (ECBC) stricter, highlighting its domestic building rating system GRIHA (Green Rating for Integrated Habitat Assessment), which scales energy efficiency in buildings.

The best way to reduce the use of conventional resources during a

building’s life is to integrate green measures during its design and construction. For example, India updated its Energy Conservation Building Code (ECBC) for commercial buildings in 2017 and its ECBC-R for residential buildings in 2018. The ECBC now includes energy performance standards for commercial buildings, requires renewable energy sources to be integrated into building design, and makes it mandatory for new buildings to demonstrate energy savings of at

By 2030, in emerging markets alone, green buildings will offer a \$24.7 trillion investment opportunity

least 25% to be code compliant.

India’s Perform, Achieve, and Trade program is a regulatory cap and trade instrument that aims to reduce energy consumption in specific energy-intensive sectors using a market-based mechanism through which consumers can get certification for and trade excess energy savings. The program was initially created for large industrial businesses, but later it was extended to hotels for the year 2020-2021.

The report further notes that the increased uptake of green bonds in several markets is mainly because central banks and regulators are providing clear guidelines on how to issue these bonds.

The People’s Bank of China published its “Green Bond Guidelines” in 2015. Similarly, India, the Association of Southeast Asian Nations, Chile, Peru, and Egypt are only a few other examples of countries that have issued green bond guidelines.

The Indian corporate is also playing its part in promoting green buildings. Led by the CEOs of leading developers and financial institutions, the Sustainable Housing Leadership Consortium is a first-of-its-kind voluntary private sector consortium that aims to mainstream green buildings in India. The consortium is working towards building and certifying all of its new housing as green, contributing 110 million square feet of green housing by 2020.

According to a smart city indicator survey conducted by Ireland-based multinational, Johnson Controls, India had only 4% of the building that can be classified as ‘green.’ However, the survey pointed out that 38% of buildings in India want to get the ‘green building certification’ in the future as compared to the global percentage of 44. Around 46% are willing to pay a premium to lease space in a certified green building in India as compared to 51% in the world.

While the green building movement has gained tremendous traction in the past few years, it will still take some time to gain wider adoption, and more efforts are required to make it mainstream. 



Andhra DISCOMs Must Clear Dues Within a Month

Andhra Pradesh High Court has asked the state's distribution companies to clear the dues of solar and wind developers by January 2020

By : Anjana Parikh

The state of Andhra Pradesh created ripples in the renewable industry in 2019 after the newly formed government led by Y.S. Jagmohan Reddy, announced its intent to revisit and renegotiate power purchase agreements (PPAs) already signed during the Chandrababu Naidu - led government.

After a series of petitions and warnings by the central power minister and court cases, the Andhra Pradesh

December 20, 2019.

The state DISCOMs were called out by the court for their negligent attitude towards clearing the dues of the developers. This development came after the earlier court order quashed the state government's letter issued to renewable developers to reduce their quoted tariffs.

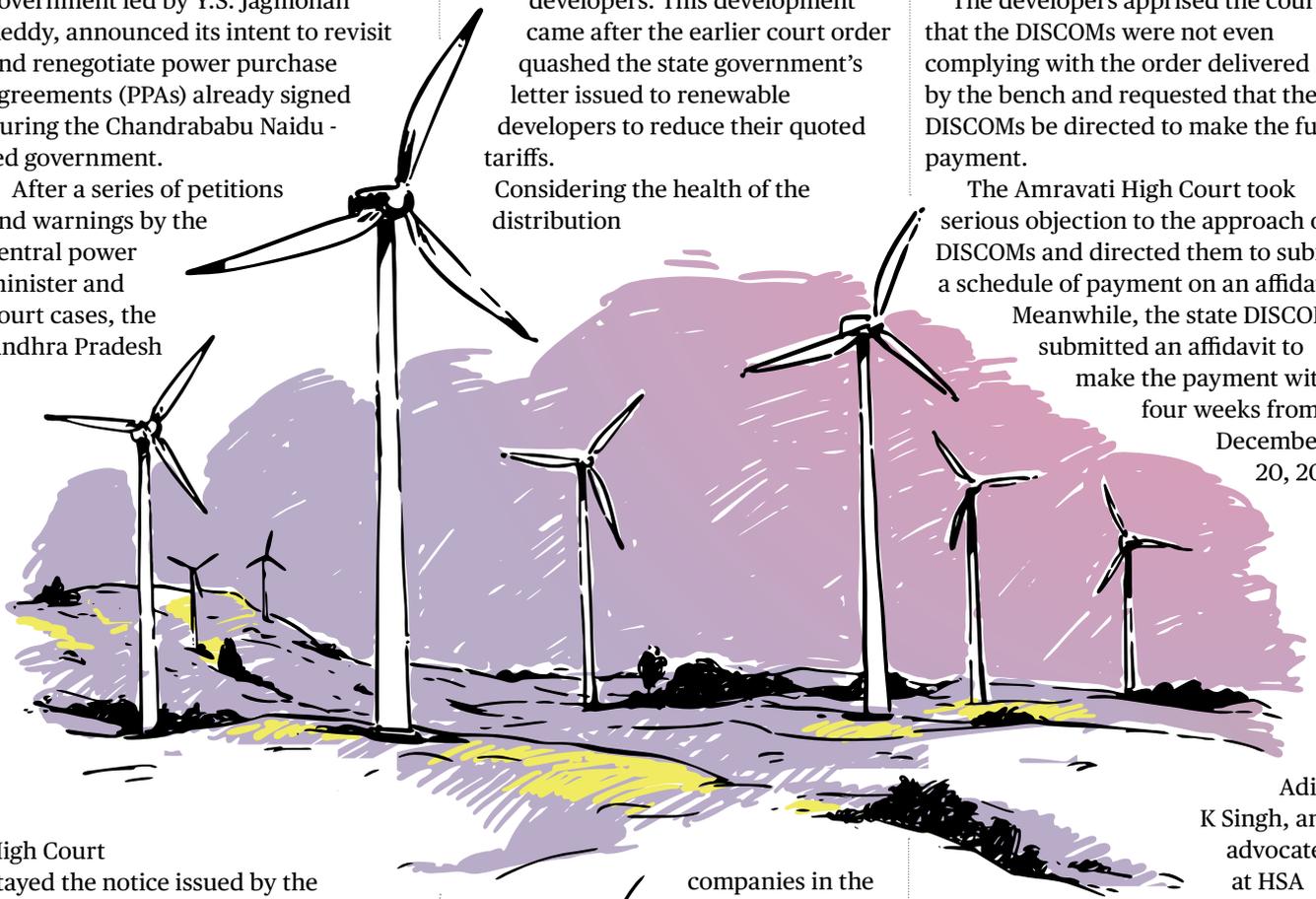
Considering the health of the distribution

outstanding payments by the DISCOMs. The court had then said that the interim arrangement is being suggested to balance the interests of both parties.

The developers apprised the court that the DISCOMs were not even complying with the order delivered by the bench and requested that the DISCOMs be directed to make the full payment.

The Amravati High Court took serious objection to the approach of DISCOMs and directed them to submit a schedule of payment on an affidavit.

Meanwhile, the state DISCOMs submitted an affidavit to make the payment within four weeks from December 20, 2019.



High Court stayed the notice issued by the Andhra Pradesh Electricity Regulatory Commission for public hearings to revise solar tariffs.

Giving relief to the developers, the Andhra Pradesh High Court at Amravati directed the state DISCOMs to clear the dues of solar and wind developers within a month of its order dated

state, developers companies in the and the fact that need liquidity to keep the projects in operation, the court had directed them to immediately pay ₹2.43 (-\$0.0341)/kWh and ₹2.44 (-\$0.0343)/kWh to wind and solar developers respectively. However, this was only an interim relief for the

Aditya K Singh, an advocate at HSA Advocates, said, "Due to payment default from DISCOMs, various developers were on the verge of declaring non-performing assets (NPA). Recognizing the difficulties faced by the developers, the High Court directed them to make the payment within four weeks. This order

should send the right signal to investors about contract enforcement. A long-standing deterrent to foreign direct investment in the renewable industry is weak enforcement of binding contracts.”

On behalf of the state DISCOMs, Santosh Rao, the chief general manager, Investment Promotion Cell (IPC)/ APSPDCL, verified the development and stated that the “contents in the counter affidavit are based on the records and are believed to be true and correct.”

The counter affidavit states that this includes 220 wind power purchase

(MNRE) and the representatives of the Andhra Pradesh government, it was decided that the power purchase agreements (PPAs) for which the tariffs have been fixed by the state electric regulatory commission (SERC) and signed will not be revisited.

The MNRE clarified to the state government that the PPAs once signed are “sacrosanct and cannot be renegotiated unless there is a clause to do so in the agreement or a case of corruption has been approved.”

The MNRE also stated that if the state government does not honor the PPAs,

The developers requested the court to order DISCOMs to make the full payment as they weren't complying with the previous order passed by the Bench

agreements (PPAs) and 47 solar PPAs.

Considering the volume of renewable power covered under the PPAs (up to November 30, 2019), the pending bills of these developers amounts to ₹14.5 billion (-\$205 million).

According to the affidavit, as of August 2019, the power utilities of Andhra Pradesh state had a debt of ₹600 million (\$8.5 million). However, after the order of the court, some of the pending bills have been discharged by raising loans.

“As of today, a total of ₹3.5 billion (-\$50 million) have been paid, and the balance of ₹10.9 billion (-\$154.7 million) is still lying due,” states the affidavit.

Is the impasse coming to an end?

Prior to this, the central and the Andhra Pradesh government reached a consensus to end the ongoing controversy hovering around the renewable sector of the state.

A committee was set up following the request of the Andhra Pradesh energy minister Balineni Srinivasa Reddy for discussing various issues pertaining to the renewable energy sector.

During the meeting between the Ministry of New and Renewable Energy

then it will not make the environment conducive for making investments in the country and the renewable sector.

The state government agreed that the PPAs once signed are “sacrosanct and should not be revisited.”

Further, the MNRE also informed the representatives of the Andhra Pradesh government that the Solar Electricity Corporation of India (SECI) has decided to enforce the tripartite agreement for collecting its dues of around ₹2.8 billion (-\$38.5 million) for the renewable energy power supplied from the funds that would be transferred from center to state.

The government of Andhra Pradesh assured to pay ₹2.8 billion (-\$38.5 million) within ten days.

The dispute in the state has been going on for months, with the renewable generators apprehensive about the future of their projects.

State DISCOMs had directed solar and wind developers to reduce the tariff and submit the revised power supply bills. The committee’s constitution was set aside by the state high court.

It further brought up instances of abrupt disruptions of power supply and from wind generators and irregular



power curtailment by renewable energy generators in the state.

Further, the Andhra Pradesh government informed that after the state’s split, it has been in a bad financial condition, and it is difficult for the state to make timely payments to the renewable generators “particularly in a situation where renewable power has been purchased in excess of the prescribed renewable energy purchase obligation (RPO) limit prescribed by the central government.”

According to government documents, it has also been decided that concessional loans should be provided to the state by the state-run companies, namely the Power Finance Corporation



Limited (PFC), REC Ltd, and the Indian Renewable Energy Development Agency

The court has directed the DISCOMs to immediately pay ₹2.43/kWh & ₹2.44/kWh to wind & solar developers, respectively

(IREDA), to clear the accrued dues.

The government has also decided that the inter-state transmission and losses (ISTS) charge will also be waived for the sale of renewable power by the state governments that have installed renewable energy capacity more than the RPO limit prescribed by the central government.

Another decision reached during the meeting was that in case the state government resorts to the curtailment of solar or wind power for reasons other than grid safety, the state utility would be bound to pay for the curtailed power as it enjoys 'must run' status.

Additionally, the National Thermal Power Corporation (NTPC) has offered

to buy 300 MW of renewable power from Andhra Pradesh at a mutually agreed rate, according to the MNRE.

"The Andhra Pradesh government's move to renegotiate and revisit PPAs of solar and wind power generators has completely disrupted the solar and wind industries freezing project development and lending activity. Hopefully, this new agreement ends the uncertainty in the industry," said Raj Prabhu, CEO of Mercom Capital Group.

The ongoing dispute in Andhra Pradesh has set a bad precedent, and the industry will take some time to recover from this. Banks have been averse to lending to state projects. 

Delhi's New EV Policy

In a city like Delhi, that's suffocating across the year due to its toxic air, a new EV policy is likely to help decrease the contaminants in the air while promoting intelligent mobility

By : Anjana Parikh

Air pollution is estimated to have caused nearly 4.9 million deaths in 2017 with India and China accounting for 1.2 million each, which was the highest in the world.

In India, Delhi has acquired a bad reputation of being perennially polluted. To this end, the Aam Aadmi Party (AAP) government recently approved a policy for electric vehicles with an intent to make the city "the EV capital of India."

The policy mainly focuses on electric two-wheelers, shared transport vehicles such as three-wheelers and buses, and goods carriers or freight vehicles. These vehicles contribute to most of the vehicular pollution in the capital.

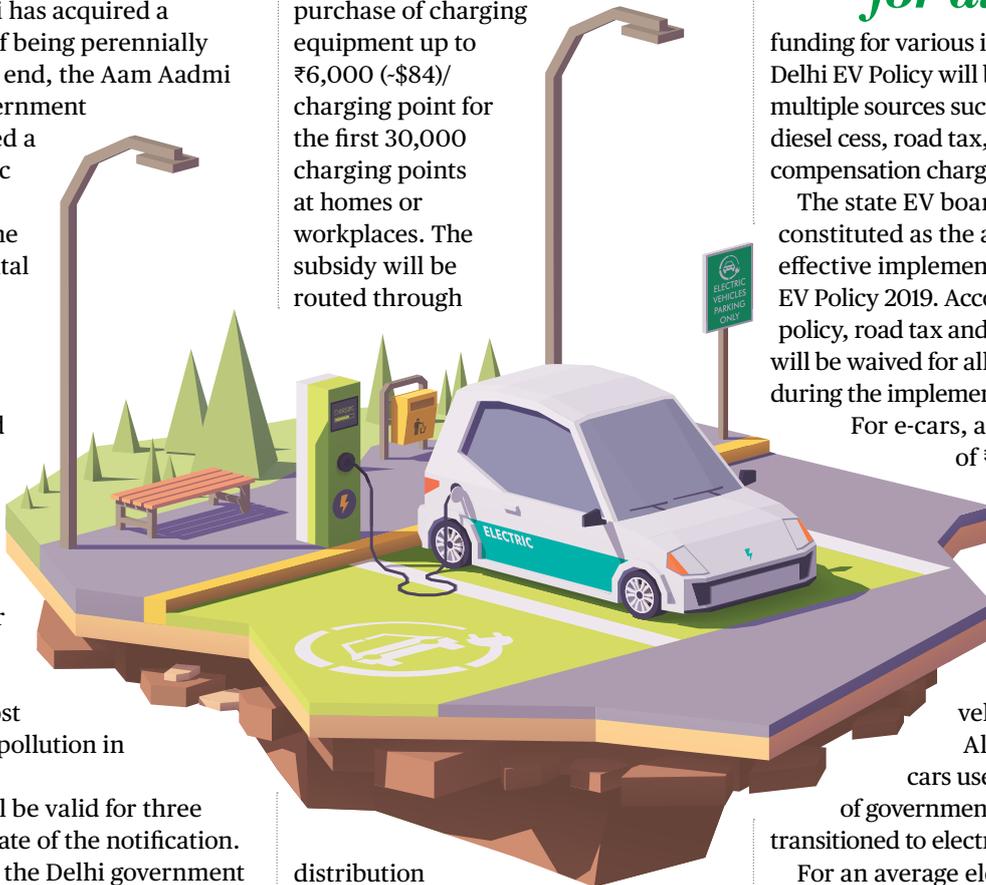
The policy will be valid for three years from the date of the notification.

Within a year, the Delhi government is targeting 35,000 electric vehicles (2/3/4 wheelers and buses), 1,000 EVs, and 250 public charging or swapping stations in Delhi.

According to the policy, the government is targeting 500,000 new EV registrations in Delhi. These EVs are estimated to cut down approximately ₹60 billion (-\$842.08 million) in oil and liquid gas imports and 4.8 million tons of carbon dioxide emissions.

As per the policy, all new residential and workplace parking will need to be 'EV ready' with 20% of all vehicle parking required to be EV ready.

Delhi government will provide a 100% subsidy for the purchase of charging equipment up to ₹6,000 (-\$84)/charging point for the first 30,000 charging points at homes or workplaces. The subsidy will be routed through



distribution companies responsible for the charger installations.

The policy will be valid for three years

A dedicated EV cell will be established within the transport department for the effective day-to-day implementation of the Delhi State EV Policy. Further,

Road tax and registration fees will be waived for all EVs

funding for various incentives under Delhi EV Policy will be obtained from multiple sources such as pollution, diesel cess, road tax, or environment compensation charge (ECC).

The state EV board will be constituted as the apex body for the effective implementation of the Delhi EV Policy 2019. According to the new policy, road tax and registration fees will be waived for all the electric vehicles during the implementation of the policy.

For e-cars, a purchase incentive of ₹10,000 (-\$140)/ kWh of battery capacity for the first 1,000 cars will be provided, subject to a ceiling cap of ₹150,000 (-\$2,105)/ vehicle.

All leased or hired, cars used for the commute of government officers will be transitioned to electric within a year.

For an average electric two-wheeler with 2 kWh battery, the applicable incentive would be approximately ₹10,000 (-\$140.35) as compared to ₹5,500 (-\$77.19) that is being offered by the Delhi Pollution Control Committee (DPCC).

For the first time in Delhi, ride-hailing service providers will be allowed to operate electric two-wheeler taxis.

A few months ago, Delhi cut down the rates of charging stations for e-rickshaws and other electric vehicles. 🇮🇳



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Indian Solar Industry Optimistic Going Into 2020

Key players in the solar industry are expecting a stronger market in 2020, with a pinch of caution

By : Nithin Thomas Prasad

After a somewhat disappointing year in 2019, the domestic solar industry's hopes are pinned on 2020. Towards the end of 2019, Mercom revised its estimates for the calendar year (CY) 2019 down to around 7.3 GW and forecasts a stronger 2020 assuming stable market conditions.

Indian solar industry stakeholders mostly have an optimistic outlook for 2020. Provided there is sufficient

pipeline and not because the market fundamentals have changed. Even though it will take time for the economy to stabilize, enforcing renewable purchase obligations, shoring up finances of DISCOMs so they can pay the developers on time, and facilitating lending will put the solar industry back on the growth path so it can continue generating clean power, decrease pollution, and create jobs," said Raj Prabhu, CEO of Mercom Capital Group.



government support, encouraging policies, and improved market conditions, the sector is poised to see one of its strongest years yet.

"The improved outlook for 2020 is due to a stronger existing project

Outlook

Industry representatives and executives whom Mercom spoke with said they expected the solar power base in the country to rise by over 10 GW, a number the country has struggled to

achieve so far.

"After a relatively muted 2019, India is expected to install 11-12 GW in 2020. The successful completion of these targets is dependent on successfully addressing the supply and demand nuances," said Rajaram Pai, Business Leader - South Asia, DuPont Photovoltaic Solutions.

Some of the new government programs focusing on solar pumps and



the agriculture sector are also helping propel growth in the sector.

“After consecutive negative growth of the solar industry in the last two years, more than 10 GW solar projects are in the pipeline to be executed in 2020. The GW scale tenders, along with new schemes such as SKY, KUSUM, agri-feeder, and residential tenders by some of the states, will further augment the demand. As we look forward to 2020,

The rooftop solar market, however, continues to be weak due to a lack of policy support

we hope for a more stable, predictable policy and regulatory regime for the solar industry in India,” said Sunil Badesra, Business Head, Sungrow (India) Pvt. Ltd.

Domestic solar manufacturers are

upbeat following the safeguard duty imposition on imported cells and modules. A better forecast bodes well for these companies with plans to expand production.

“In the short term, we predict module manufacturing capacity going above 12-13 GW in the next 5-8 months from the current levels of 10 GW, and another 5-7 GW of capacity in the next 36 months. We might see an additional cell capacity of 2-3 GW in the next 12 months and an increased 5-7 GW of capacity in the next 36 months,” said Adani’s CMO Prashant Mathur.

“India has tremendous potential in renewable energy and the government’s goal of installing 175 GW of renewable energy, 100 GW of which is solar capacity, by 2022 looks achievable with the right policies and participation of the industry,” Mathur added.

We are also seeing numerous solar inverter companies trying to make a mark in a price-sensitive market like India. According to Mercom’s India Solar Market Leaderboard 1H 2019, the top five inverter suppliers made up over 73% of the Indian market share.

“We have high expectations for India’s rooftop solar market. In 2020 we are seeing increasing competition in the pricing of solar inverters, and we’ll continue to cope with these challenges by strengthening our advantages in R&D and product innovations,” commented Rucas Wang, regional director at Growatt.

The rooftop solar market continues to be weak due to a lack of policy support, and there is general consensus in the industry that unless there is significant growth in rooftop solar, it will be almost impossible to reach the national solar goals.

“The non-utility sector is expected

to drive up capacity expansion to allow India to achieve the 100 GW target by 2022. India has the huge untapped potential of non-utility solar, and the right policy environment could unlock India’s growth in this space,” said Pinaki Bhattacharyya, CEO of AMP Energy India.

There is a desperate need for foreign investment in the renewable energy sector in the country. In 2019, financial institutions like the Bank of America, Asian Development Bank, Masdar, Goldman Sachs, and Abu Dhabi Investment Authority (ADIA) made investments in the sector. However, it is imperative to

foreign financial institutions and pension funds that are sitting on the sidelines.

“We estimate that installations in 2020 will be about 12-13 GW conservatively. However, the government has announced an unprecedented policy push, and states are providing the necessary infrastructure. Annual investments in solar could surpass investments in coal by 2019-20, with \$35 billion (-₹2.48 trillion) committed by global players,” said Mukesh Mishra, Manager at Hanwha Q Cells.

While markets across the globe have already transitioned to monocrystalline

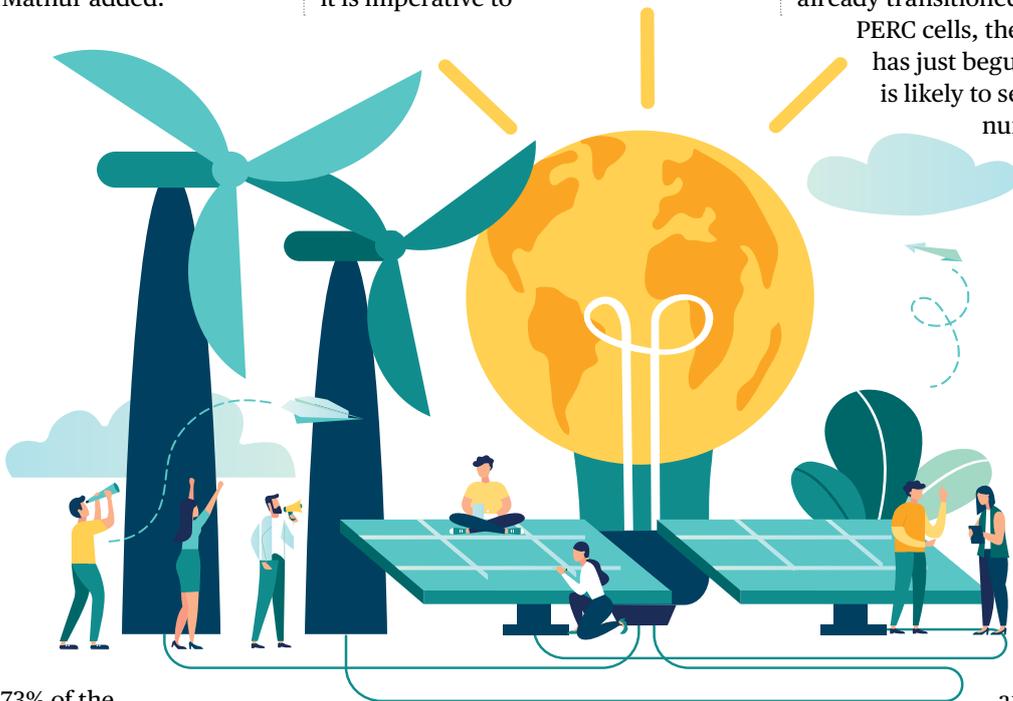
PERC cells, the shift in India has just begun. The next year is likely to see an increasing number of projects utilizing PERC cells as the supply ramps up, and the prices slide consequently. Mercom previously reported that the shift to mono-PERC modules is rapid as they are more efficient and can help reduce land

and other balance of system (BoS) costs for developers, leading to higher returns.

“On the supply side, project developers will be offered higher efficiency (including mono-PERC and bi-facial) modules from both Indian and overseas manufacturers with demand peaking post the tenure of the safeguard duty in the second half of 2020. This is positive for the industry with improved cost per watt and better yields,” added Pai.

Challenges

There are, however, several challenges to overcome, including regulatory and policy inconsistencies, changes in duties, and payment delays



Some of the new government programs focusing on solar pumps and the agriculture sector are helping propel growth in the sector

create a much more conducive policy environment in 2020 to attract more

by distribution companies (DISCOMs), among others.

Domestic manufacturers expressed concerns over ending the safeguard duty in 2020. The duty, which was imposed on imports to promote domestic manufacturing, is set to end in July 2020.

“Ending the safeguard duty will be a big challenge for Indian manufacturers who will have to rely only on projects under the Domestic Content Requirement (DCR) category. Since [it] is about to end in 2020, the government needs to strongly consider extending the duty further to promote more indigenous manufacturing, said D.V. Manjunatha, Managing Director at EMMVEE.

A 25% safeguard duty was announced on solar cell and module imports from China and Malaysia between July 30, 2018, and July 29, 2019. The duty was set at 25% for the first year, followed by a phased down approach for the second year, with the rate set to be lowered by 5% every six months until July 2020.

On the other hand, many companies in the Solar Micro, Small, and Medium Enterprises (MSMEs) segment told Mercom that these policies had created more hurdles rather than simplifying issues. Manufacturers of solar modules, ancillary products, system integrators,

and raw material suppliers in the solar photovoltaic space complained that the government’s protectionist policies were increasing costs for smaller local manufacturers and had loopholes.

The safeguard duty on solar imports from China and Malaysia is set to expire in July 2020

Additionally, solar developers with projects that were auctioned before the imposition of the safeguard duty say that they have been struggling to get reimbursement for their additional expenses as a result of the duty. This has adversely affected their business and the pace of project development in the country.

Policy swings, regulatory bottlenecks are also currently weighing down the rooftop solar industry in India, according to Badesra.

“We are cautiously optimistic about the Indian solar industry in 2020. Previously, tender cancellations, tariff re-negotiations by a few states had

increased the uncertainty of some of the large-scale projects and hence delayed their executions,” he added.

Payment disputes by DISCOMs were also rampant, slowing down any progress made by developers. The government’s introduction of credit mechanisms and amendments to policies has done little in the way of negating these issues.

Domestic manufacturing concerns took center stage for most industry players in 2019.

“Some of the main concerns from a manufacturing standpoint is the large dependency on the import of raw materials, the incremental costs for transportation and the lack of support for major technology and capital expenditure upgrades, or depreciation subsidy which is, in turn, increasing the overall costs of the products,” said Mathur.

“The scale at which Indian manufacturers operate is 1/20th and 1/10th of our neighboring countries in the cell and module capacities respectively, and we are not able to capture all benefits available to them on the cost side due to economies of scale,” Mathur added.

The outlook for 2020 remains mostly positive. Hope remains for the government to achieve its ambitious target of 100 GW of solar capacity by 2022 as long as it works in tandem with the industry to create a more conducive and consistent policy environment

Conclusion

“The demand in 2020 looks a lot stronger, and we should see the solar market resume year-over-year growth again. But a lot will depend on the economy getting back on track, which will affect both lending and power demand,” added Prabhu. 





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Karnataka's Solar Installers Rise Against State's New Rooftop Order

The recent state order has been criticized for being against the expansion of rooftop solar in the state and the developers are up in arms against its implementation

By : Rakesh Ranjan Parashar

The Karnataka Electricity Regulatory Commission (KERC) recently issued a discussion paper that proposes several business models. The Commission has expressed that there is

It has been alleged that the shift from net metering to gross metering will deal a fatal blow to the viability of solar rooftop installations

a need for a proactive and constructive role for the distribution licensees to

facilitate smaller consumers to install solar systems at an optimal cost, either through investment from the consumers or through third party investments by the distribution licensees themselves.

The furor that greeted the order passed by the KERC on December 9, 2019, seems unlikely to die down. The order which was seen by many as an attempt to give the necessary boost to the rooftop solar segment in the state by encouraging third-party investments in solar rooftop projects on consumers' rooftops hasn't gone down well

with the solar installers.

The association which has been protesting vehemently against the order organized a press conference on December 13, 2019, where they laid out their grievances following the KERC order. Following this, they met with the chairman of the Commission to communicate their issues with the order passed.

In its order, the Commission has



proposed various business models. The Commission also felt that there was a need for a proactive and constructive role by the distribution licensees to facilitate smaller consumers to install solar systems at an optimal cost, either through investment from the consumers or through third party investments by the distribution licensees themselves.

In the order, the Commission has broadly categorized the different models as utility centric business model, consumer-centric, or third party owned (RESCO) models.

Utility-Centric Business Model

Consumer-owned model - This model will apply to all the categories of consumers under the net or gross metering arrangement. The distribution licensee will select the contractor through a reverse bidding process and facilitate setting up of the rooftop solar systems for which the onus of bringing the funds will be on the consumers. The distribution licensee will monitor the project implementation charging a facilitation fee.

Consumer-owned model - Though it shares the same name as the model described above, there is a slight difference. The difference is that under this model, the EPC contract will be between the consumer and the distribution licensee

Utility-owned model - Under this model, the distribution licensee will set up, own and operate projects on the rooftop of the interested consumers. It will use its funds after signing the PPA with the consumers on a gross metering basis paying the consumer a rent for the roof utilized

Third-party owned model - Under this model, the third-party developer who is selected based on the lowest quoted tariff in the reverse bidding will set up, own, and operate the projects

Third-Party Investment Model

Under this model, third-party developer invests capital in installing a rooftop solar project on the rooftop of a consumer and owns and operates the system for a mutually agreed period.

After taking into account the suggestions from all the stakeholders, the commission noted that from the operational point of view, there is no change in the rooftop project developed

dependent on the market conditions and will not vary depending upon the type of model adopted.

The Commission in its order has noted that the sale of energy by a



under consumer-owned systems and third-party investment model. The various parameters applicable in the development of the project, such as capital cost, borrowing costs, operation and maintenance expenses, and capacity utilization factors are

third-party investor to the consumer attracts the payment of cross-subsidy surcharge and additional surcharge. The Commission has observed that the exemption from levying such charges for a limited period might be granted in case of all low tension (LT)

domestic consumers. However, for other consumers with gross metering, the question of levying cross-subsidy surcharge and additional surcharge does not arise.

surcharge for rooftop solar projects of LT domestic consumers under the third-party investment program for three years for projects commissioned within March 31, 2021.



The Commission noted that the levy of cross-subsidy surcharge and additional surcharge would discourage investment by the third party for implementing the solar projects. As a promotional measure, the Commission had decided to exempt cross-subsidy surcharge and an additional

“The order has made DISCOMs the sole arbiter, which takes away the right of the consumer to choose his supplier. The government-owned DISCOMs should not be allowed to take away the consumers’ profit from generating through renewable sources, it states.

The consumer loses the right to choose his supplier, which is not the right way to go,” Ramesh S, the president of the association said.

The association also believes that the Commission has no business to ensure that DISCOMs make profits by emasculating power from other sources, and as the order is not a tariff order, the Commission has no rights to extend it to non-tariff matters.

The association feels that the consumer who opts for rooftop solar will have to choose an EPC provider determined by the DISCOM, which is against the free market principles.

The association has been vehemently protesting against the reverse auction mechanism stipulated in the order,

The order has made DISCOMs the sole arbiter, which takes away the right of the consumer to choose his supplier

which gives the consumers the chance to choose the best price for a rooftop solar project. The association feels that the reverse bidding is unworkable as each project is unique, and it will be impossible for DISCOMs to float a bidding process for such projects.

The association has alleged that the shift from net metering to gross metering will deal a fatal blow to the viability of solar rooftop installations. They feel that the tariff determined at ₹3.07 (-\$0.043) is far too low to attract any investor.

The association feels that the open-access rule for the third party funded solar systems will kill the growth of the solar sector in Karnataka.

Currently, rooftop solar installations in Karnataka account for 234 MW against the target capacity of 2,400 MW by March 2021. ☹

Bundling Renewables for Uninterrupted Power Supply

To facilitate round-the-clock power supply and address intermittency, the MNRE has come up with a blueprint to complement renewable power with power from thermal projects

By : Rakesh Ranjan Parashar

To address the intermittency issue posed by renewable sources, the government has come up with a new plan. The Ministry of New and Renewable Energy (MNRE) has issued a draft proposal to supply round-the-clock power from renewable (solar, wind, and hydro) projects, which will be complemented with power from thermal projects.

The MNRE has asked for feedback from various stakeholders, including the Ministry of Power (MoP), renewable energy associations, and state governments and their power distribution companies (DISCOMs), among others.

The first phase of JNNISM provided for the 'bundling' facility, where solar power could be bundled with the comparatively cheap thermal power from the unallocated quota generated at National Thermal Power Corporation (NTPC) coal-based stations. This was to provide a boost for grid-connected solar projects.

Over the period, the de-risking of renewable energy sector, coupled with the advancement of technologies, resulted in bringing down the tariffs of solar and wind power to below the ₹3.00 (\$0.042)/kWh level, which is cheaper than the cost of thermal power, paving the way for a wider adoption of renewable energy across the country.

But a drawback that goes against renewable energy is its intermittency, making it difficult for DISCOMs to maintain a stable and steady flow of power. The challenge is more pronounced

Power generator must supply at least 51% of the total power from renewables, the balance can come from thermal energy

in large projects where the DISCOMs have to balance power to maintain grid stability and meet the requirements in hours when renewable energy is not available.

All these factors have led to the concept of 'reverse bundling' wherein high-cost thermal power is bundled with cheaper renewable energy to provide round-the-clock power supply to the DISCOMs.

As per the proposed plan, the power producer will supply renewable power bundled with thermal energy and maintain at least 80% availability on an annual basis. The generator has to supply the power where at least 51% of the total power provided annually is from renewable sources, and the balance can come from thermal generation sources.

As far as the tariff is concerned, a single composite tariff for renewable energy, complemented with thermal energy, will need to be quoted by the bidders.

The draft document notes that the tariff should be quoted at the delivery point, which will be at the central transmission utility interconnection point and the





DISCOMs will bear all transmission-related charges and losses from the delivery point onwards.

It is important to note that the tariffs for renewable power are set for the entire period of the PPA, which is not the case with the thermal power as it is indexed with the prices of coal to adjust with the change in prices of fuel. Since the generator will be responsible for supplying the composite power, the tariff will be adjusted to cover the possible increase or decrease in coal prices as per the index to be notified by the regulatory commission.

According to the draft document, the bidders will have to specify the composite fixed charges as well as the composite variable charges. The composite fixed charges will apply for renewable power, whereas the composite variable charges will be reflective of the variable component of energy charges for thermal power.

The bids should be evaluated for the composite levelized tariffs. The index to be adopted for increasing or decreasing the variable charges will be specified in the request for selection (RfS).

As it is up to the bidder to choose the type of thermal power to be supplied with renewable energy, the procurer may specify the escalation and de-escalation indices for both the

The renewable energy component under this program will also be considered eligible for RPO compliance

international and domestic fuel in the RfS. Based on the variable charges quoted and the type of fuel used, the levelized composite tariff may be calculated.

Another tariff alternative proposed is the ‘normative composite fixed charges’ and the ‘normative composite variable charges.’ As the generator has to supply at least 51% of annual energy from renewable sources, it is assumed that 51% of the tariff is represented by renewable components and the remaining 49% as the thermal component. Further, in the new coal-based thermal tariffs, the average variable cost to fixed cost ratio is in the range of 70:30. So, for the normative approach under this plan, the total composite tariff should be considered to

be comprising of 51% of the renewable tariff, 30% variable thermal tariff, and 19% fixed thermal tariff.

The draft document also mentions that if the annual availability of power falls below 80%, a penalty may be charged, corresponding to this shortfall in energy, at 25% of the PPA tariff.

The renewable energy component under this program will also be considered eligible for RPO compliance, and the bidding process would be carried out by SECI, NTPC, or any other procurer authorized by the government.

The selection of the bidder will be through a transparent bidding process, and the PPA will be valid for 25 years. SECI or NTPC or any other intermediary procurer authorized by the government, will be allowed to charge a trading margin.

Meanwhile, SECI has invited an expression of interest from power generators involved in hydro, pumped storage, gas, battery storage, and thermal generating stations to supply power to SECI, which it would then blend with different renewable sources. The aim is to meet the challenges posed by the intermittent nature of renewable energy sources, which need to be supplemented with other conventional sources of power. ☐

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Online Smart Service



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Growatt New Energy

Solar Sector Receives \$12 Billion in Corporate Funding

Financing activity was robust in the solar sector in 2019 with a 20% increase in funding compared to 2018

By : Ranjitha S

The financial activity was strong in 2019, a reflection of growth in the solar sector around the globe, and the comfort financial institutions have in the solar industry as a mature low-risk investment. The majority of the public financing deals came out of China and India, fueled by



several initial public offerings.

Total corporate funding in the solar sector increased by 20% in 2019,

reaching \$11.7 billion in 117 deals, up from \$9.7 billion in 139 deals in 2018, according to Mercom Capital Group's 2019 Q4 and Annual Solar Funding and M&A Report.

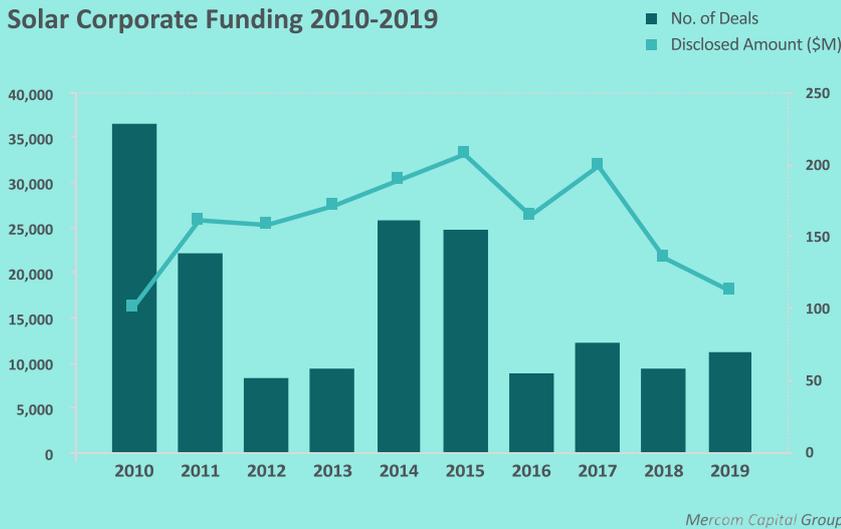
The increase in corporate funding was mainly due to large debt financing activity in the first (Q1) and last (Q4) quarters of 2019 compared to 2018.

In the first nine months (9M) of 2019, total corporate funding was up with \$9 billion raised, compared to \$6.7 billion that was raised in the same period last year, a 34% increase year-over-year (YoY).

“Financial activity was up across the board in the solar sector in 2019 with venture funding, public market, and debt financing all increasing year-over-year. Solar equities also had a great year with six solar IPOs around the world, and strong debt financing activity, including securitization deals, rounded off a strong year for the sector,” said Raj Prabhu, CEO of Mercom Capital Group.

The report said that Global Venture Capital/Private Equity (VC/PE) funding in the solar sector in 2019 came to \$1.4 billion in 53 deals, compared to

Solar Corporate Funding 2010-2019



\$1.3 billion in 65 deals in 2018. Solar downstream companies accounted for 75% of VC/PE funding that went into solar companies in 2019.

The top disclosed VC funding deal in 2019 was Indian renewable developer ReNew Power that raised \$300 million

through a rights issue. Collectively, Indian solar downstream companies raised approximately \$650 million in 2019.

The other top deals include Hero Future Energies with \$150 million, followed by Avaada Energy with

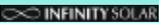
\$144 million. Yellow Door Energy raised \$65 million, and Infinity Solar brought in \$60 million.

Public market financing increased by 9% in 2019 to \$2.5 billion compared to the \$2.3 billion raised in 2018. Five of the solar stocks tracked by Mercom increased more than 50% in 2019, with four equities increasing more than 100%.

Initial Public Offerings (IPOs) were instrumental in higher public market financing activity in 2019, with \$1.3 billion raised in six deals notes the report. The largest deal was Xinyi Energy Holdings (Xinyi), a Chinese solar farm operator, which raised \$465 million in its initial public offering. Other significant companies that went public in 2019 included U.S.-based residential solar installer

Solar equities also had a great year with six solar IPOs around the world, and strong debt financing activity, including securitization deals, rounded off a strong year for the sector

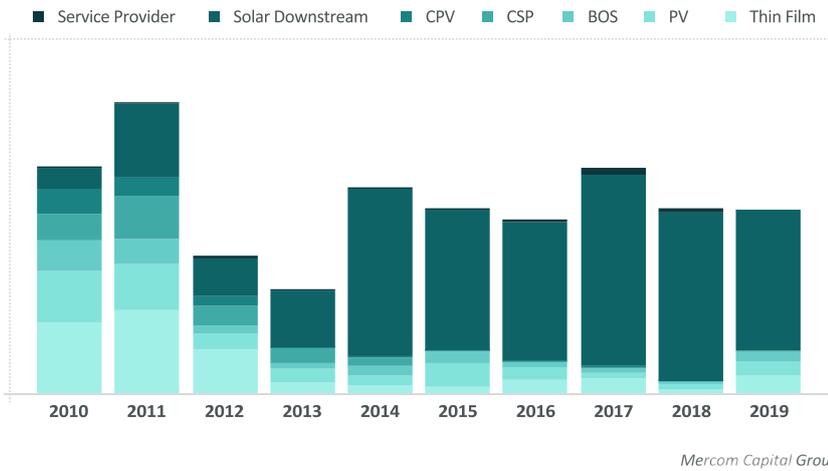
Solar Top VC Funded Companies in 2019

Company	Country	Amount (\$M)	Investors
 ReNew POWER	India	300	Goldman Sachs, Abu Dhabi Investment Authority (ADIA), Canada Pension Plan Investment Board (CPPIB)
 HERO FUTURE ENERGIES	India	150	Abu Dhabi Future Energy Company (Masdar)
 AVAADA	India	144	Asian Development Bank (ADB), German development bank - DEG, FMO
 YELLOW DOOR ENERGY	India	65	International Finance Corporation, Mitsui, Equinor Energy Ventures, Arab Petroleum Investments Corporation, Adenium Energy Capital
 INFINITY SOLAR	Egypt	60	European Bank for Reconstruction and Development (EBRD)

Mercom Capital Group



Solar VC Funding 2010-2019 (By Category)



\$2 billion raised for the Noor Energy 1 Solar Project by Dubai Electricity and Water Authority (DEWA), ACWA Power, and Silk Road Fund.

According to the report, there were 65 merger and acquisition (M&A) deals in the solar sector in 2019 compared to 82 transactions in 2018. The top deal in 2019 was \$6.1 billion acquisition of Pattern Energy by Canada Pension Plan Investment Board (CPPIB). Oil and gas majors like BP, Tokyo Gas, PETRONAS, Reliance Industries, Shell, and Total continued to be significant acquirers of solar companies in 2019.

There were 192 large-scale solar project acquisitions in 2019 compared to 218 transactions in 2018. About 26.1 GW of solar projects were acquired in 2019, compared to 29 GW in 2018, a decrease of 8% YoY.

Sunnova which raised \$168 million on the New York Stock Exchange; Sterling and Wilson, an Indian-based EPC company, raised \$406million on the Bombay Stock Exchange; and Ginlong Technologies, which makes the Solis brand of inverters, raised \$79 million on the Shenzhen Stock Exchange.

Debt financing activity surged in 2019 with \$7.8 billion in 46 deals, a 29% increase year-over-year (YoY) spurred by eight securitization deals in 2019, totaling \$1.6 billion. The top debt deal in 2019 was Yieldco company TerraForm Power, which raised \$700 million through senior notes. Solar Mosaic was the most active company with \$468 raised in securitization deals in 2019. Interest rates for securitization deals ranged from 3.36% to 9.96%.

Announced large-scale project funding deals were up in 2019 with \$16.1 billion in 152 deals, compared to

\$14.1 billion in 184 deals in 2018.

The top project funding deal was the

The increase in corporate funding was mainly due to healthy debt financing activity in Q1 and Q4 of 2019





Solar Project Acquirer Mix (%) 2019



Mercom Capital Group

Project developers and independent power producers were the most active acquirers in Q4 2019, with 17 acquisitions totaling over 8.1 GW, followed by investment firms and funds with 16 transactions totaling 1.5 GW, and electric utility companies with a total of 228 MW.

Yieldcos and Manufacturers made one acquisition each for 100 MW and 70 MW, respectively, and an oil and gas major and a Trading group acquired one project each for a total of 96 MW.

“Investment firms acquired over 30 GW of large-scale solar projects in the past five years, a reflection of solar’s attractiveness as a long-term, low-risk investment,” added Prabhu. 

An Alternative to Lithium-Ion Battery

IBM Research claims it has come up with a technology that eliminates the use of heavy metals in battery production making it less hazardous environmentally

By : Rakesh Ranjan Parashar

Cobalt, which is mainly available in Central Africa, has come under some serious fire for exploitative extraction processes.

The research team at IBM Research claims to have come up with a new battery that does not use any heavy metals with sourcing concerns.

The latest innovation in which three new materials have been used has never been combined in a battery before. According to IBM, the materials used for this battery can be extracted from seawater, and there is no need to use other invasive methods for extracting the materials, which makes it a viable alternative as compared to the standard batteries in use.

It's not just the materials that make the innovation unique. IBM claims that initial tests have proved that it is more efficient and cost-effective than the lithium-ion batteries. It also has



Image: IBM Research

The heavy metals used in today's batteries are not only an environmentally toxic but also a humanitarian hazard. Companies around the world are trying out new methods that could get rid of the use of heavy metals like nickel or cobalt in the production of batteries. As we are looking for battery-powered alternatives for everything from electric vehicles to smart grids, it becomes more important to look at the safety of battery materials.

A new research finding at IBM Research could help eliminate the use of heavy metals in battery

production, and this could lead to a paradigm shift in the long-term sustainability of many elements in our energy ecosystem.

Generally, heavy metals like nickel and cobalt are used in batteries, which pose a serious threat to our environment and are hazardous.

faster charging time, higher power, and energy density as compared to the more prevalent lithium-ion batteries.

The composition of the battery consists of cobalt and nickel-free cathode material, as well as a safe liquid electrolyte with a high flash point.

The composition of the battery consists of cobalt and nickel-free cathode material and a safe liquid electrolyte with a high flash point

The unique combination of the cathode and electrolyte solution can suppress lithium-ion dendrites during charging leading to less heating, which is the main drawback of lithium-ion batteries, according to the company.

IBM claims that the battery requires only five minutes to reach 80% of the total charge, and this bodes well for the future of electric mobility.

To take that next step in battery development, IBM Research has joined hands with Mercedes Benz Research and Development, North America; Central Glass, one of the top electrolyte suppliers in the world; and Sidus, a battery manufacturer to develop the complete ecosystem for battery development.

As per the company’s blog, the research team at IBM Research is also using artificial intelligence (AI) called semantic enrichment to further enhance the battery potential by identifying new and high-performance battery materials.

The team at IBM Research has used a multidisciplinary approach combining materials science, molecular

chemistry, electrical engineering, advanced battery lab equipment, and computer simulation to come up with this latest innovation in material science that might pave the way for the most powerful battery soon.

While IBM seems to be optimistic

about this discovery, it remains to seen whether this innovation can provide a viable alternative to lithium-ion batteries and pave the way for the next generation of batteries free of heavy metals. Not many have succeeded in this endeavor so far. ☹



Image: IBM Research

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RBI Eases External Borrowing Norms for Solar & Wind

External borrowings have become increasingly common for refinancing operating solar, wind projects. The relaxation of the provisions by the RBI is likely to benefit developers who are finding it difficult to raise funds in India

By : Shaurya Bajaj

One of the biggest challenges in the solar and wind sectors is the availability of funding. Over the past year, the credit crunch in the country has

worsened, making it more difficult for renewable project developers to raise debt. While those with big pockets are relatively less affected by the ongoing liquidity crisis, small solar companies

are bearing the real brunt.

Solar and wind energy developers initially borrow from domestic lenders at a high cost. Once the project is commissioned and starts generating



revenue, developers refinance these high-cost rupee loans from lenders by low-cost foreign currency loans through External Commercial Borrowings (ECBs) from foreign lenders.

Last year, the National Solar Energy Federation of India wrote to the Reserve Bank of India (RBI) to carve out a special category to allow ECBs of an average maturity period of at least five years within the new merged foreign currency ECB category that will allow solar and wind project developers to repay their rupee loans to domestic lenders from ECB proceeds.

Borrowers can raise external commercial borrowings for the repayment of rupee loans

Further, NSEFI had also requested to rationalize the new ECB Framework so that it would exclude repayment of rupee loans from the negative list. As per NSEFI's letter, if this were not done, the new framework for ECBs would pose a risk for the growth of the utility-scale renewable energy projects in India.

According to a recent letter from the Department of Economic Affairs to NSEFI, some of the issues raised by them were addressed by the RBI in July 2019.

However, according to a notification from the RBI, the existing permissible end-use of repayment or refinancing of rupee loans availed under "Track-II of ECB" was not considered in the new merged foreign currency ECB framework in any form. This would stop developers from repaying rupee loans to domestic lenders using ECB proceeds.

RBI Relaxes End-Use Stipulations

The RBI announced that borrowers would be permitted to raise the



following ECBs from recognized lenders barring foreign branches or overseas subsidiaries of Indian banks.

- ECBs with a minimum average maturity period of ten years for working capital purposes and general corporate purposes. Borrowing by NBFCs for these purposes has also been permitted.
- Eligible borrowers can avail ECBs with a minimum average maturity period of seven years for the repayment of rupee loans availed domestically for capital expenditure and also by NBFCs for on-lending for the same purposes. For repayment of rupee loans availed domestically for purposes other than capital expenditure and on-lending by NBFCs for the same, the minimum average maturity period of the ECB should be ten years.
- It was also decided by the central bank to permit eligible corporate borrowers to avail ECB for the repayment of rupee loans availed domestically for capital expenditure in the manufacturing and infrastructure sector if classified as SMA-2 or NPA, under any one-time

settlement with lenders. Lending banks are also permitted to sell, through assignment, such loans to eligible ECB lenders (except foreign branches/ overseas subsidiaries of Indian banks) provided that the resultant external commercial borrowing complies with all-in-cost, minimum average maturity period and other relevant norms of the ECB framework.

These changes were announced in a notice issued by the RBI in July 2019. Essentially, the relaxation of these norms will allow corporates and non-banking finance companies to use ECB proceeds for working capital purposes, general purposes, and repayment of rupee loans, which was not being allowed earlier.

Access to finance for solar and wind projects is a big priority for the government to address in order to help the industry achieve the government's installation goals by 2022. Multinational financial institutions are risk-averse, and a lot more needs to be done to improve the business climate around solar and wind project development, but this is a start. ☺

Solar Jobs and Income in Rural Areas

Other than being one of the cleanest sources of power generation, rural India is benefitting greatly from job creations and new income streams from solar project development

By : Nithin Thomas Prasad



The development of large solar power projects in rural areas usually gets a bad rap as they are associated with issues like land grabbing, deforestation, and disruption of the rural ecosystems. While these downsides to large-scale project developments cannot be denied, the positive impact of these projects is often overlooked.

Solar energy projects are providing rural economies with new sources of revenue, employment and business opportunities, product and policy innovation, capacity building, and, most notably, affordable energy.

To find out more about the social and economic benefits of renewable projects in rural areas, Mercom spoke with project developers who shed light on the direct and indirect benefits their renewable energy projects have had on rural economies in the country.

Employment and Revenue Generation

Renewable energy projects can be a valuable avenue for income generation. As land is a vital component of any renewable energy project and can help in generating extra revenue for landowners.

Solar developer Azure Power Global

Limited said that about 10-15% of their capital expenses, and around 70-80% of operational costs, are spent toward land leases, direct and indirect employment of locals during both the developmental and operational stages of a project.

“We generally lease land, which otherwise has few alternative uses, providing local communities with a stream of discretionary cash flow without displacing alternative business,” said an executive from Azure.

While the sector has been attracting green energy enthusiasts for jobs in urban settings, projects in remote areas have created valuable employment opportunities that are otherwise scarce, especially for the uneducated and underserved.

These projects can create jobs during and after the project development stage in operation and maintenance of these projects on completion. Local laborers, electricians, among others, are hired for the duration of the development phase.

Solar projects are providing rural economies with new sources of revenue, employment and business opportunities, capacity building, and clean energy

Azure also said it employs people from nearby local villages during the construction phase of the project and later provides direct and indirect employment through jobs like module cleaning, grass cutting, security guards, technicians, among others, for the operations and maintenance of the projects.





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However, long-term jobs tend to be created indirectly. “One such example is of Jagir Singh, a lessor for our 2 MW project in Punjab, where he was employed as a security guard to look after the plant, and now, a decade later, he heads security for the plant,” the company added.

Oorja Development Solutions, an off-grid solar provider, working on rural electrification using decentralized solar energy systems, told Mercom it has also seen success with its projects in terms of providing a social and economic boost for rural economies.

It has deployed pay-as-you-go community solar pumps in eastern Uttar Pradesh and western Assam, cumulatively reaching about 150 smallholder farmers. Oorja added that for every batch of six pumps installed, at least two full-time jobs are created in the local farming community.

Oorja noted that these were mostly 3 HP/3.2 kW solar pumps, each providing irrigation water to 15-30 farmers in Bahraich district, UP, and Bongaigaon district, Assam.

Education and skill training

Unskilled or semi-skilled men and women are hired from nearby villages and are trained to handle day-to-day pump operations, which include disbursing water, recording water usage, collecting cash payment, and driving water sales. Oorja also hires a solar technician in each district to attend to repairs and maintenance and

assist with customer service.

Additionally, Oorja also creates temporary employment opportunities in these areas during the installation process. It hires 5-6 people from surrounding villages for electrical wiring purposes, civil works, and fabrication.

Renewable energy projects are also providing a bump in the income of rural households. Farmers and landowners who have integrated renewable energy production into their value chains have not only

increased their income but also have diversified and stabilized it. This applies to the entire village economy.

The Mlinda Foundation, a non-governmental organization that focuses on rural electrification through the use of solar mini-grids, has also seen the social and economic benefits of their projects in these areas.

Its assessment has shown that there was a 23% increase in household incomes, a 7.3% rise in GDP per capita, and a 28% boost in village enterprise revenue since the deployment of its projects.

“We have a 50-village mini-grid project going on in remote villages in Jharkhand that is developing local economies, providing jobs, reducing economic migration, and driving economies to a low carbon economy,” a representative from Mlinda told Mercom.

The organization said these projects have directly benefitted village microenterprises by providing them with reliable and accessible electricity throughout the day so they can function longer. Because of these projects and many other factors, the overall economic health of the villages rose.



Ancillary Benefits

Renewable energy projects are also helping drive new skill development, which is vital for economic growth in these rural settlements. Most people in these areas rely on jobs and skills that involve a significant amount of manual intervention and labor. This tends to be inefficient and negates any potential for growth.

The SELCO Foundation told Mercom that bringing in decentralized and sustainable energy, combined with appropriate technology and financing, can enable, and in some cases, revive livelihood opportunities in villages.

Having a reliable source of energy like solar can also support jobs in other sectors within the community that relies on energy, such as agriculture, blacksmithing, pottery, weaving, carpentry, among others, the sustainable energy promoter said.

“Preeti Joshi, an entrepreneur from Haligal, Karnataka, who started a small catering business after losing her husband, is now the only flour milling

and roti entrepreneur in her entire town. She adopted the solar-powered roti rolling machine, which not only increased her productivity but also allowed her to focus on diversifying her business,” the SELCO foundation said.

The integration of solar devices like these into value-chains is bringing about innovation in practices and products in rural areas, which are driving development.

This is also an example of empowerment and capacity building. Newer technologies necessitate training locals on the operation and maintenance of these tools effectively.

In most cases, training also focuses on capacity building.

Companies also talked about the initiatives they have taken to promote rural development. They included drives for preventive health care and sanitation, education, environmental sustainability, women’s empowerment, safe drinking water, farmer’s awareness, and agricultural training programs.

The Azure spokesperson said it had taken steps to improve housing and sanitation facilities in these remote settlements by constructing low-cost housing and toilet facilities. It has also contributed toward safer drinking water by installing reverse

About 10-15% of solar project capital expenses and around 70-80% of operational costs are spent toward land leases and employment of locals



osmosis (RO) water purification systems. They have also conducted programs to promote education and skill development, including ones for special education and employment, enhancing vocational skills among children, women, and the elderly.

The company added that its skill development sessions in Gujarat included tailoring, mobile repair, and motorcycle repair programs for over 1,000 participants. It has also supplied desks, projectors, and computers to schools across five states, benefitting over 5,000 students.

These indirect benefits are a result of the presence of these companies in rural areas for renewable energy project development in the first place. These villages would otherwise receive little to no such aids as government programs can often fail to reach them.

Oorja said it has focused on conducting farmer and community meetings to spread awareness about the benefits of solar irrigations and crop rotation. It added that before its intervention, farmers used diesel-powered motor pumps and practiced only one or two growing seasons a year.

It also educated farmers about how much water is needed for each crop and how to plan their irrigation requirements, allowing them to maximize their income generation potential from farming.

In rural areas in Assam, Oorja said it has teamed up with grassroots level NGO, SeSTA, that plays an active role in educating farmers to grow different varieties of crops. They also assist farmers in purchasing seeds and other agriculture equipment at the best price during the sowing and harvesting seasons.

The company plans to introduce a cold storage service in these



settlements, which will help farmers extend the shelf life of their produce, reuse food waste, and get higher prices for their produce in the market.

Path forward

All of these are by-products of renewable energy project development in rural areas. Their primary benefit remains their ability to provide these economies with affordable, reliable, and environmentally sustainable energy.

Unlike coal, gas, and even wind energy projects, distributed solar projects are highly flexible and can be adapted or customized to suit individual needs. They can be installed

almost anywhere in any size and the need for land, and comprehensive infrastructure does not hinder their development as much as in the case of other energy sources.

Mercom recently reported that corporate social responsibility (CSR) funds by companies can be an effective tool for solar expansion and that in India, this expenditure has been on the rise. These funds, when used the right way, can bring about social and economic change in rural economies. A recent example of CSR would be the tender issued by BHEL to set up 122 solar-powered smart class facilities in government high schools of Yadgir district of Karnataka as part of its CSR.

“Solar projects are providing much needed economic stimulus to the country, especially in rural areas, in addition to clean power. The right government policies and financial support to the solar industry can translate to real income and jobs, which is sorely needed,” said Raj Prabhu, CEO of Mercom Capital Group. ☐

Rural electrification through solar mini-grids has shown a 23% rise in household incomes, a 7.3% rise in GDP per capita, and a 28% boost in village enterprise revenue

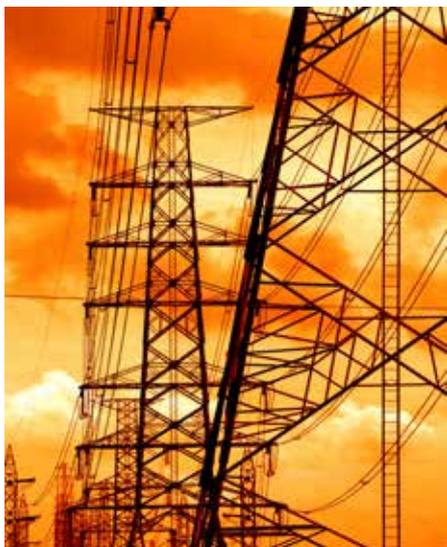
Industry News and Policy Briefs

In its latest load generation balance report, the **Central Energy Authority** 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 peak surplus of 8.4% (15.9 GW).



The Parliamentary Standing Committee on Energy expressed its concerns about the performance of the MNRE and the country's ability to achieve its **100 GW** solar target by 2022.

Tata Power Company Limited was awarded the Letter of Intent (LoI) by the **Odisha Electricity Regulatory Commission** for the distribution and supply of electricity in Odisha's five circles that constitute the Central Electricity Supply of Odisha.



The Asian Infrastructure Investment Bank, a multilateral development bank, announced that its board of directors had approved a **\$65 million** (₹912,896) loan for a 250 MW solar power project in Jodhpur.

ŠKODA AUTO Volkswagen India Private Limited, a Czech Republic-based automobile company, announced that it had commissioned **8.5 MW** of solar rooftop systems at its manufacturing plant in Chakan, Pune.

In the automobiles segment, **Tata Motors** partnered with **Prakriti E-Mobility Limited**, an electric vehicle-based taxi service, to deploy 500 of its Tigor EVs in New Delhi. The first batch, consisting of 160 Tigor EVs, is expected to be operational by January 2020.

India has set up **186 waste-to-energy projects** for generation of **biogas**, bio-CNG power with a cumulative capacity of **317 MW** to recover energy from waste and effluent generated from industries, so far. Out of the 186 projects, five projects are based on municipality solid waste, thus generating a total capacity of 66.5 MW of energy.



The Qatar Investment Authority signed an agreement to invest ₹32 billion (-\$450 million) for a 25.1% stake in **Adani Electricity Mumbai Limited**. As part of the transaction, both the entities have agreed to ensure that over 30% of the electricity supplied by AEML will be sourced from solar and wind power projects by the year 2023.

Independent power producer **ReNew Power Private Limited** announced a joint venture partnership with **South Korea's GS E&C** for the construction of a 300 MW solar power project in Rajasthan. The project is part of the Solar Energy Corporation of India's (SECI) tranche-IV auctions, which were concluded earlier this year.



The Bank of America announced its plans to lend **₹3.56 billion** (-\$50 million) to **Fourth Partner Energy**, a distributed solar energy management company. The amount is a local currency revolving credit facility.

Mercom also reported that in the first nine months (9M) of 2019, India imported solar cells and modules worth **\$1.6 billion** (₹115.7 billion), a drop of around **22%** compared to 9M 2018. However, exports in 9M 2019 amounted to approximately **\$135 million** (-\$9.5 billion), an increase of about **46%**.



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The Ministry of Power's payment ratification and analysis portal PRAAPTI showed that outstanding dues to power generators from distribution companies at the end of October 2019 stood at **₹844.45 billion** (-\$11.83 billion), up by **₹297.76 billion** (-\$4.17 billion) or **54%** from the same period last year.



The **Gujarat Electricity Regulatory Commission** came out with a draft notification regarding the second set of amendments for its **net metering** regulations for grid-connected rooftop solar systems. As per the new amendment, the distribution licensee is to provide the net metering facilities to consumers, provided that the cumulative capacity to be allowed at a distribution transformer does not exceed the capacity of the distribution transformer.



To promote the adoption of e-mobility in the national capital, the **Energy Efficiency Services Limited** said it signed an MoU with the **South Delhi Municipal Corporation** to establish the infrastructure for electric vehicles in the SDMC area for ten years.

The **MNRE** also amended an order related to the **dispute resolution mechanism** to resolve disputes between solar, wind developers, and the Solar Energy Corporation of India (SECI) or the National Thermal Power Corporation (NTPC). The developers had requested the MNRE to set up a dispute resolution mechanism to solve the issues that are both within and outside the scope of contractual agreements. In June 2019, MNRE had issued an order to establish a system to resolve disputes between solar and wind energy developers.

The **Karnataka** Renewable Energy Systems Manufacturers Association protested vehemently against the order passed by the Karnataka Electricity Regulatory Commission on rooftop solar. On December 9, 2019, the state had issued an order as an attempt to accelerate capacity additions in the rooftop solar segment. But the order hasn't gone down well with the rooftop solar installers.

In a significant development, the **Delhi government** approved a policy for **electric vehicles** with an intent to make the city "the EV capital of India." The policy mainly focuses on electric two-wheelers, shared transport vehicles such as three-wheelers and buses, and goods carriers or freight vehicles. According to the policy, the government is targeting 500,000 new EV registrations in Delhi. These EVs are estimated to cut down approximately **₹60 billion** (-\$842.08 million) in oil and liquid gas imports and 4.8 million tons of carbon dioxide emissions.



The month of December also saw **Rajasthan** releasing its **Solar Energy Policy, 2019**, which aims to achieve a target of 30 GW of solar power by the financial year 2024-25. Of this, utility or grid-scale solar parks will account for 24 GW, distributed generation is expected to account for 4 GW, the solar rooftop will total 1 GW, and solar pumps will make up the remaining 1 GW. The state also unveiled its Wind and Hybrid Energy Policy, 2019, which aims to achieve 2 GW of wind power capacity to fulfill the renewable purchase obligation (RPO) by FY 2024-25 and 3.5 GW of hybrid power projects by FY 2024-25.

The **Chhattisgarh State Electricity Regulatory Commission** specified the terms and conditions of **tariffs for renewable energy** sources for the sale of power to distribution licensees. The new regulations state that the control or review period under these regulations will be three years, with the first year commencing from April 1, 2019. The commission added that it would also determine the generic preferential tariff in the case of small hydro, solar PV, and co-generation power projects at the beginning of each year of the control period.



Validity of RECs Extended to March 31, 2020

The trading volume of RECs has declined in the past few months. To bridge the demand-supply gap, the government has come up with a new plan to extend the validity of RECs that were soon going to expire

By : Rakesh Ranjan Parashar



RECs that have expired or are due to expire between November 1, 2019, and March 31, 2020, will now remain valid up to March 31, 2020. This move will provide relief to renewable energy generators of both solar and non-solar projects, which

are a part of the REC mechanism.

The Commission stated that the validity of the 9,514 RECs (4,960 solar RECs and 4,960 non-solar RECs) issued before April 1, 2017, which expired in November 2019, needs to be extended.

Renewable Energy Certificates (REC) play a crucial role in meeting the renewable purchase obligation (RPO) targets set by the government. The goal of RECs is to fill the gap between the renewable generation and RPO requirements.

Recently, the Central Electricity Regulatory Commission (CERC) decided to extend the validity of solar and non-solar RECs, which have or are due to expire shortly.

The Commission observed that the

CERC: RECs expired between 01.11.2019-30.11.2019

No. of RECs expired in the month of	No. of Solar RECs expired between 01.11.2019 - 30.11.2019	No. of Non-Solar RECs expired between 01.11.2019 - 30.11.2019	Total RECs (Solar+Non-Solar) expired
Nov-19	4,960	4,554	9,514
TOTAL	4,960	4,554	9,514

Source - CERC

Mercom India Research

The Commission further noted that 216,849 RECs issued before April 1, 2017, have expired or are due to expire in the next four months. This includes 29,808 solar RECs and 1,87,041 non-solar RECs. The Commission observed that there is a need to extend the validity of these RECs, which are due to expire in the next four months up to March 31, 2020.

to expire between October 31, 2018, and March 31, 2019. In October 2017, the Supreme Court had extended the validity of solar and non-solar RECs that were due to expire between April 1, 2017, and March 31, 2018, up to March 31, 2018.

There was a significant decline in the number of solar and non-solar RECs that were traded in November 2019

price remained unchanged on both the trading platforms. Since March 2019, the REC inventory has been declining steeply, resulting in the prices spiking. In June 2019, Mercom reported that India's REC inventory was almost exhausted.

Various state distribution licensees off late have been complaining of not being able to meet their renewable purchase obligations (RPO) because of the shortage of REC supplies and an increase in prices. Recently, the Joint Electricity Regulatory Commission (JERC) in its order directed Dadra and Nagar Haveli Power Distribution Corporation Limited (DNHPDCL) and the electricity department of Daman & Diu to purchase RECs to meet its RPO. In its reply, the DNHPDCL commented that the availability of solar RECs is hardly 21% against the market demand, and the settlement ratio is 13%, and solar RECs are being traded nearly 140% above the CERC notified floor price of ₹1,000 (\$14.09).

Since 2017, there has been a significant increase in the purchase of RECs due to stricter norms regarding Renewable Purchase Obligation compliance. Before that, entities were not actively buying RECs. As these entities started buying late, there is now a demand and supply gap that does not appear to be subsiding. 

CERC: RECs Likely to Expire Between 01.12.2019-31.03.2020

No. of RECs that expire in the month of	No. of Solar RECs likely to expire between 01.12.2019 - 31.03.2020	No. of Non-Solar RECs likely to expire between 01.12.2019 - 31.03.2020	No. of Non-Solar RECs likely to expire between 01.12.2019 - 31.03.2020
Dec-19	4,307	88,921	93,228
Jan-20	328	29,521	29,849
Feb-20	24,707	48,383	73,090
Mar-20	466	20,216	20,682
TOTAL	29,808	1,87,041	2,16,849

Source - CERC

Mercom India Research

Earlier, the Commission in its order dated April 30, 2019, had extended the validity of RECs, which were likely to expire between April 1, 2019, and October 31, 2019, up to December 31, 2019. The Commission had observed that 1,21,888 RECs, which had been issued before April 1, 2017, were due to expire within the next six months, and it included 8,307 solar RECs and

There was a significant decline in solar and non-solar RECs traded in November 2019

113,581 non-solar RECs. The decision provided the sellers with eight REC trading sessions to close the entire inventory.

Like this order, back in October 2018, the central Commission had issued an order extending the validity of 183,999 RECs that were issued before April 1, 2017, and were due

compared with the preceding month. A total of 54,453 solar RECs were traded on the Indian Energy Exchange (IEX) and Power Exchange India Limited (PXIL) together. These RECs were traded at ₹2,400 (-\$33.9)/REC, and the



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New Guidelines for Decentralized Solar

In the new guidelines, the MNRE has said that now, state governments will enable time-bound clearances of solar projects through a single-window clearance system

By : Anjana Parikh



India is a land of diversity, and each state has its own set of challenges to overcome when it comes to supplying electricity. Grid connectivity has long been an issue in rural areas of the country owing to a lack of infrastructure apart from the difficult terrain in some regions.

In such a scenario, turning to rooftop, off-grid and decentralized solar solutions are both feasible and practical.

The Ministry of New and Renewable Energy (MNRE) is targeting the installation of 118 MW of solar power capacity by March 31, 2020, through off-grid solar applications under Phase-III of Decentralized Solar PV Applications Program.

In conjunction with it, the MNRE recently issued guidelines to develop decentralized solar power projects in the country.

According to the MNRE, “The

draft guidelines were placed on the ministry’s website for stakeholder consultation. The suggestions received from different stakeholders have been suitably incorporated, and final guidelines are being issued herewith to facilitate the development of decentralized solar power projects in the country.”

The new guidelines will apply to distribution companies (DISCOMs) procuring solar power from



decentralized solar power projects of capacity more than 2 MW connected to rural distribution sub-stations of 33/11 kV, 66/11 kV, and 110/11 kV.

Further, the new MNRE guidelines state that the bidder should submit a non-refundable processing fee of ₹10,000 (-\$141.30)/MW or part of the capacity applied along with the response of Request for Selection (RfS). The net-worth of the bidders should not be less than 20% of the estimated cost of the project. In the case of MSME and start-ups, the provisions as per the government policies will be applicable.

According to the draft proposal of the guidelines issued in September 2019, the net-worth of the bidders should not be less than ₹10 million (-\$1.41 million)/MW.

In September 2019, the MNRE called for comments, suggestions, and opinions from stakeholders before October 11, 2019. The draft proposal

Bidders need to deposit a non-refundable processing fee of ₹10,000/MW with the RfS

stated that the DISCOMs will provide connectivity at the substation and will have to ensure ‘must-run’ status to the solar projects by keeping the feeders ‘On’ during the sunshine hours of the day.

As per the final guidelines, DISCOMs may also allow power trading agencies to act as intermediate procurers. These agencies will then float bids for setting up power projects and sell the power to DISCOMs or open access customers

on mutually agreed trading margin not exceeding ₹0.07 (-\$0.001)/ kWh.

Also, the solar power generator must obtain necessary clearances as required for setting up the solar power project. However, the state government will facilitate time-bound clearances through a single-window clearance system for such projects.

The generator will provide the performance bank guarantee of ₹500,000 (-\$7,065)/MW within 30 days from the date of issue of Letter of Award. In cases where the DISCOM provides land and evacuation facilities, the distribution company may prescribe a higher PBG amount.

Besides numerous unelectrified households, the new guidelines for developing decentralized solar projects will also help in ensuring regular energy access to parts of the country that are still subject to frequent and prolonged power cuts. 



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Top Solar and Wind

2019 *Stories*



2019 was a mixed bag for the Indian solar industry with several positive and negative developments that interfered with the momentum of solar installations

By : Anjana Parikh

The Indian solar industry did not fare as well as expected in 2019. The year saw some state-level policy upheavals, auction delays and cancellations, and a sluggish economy, among a range of other problems that thwarted the pace of solar installations. As the year comes to an end, Mercom looks back at the developments that got the most attention from our readers worldwide. Here are some of the top stories from 2019.

35 GW of solar Installed, 65 GW More to go for India to Reach its 100 GW Solar Target

Total solar installations in India have crossed the 35 GW mark, according to Mercom's India Solar Project Tracker. The country has a goal of reaching 100 GW of solar capacity by the end of 2022.

Out of the 35 GW, -31 GW of large-scale solar projects were in operation as of November 2019, while 4.1 GW of rooftop solar installations were recorded as of September 2019. India needs to install at a rate of over 20 GW a year to reach 65 GW of solar capacity in the next three years.

Accurate Forecasting of Renewable Generation a Tough Task for Solar & Wind Developers

Renewable energy generation, especially from wind and solar power, is variable, due to its dependency on the weather. The most critical scheduling input comes from weather forecasting agencies. Without accurate weather prediction, it is impossible for a renewable generator to submit accurate schedules. With the seasonal variations,

the generation frequency of renewables changes drastically in a shorter period, which the grid operators do not have the visibility into since until recently, the wind and solar generators were exempt from any forecasting and scheduling responsibilities.

India's E-Commerce Industry: Untapped Market for Rooftop Solar

The commercial and industrial (C&I) segment is growing at a faster pace due to attractive solar tariffs as compared to retail power prices. However, even

The concept of Corporate Social Responsibility (CSR) that was introduced through the Companies Act 2013 puts the onus on companies to formulate policies that will help uplift the community. As per the Companies Act, companies with a net worth of ₹5 billion (-\$70.5 million) or more, or a turnover of at least ₹10 billion (-\$141 million), or a net profit of a minimum ₹50 million (-\$705,000), have to spend 2% of their average three-year annual net profit towards CSR activities in a given financial year.



this segment has slowed down this year as installers have struggled to obtain financing. The 1 MW net metering cap, has restricted rooftop growth. While educational institutions are an attractive rooftop solar market and corporate social responsibility funds can be tapped for its growth, the e-commerce sector can also be an attractive potential market for rooftop solar.

Corporate Social Responsibility Funds Can be an Effective Tool for Solar Expansion

Even though the policy has been in place for years, compliance has been an issue, and the government is trying to enforce the CSR compliance aggressively.

Lack of Insurance for Solar Modules Holding Back India-Made Modules

Lack of insurance products for solar PV modules in India is a problem that needs to be addressed. Indian solar module manufacturers often point out that the Chinese government has made it a point to provide module

insurance, thereby making it more attractive to solar PV project developers. Insurance generally backs up the warranty that's extended by the manufacturers to their clients. The warranties generally are 10-year product warranty and 25-year performance warranty. The insurance companies usually inspect the manufacturing unit before extending the insurance offer for projects of 2 MW and above. They also offer export insurance. However, not all manufacturers have insurance.

Harsh Penalties for Deviation Settlement is Playing Havoc with Solar, Wind Projects

Due to the intermittent nature of wind and solar energy, forecasting and scheduling are essential for stable and efficient grid management. Over the past couple of years, central and several state electricity regulatory commissions have issued forecasting guidelines for the industry. These guidelines provide a methodology in case there is a deviation in the generation, and developers are required to pay penalties due to these deviations. This process is called deviation settlement mechanism (DSM) through which developers compensate electricity grid infrastructure providers for errors in forecasting and scheduling of power generated by their projects.

Land is Still the Biggest Impediment for Large-Scale Solar Development

Even with the headway made in the solar sector, large-scale project development is not easy. After hearing from solar developers, Mercom found that land acquisition, transmission, and successfully acquiring approvals remain a challenge to commission large-scale projects on time. Land acquisition is one of the single biggest challenges, and even the most experienced developers seem to have problems with it. Developers mentioned that solar park projects, where the government provides land, are also becoming increasingly competitive, forcing them to look at other state tenders.



However, even the government is running into difficulties with respect to acquiring land and transmission infrastructure.

India's NBFC Crisis Exacerbating Financing Challenges for Utility-Scale Solar Projects

Since September 2018, India's Non-Bank Financial Companies (NBFC) have been in a crisis after Infrastructure Leasing, and Financial Services (IL&FS) admitted to defaulting on several payments to its creditors, consequently leading to a liquidity crisis. Broadly, the cause of the problem was how NBFCs had borrowed money from banks and investors to finance long term infrastructure projects stalled due to several reasons. This has essentially led to the drying up of funds in such financial institutions, making them unable to extend credit to infrastructure, housing, and retail sectors.

Serious Policy Push Needed to Get India's Rooftop Solar Market to the Next Level

New policy ideas and implementation by central and state governments is the need of the hour

as we are beginning to see some slowdown. Most of the growth in the rooftop segment is currently coming from C&I consumers, but residential rooftop has lagged due to financing challenges and unfriendly net metering policies in states where the policy exists mostly in name only. Net metering has always been seen as a threat by DISCOMs and has been a drag on the rooftop sector. Approval processes can be lengthy, which can last anywhere between three to six months, discouraging most consumers.

Small Rooftop Solar Companies in India Struggle to Find Viable Financing Options

Financing residential rooftop for small businesses has been extremely challenging. Compared to the United States or Europe, where every company and individual has a credit risk profile, India lacks such a system making it extremely risky to lend. A new system or program is needed to finance such consumers and expand the reach of rooftop solar. The rooftop segment is still relatively small and new, and banks have yet to get comfortable lending to these projects. ©

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Rajasthan Targets 30 GW of Solar by 2025

One of the sunniest states in India, Rajasthan, has so far not lived up to its potential for solar installations. However, the state recently announced its new and ambitious solar policy that could change the course

By : Rakesh Ranjan Parashar



Rajasthan is blessed with attractive solar insolation levels, but it has not translated when it comes to solar installations. The state has been reluctant to support solar beyond its RPO targets and most of the projects installed in Rajasthan are through central government policies.

In its Solar Energy Policy, 2019, the state now aims to achieve a target of 30 GW of solar power by financial year (FY) 2024-25. Of this, utility or grid-scale solar parks will account for 24 GW, distributed generation is expected to account for 4 GW, the solar rooftop will total 1 GW, and solar pumps will make up the remaining 1 GW.



The state has also unveiled its Wind and Hybrid Energy Policy, 2019, which aims to achieve 2 GW of wind power capacity to fulfill the renewable purchase obligation (RPO) by FY 2024-25 and 3.5 GW of hybrid power projects by FY 2024-25.

Solar Policy

The state government is planning to develop 33 district headquarters as ‘Green Energy Cities’ in the next five years by installing 300 MW of solar rooftop systems.

Net metering will be allowed for rooftop solar of up to 50% of the capacity of the distribution transformer of the area.

According to the new policy, solar rooftop systems can also be set up under the gross metering regulations as per the guidelines prescribed by the state or central government. Solar rooftop systems up to 1 MW capacity will be allowed under this.

The state will promote setting up of decentralized solar power projects with a minimum capacity of 0.5 MW and a maximum capacity of 3 MW in the premises and vicinity of 33 kV grid sub-stations for the sale of power to DISCOMs.

The state will also promote stand-alone solar systems to provide electricity to households in remote villages and solar PV pumps for pressure irrigation systems.

The policy also talks about encouraging solar projects for captive use under various scenarios and the exemption of transmission and wheeling charges and electricity duty.

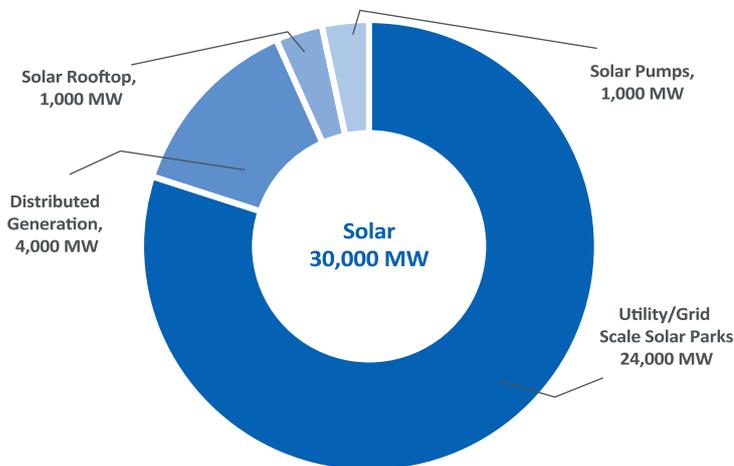
Rajasthan Solar Park Development Company Ltd., a special purpose vehicle of the RERC, has been established for the development of infrastructure and management of solar parks. The RERC will develop solar parks in Rajasthan on its own or through any other SPV, which may be created as required.

The state is also keen to support solar projects with storage systems like battery storage, pumped hydro storage, or any other grid-interactive storage system. The DISCOMs plan to procure up to 5% of their RPO target from renewable energy projects with storage systems at a tariff discovered through competitive bidding in addition to the RPO target.

The state will give extra attention to the development of solar parks by the private sector. The solar power park developer will be allowed to acquire agricultural land from the titleholder for developing solar parks above the ceiling limit per the provisions of Rajasthan imposition of ceiling on Agriculture Holding Act, 1973.

The state is also planning to support electric vehicle charging in the state. The charging infrastructure will be developed as per the guidelines and

Rajasthan: Solar Energy Policy 2019 - Targets Up To FY 2024-25



Data from RRECL

Mercom India Research

standards issued by the Ministry of Power (MoP) and the Central Electricity Authority. The EV charging stations may be established by the state or central public sector undertakings, private operators, or under the public-private partnership (PPP) models.

The state will also promote solar power projects on private land. Developers will be permitted to set up solar power projects on private agriculture land without the requirement of land conversion per the provisions of the Rajasthan Tenancy Act 1955 and the Rajasthan Land Revenue Act 1956.

The government aims to encourage manufacturing facilities for solar equipment in Rajasthan, leading to the development of the solar energy ecosystem and employment generation.

It is interesting to note the setting up of the Rajasthan Renewable Energy Development Fund. In the future, solar projects set up in Rajasthan for sale of power to entities other than DISCOMs of Rajasthan are mandated to contribute to this fund. Projects commissioned by March 31, 2024, have to contribute ₹200,000 (\$2,814)/MW per year. The contribution amount

increases by ₹100,000 (\$1,407)/MW per year, every year after that.

Wind Policy

The state is striving to achieve 2 GW of wind power capacity to fulfill renewable purchase obligation (RPO) of state DISCOMs as determined by the RERC up to 2024-25. In addition to this, the state is planning to install 2 GW of wind power projects for captive consumption.

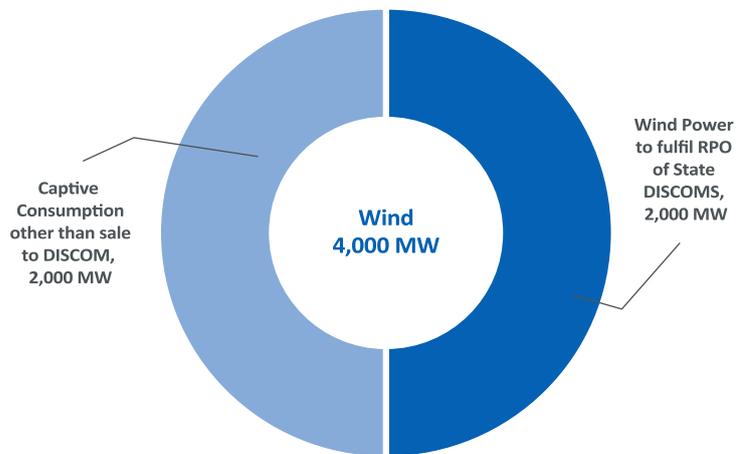
The state will promote wind power

projects in the state for the sale of power to the Rajasthan DISCOMs through competitive bidding to achieve its RPO target.

The state will also facilitate wind power projects for captive use or third-party sale for consumers within the state. The maximum permissible capacity for captive use will be limited to the contract demand of the consumer.

The state will also allow setting up wind power projects of any capacity

Rajasthan: Wind Energy Policy 2019 - Targets Up To FY 2024-25



Data from RRECL

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for captive or third-party sale outside the state or through power exchange.

The state will encourage the repowering of existing wind turbines that have completed ten years in operation. In case of power being procured by state DISCOMs through existing PPA, the power generated corresponding to average of last three year’s generation before repowering would continue to be procured on the terms of PPA and the remaining additional generation may be purchased by DISCOMs at a tariff discovered through competitive bidding in the state at the time of commissioning of the repowering project.

The government land will be allotted to the wind power projects as per the provisions of Rajasthan Land Revenue Rules, 2007. For setting up of wind power projects, the maximum area which may be allotted to the developer will be 3 Hectare/MW.

Hybrid Policy

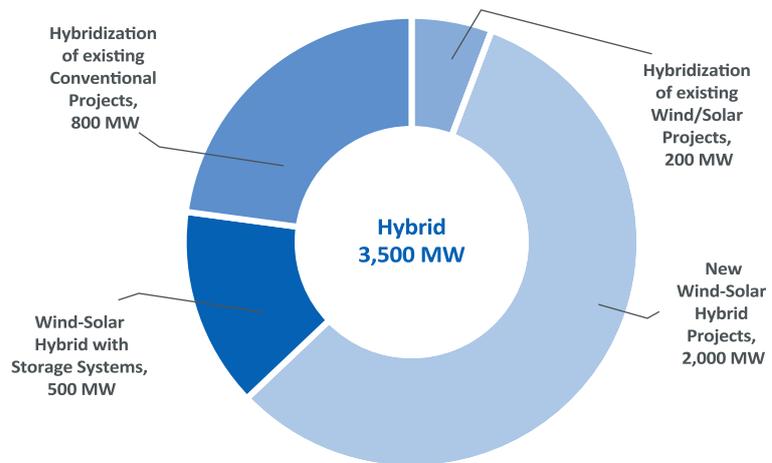
The policy aims to achieve a target of 3.5 GW of projects by the financial year 2024-25, out of which hybridization of existing wind or solar projects will account for 200 MW, new wind-solar hybrid projects will account for 2 GW, wind-solar hybrid with storage systems will account for 500 MW, and hybridization of existing conventional projects will account for 800 MW.

The state will promote setting up of wind-solar hybrid power projects for optimal and efficient utilization of infrastructure and land and achieve better grid stability. The maximum permissible capacity of an individual project for captive use within the state will be limited to the contract demand of the consumer.

The state will promote wind-solar hybrid power projects with storage systems to reduce the variability of output of renewable power into the grid and to ensure the availability of firm power for a particular period.

The state will also provide support to the hybridization of existing conventional thermal power projects by allowing the setting up of renewable power projects by the conventional power generators for using its thermal

Rajasthan: Hybrid Power Policy 2019 - Targets Up To FY 2024-25



Data from RRECL

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power or renewable power to meet its scheduled generation from the specific thermal generating station.

For setting up of wind-solar hybrid projects based on different technologies, the maximum land area which can be allotted is as under:

- 3 hectare/MW for SPV on crystalline technology
- 3.5 hectare/MW for crystalline technology with tracker
- 3.5 hectare/MW for SPV on thin-film/amorphous technology with or without a tracker

For the wind-solar hybrid power projects with a storage system, additional land will be allotted as per the rules prescribed by the state’s revenue department.

Rajasthan accounts for 4.4 GW of large-scale solar projects in-operation, while nearly 1.9 GW of projects are under development pipeline as of November 2019. According to the MNRE, Rajasthan has 4.3 GW of wind power capacity as of Oct 2019. Thermal is still the largest source of power generation in Rajasthan. ☺



Market Leaders of 1H 2019 Revealed

There was a whole new set of market leaders in the solar sector in 1H 2019 with a diverse group of suppliers from both India and other regions of the world

By : Priya Sanjay

Solar installation activity in the first half (1H) of the calendar year 2019 was relatively slow, but India was still the third largest solar market in the world behind China and the U.S. The market leaderboard for 1H 2019 has completely changed with a new market leader in almost every category we track, showing a very dynamic market.

India's solar installations recorded in 1H 2019 totaled 3.2 GW, and the country's cumulative installed solar capacity has exceeded 31.5 GW. India's pipeline of utility-scale projects under development stood at approximately 22.3 GW at the end of 1H 2019, with another 34.4 GW of tenders pending auction.

The rankings computed by Mercom India Research for its newly released India Solar Market Leaderboard 1H 2019 reveals the industry's leaders

as well as their market share and shipment rankings across the Indian solar supply chain.

"The India solar market leaderboard has a completely new set of market leaders in almost every category in the first half of 2019. The market is extremely dynamic with a lot of fluctuations and no clear standouts, leaving it open for new leaders to

emerge in the future," said Raj Prabhu, CEO of Mercom Capital Group.

Utility-scale Solar

Large-scale project development accounts for 88% of cumulative solar installations with 27.7 GW in India and 83% of solar capacity additions in 1H 2019 with 2,716 MW.

According to the report, the top

1H 2019 India Solar Market Share Leaders

Utility-scale Project Developer	Azure Power
Rooftop Installer	Azure Power
Inverter Supplier	TMEIC
Solar Module Supplier	Trina Solar
Solar Mounting Structure Supplier	Ganges Internationale
Solar Trackers	Scorpius Trackers

Mercom's India Solar Market Leaderboard 1H 2019

10 large-scale developers accounted for 84% market share in 1H 2019, while others made up the remaining 16%.

Azure Power was the top utility-scale developer in 1H 2019, with a market share of 15.5%. Azure Power installed over 400 MW of large-scale solar projects during 1H 2019. ReNew Power was second in terms of large-scale projects installed in 1H in India with a market share of 12.9%. Sprng Energy and Tata Power came third with a 9.2% market share each.

ACME Solar and Adani were the top two utility-scale solar power developers cumulatively as of June 2019.

Five companies had a cumulative project development pipeline of over 1.5 GW apiece at the end of June 2019. ACME Solar had the largest project pipeline as of June 2019.

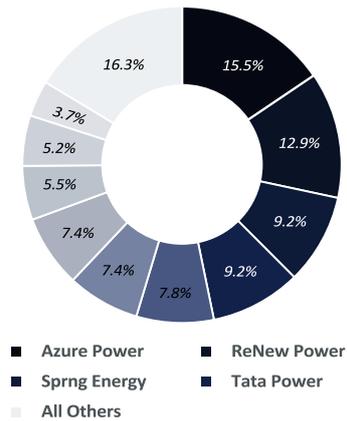
Rooftop Solar

The Ministry of New and Renewable Energy has set a target of 175 GW of renewable energy capacity by the end

of December 2022, of which 100 GW is targeted for solar projects with 40 GW expected to come from solar rooftop installations.

Rooftop solar installations accounted for 17% of total solar installations in 1H 2019 with 555 MW.

Leading Utility-scale Developers in India, 1H 2019



Mercom's India Solar Market Leaderboard 1H 2019

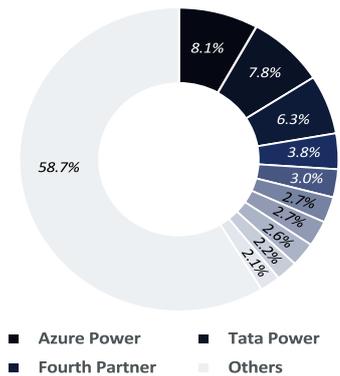
Rooftop installations grew by 58% year-over-year (YoY) with cumulative installations totaling nearly 3,816 MW as of June 2019.

In 1H 2019, rooftop solar installations fell by 45% compared to 1H 2018. General elections, regulatory headwinds in several states, and a lack of financing were some of the reasons for the slowdown in the rooftop market in 1H 2019. Several rooftop installers have shifted to group captive projects due to its attractiveness.

In 1H 2019, the top 10 rooftop solar installers represented 41% of market share, leaving all other rooftop developers with 59%.

Tata Power Solar had the largest cumulative rooftop portfolio, and Azure Power emerged as the top rooftop solar installer in 1H 2019.

Leading Rooftop Solar Installers in India, 1H 2019



Mercom's India Solar Market Leaderboard 1H 2019

Inverter Suppliers

TMEIC emerged as the top supplier of solar inverters to the Indian market 1H 2019 with a market share of approximately 20%, while Sungrow came in second with a market share of about 16%, followed by ABB at 15%.

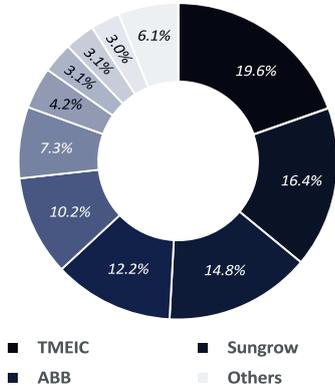
Huawei and TBEA Energy rounded off the top five spots in this segment. The top three suppliers accounted for nearly 3 GW of solar inverter shipments to the Indian market. Together, the top five companies accounted for nearly 73% of the total market share.

Large-scale solar projects have been using central inverters because of



lower costs, maturity, and reliability of the technology. However, the share of string inverter supply has been

Leading Solar Inverters Suppliers in India, 1H 2019



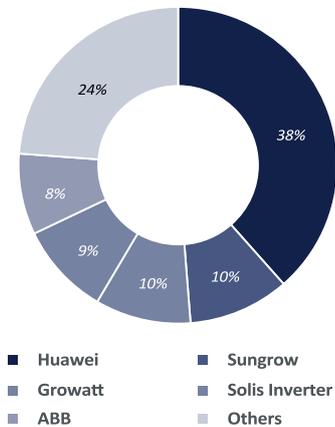
Mercom's India Solar Market Leaderboard 1H 2019

increasing across the country as they are more flexible in terms of size and usage. With approximately 20% of solar installation growth forecasted next year in India, most of the inverter suppliers are expected to fare much better in 2020.

String Inverters

In 1H 2019, Huawei was the leading supplier of string inverters with a market share of 38%, followed by Sungrow with a market share of 10%. Growatt came in third, followed by Solis and ABB, which rounded off the Top 5 list for the first half of 2019.

Leading Solar String Inverters Suppliers in India, 1H 2019



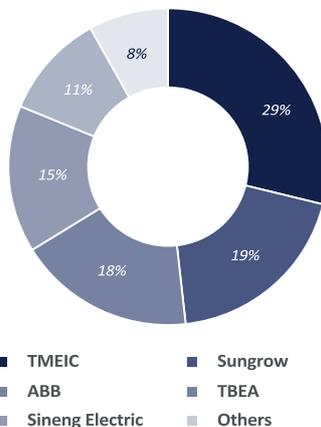
Mercom's India Solar Market Leaderboard 1H 2019



Central Inverters

Among central inverter suppliers, TMEIC led with a market share of 29%, followed by Sungrow with 19%, and ABB with 18%. TBEA and Sineng Electric rounded off the top five solar central inverter suppliers' list for 1H 2019.

Leading Solar Central Inverters Suppliers in India, 1H 2019



Mercom's India Solar Market Leaderboard 1H 2019

There are over 300 utility-scale solar project developers in the country

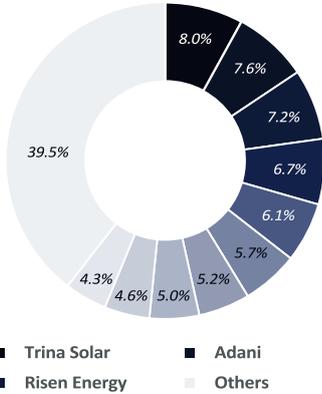
Solar Module Suppliers

India's solar imports declined significantly in the second quarter (Q2) of the calendar year (CY) 2019. China continued to be the largest exporter of solar modules and cells to India, accounting for 71.5% of the import share in Q2 2019. However, with the imposition of 25% safeguard duty by the Indian government on solar imports from China and Malaysia and slowdown in installations, solar imports from China have declined in the past three quarters.

In 1H 2019, the top ten module suppliers acquired 60% of the market share. Trina Solar, Adani, and Risen Energy emerged as the top three

suppliers of solar modules in India in terms of shipments. Together, these

Leading Solar Module Suppliers in India, 1H 2019



Mercom's India Solar Market Leaderboard 1H 2019

three module suppliers accounted for nearly 23% of the market share.

In terms of cumulative shipments, the top three suppliers were Trina Solar, Canadian Solar, and JA Solar.

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.

Solar Trackers and Mounting Structures

In India, most solar large-scale projects do not have trackers. Cost plays a big part in using trackers in India. With most major Indian solar states enacting deviation charges for over or under production, trackers are not on the priority list of many developers in India. Tracker shipments have slowed down in India as developers consider them as an added cost to their project without the return on investment (ROI). Currently, there are over 30 suppliers of solar trackers in the Indian market.

Scorpius Trackers was the top supplier in 1H 2019 with followed by PetaWatts Solar. The top six companies accounted for around 87% of the Indian solar tracker market share by the end of 1H 2019.

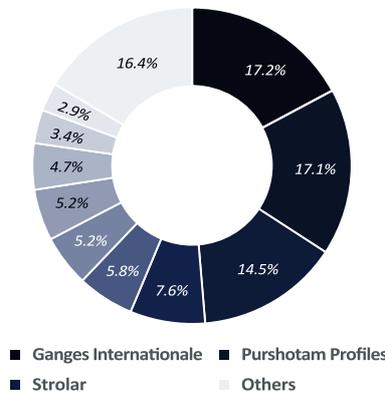
Module mounting structures are the backbone of a solar project. Good

Out of India's 35 GW installed capacity, ~31 GW are large-scale solar projects while over 4 GW were rooftop installations

quality of mounting structures on a ground-mounted or rooftop solar project not only helps maintain the optimum generation; these structures need to withstand the weight of solar panels, high wind speeds, and varying temperatures.

Ganges Internationale, Purshotam Profiles, and Stolar emerged as the top three mounting structure suppliers in the Indian solar market. Together, these three companies supplied about 48.7% of the market demand, while the

Leading Solar Mounting Structure Suppliers in India, 1H 2019



Mercom's India Solar Market Leaderboard 1H 2019

top 10 suppliers commanded nearly 84% of the market share.

Ganges Internationale held the top spot, with over 17% of the market share. The Tamil Nadu-based company has a manufacturing facility of 1 GW with plans to expand it by another 400 MW. As of 2018, the company had installed over 4 GW of mounting structures across the world. Purshotam Profiles was second on the leaderboard, followed by Stolar, which was third in market share in the first half of 2019.

Open Access Solar

Open access solar is an attractive source of power for large consumers as it allows them to procure solar energy at competitive prices from offsite solar projects using the existing transmission and distribution infrastructure.

However, the open access market in India is marred by restrictive policies and a plethora of charges for consumers, which has made the proposition unattractive. Therefore, it is no surprise that the open access solar market still accounts for less than 10% of the total installed solar capacity.

Rays Power Experts and CleanMax Solar were the top open access developers as of 1H 2019. These two companies accounted for 20% of the market share, while the top 10 developers made up for nearly 55% of the market share.

With every passing year, the distance between the 2022 target set by the government and the current installation numbers has narrowed down. However, now we are fast approaching the deadline, but the performance so far has failed to supersede the expectations. ☹️



Major Tender and Auction Announcements in December 2019

This is a list of major tenders and auctions from the month of December 2019. 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 Electricity Corporation of India (SECI) has announced two tenders for **1,200 MW of solar** and **1,200 MW of wind-solar hybrid** projects connected to the interstate transmission system (ISTS). The projects under both the tenders will be developed on a build-own-operate (BOO) basis, and SECI will enter into a power purchase agreement for a period of 25 years based on the terms, conditions, and provision on the request for selection (RfS). The tender for 1.2 GW of solar projects has been floated under tranche VIII of the ISTS program. The second tender for 1,200 MW of wind-solar hybrid projects has been issued under the Tranche III of the ISTS program.

The National Thermal Power Corporation (NTPC) invited bids to develop **923 MW of solar** projects. The tender has been floated under tranche II of the second phase of the central public sector undertaking (CPSU) program, which is a part of the National Solar Mission (NSM). The tender has been announced under the domestic content requirement (DCR) category, which mandates that domestically manufactured solar

cells and modules must be used in the development of the projects.

The NTPC invited bids for **500 MW** of grid-connected solar projects under an engineering, procurement and construction (EPC) package in the state of Maharashtra. The projects under this tender can range anywhere between 100 MW and 500 MW. The tender has been floated under the open category of solar cells and modules. The last date for the submission of bids is January 2, 2020.

The Maharashtra State Electricity Distribution Company Limited (MSEDCL) issued a request for selection (RfS) for the long-term procurement of power from **500 MW** of intra-state grid-connected solar power projects (Phase - V). The MSEDCL has set the ceiling tariff of **₹2.90 (-\$0.041)/kWh** for this tender. To be eligible to take part in the competitive bidding process, applicants must have had a net worth of at least ₹55 million (-\$768,822) and a minimum annual turnover of ₹2.5 million (-\$34,947) in the previous financial year.





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Top Rooftop Solar Tenders

The **New Okhla Industrial Development Authority** (NOIDA) issued a tender for **5 MW** of rooftop solar projects ranging between 500 kW and 5 MW on buildings across the city. Interested bidders must pay an earnest money deposit (EMD) of ₹4.3 million (-\$60,012) to participate in this tender. The tender noted that the last date for the submission of bids would be disclosed on a later date. The project is expected to cost ₹215 million (-\$3 million). The tender stated that the rates quoted by the contractors must be within Noida's maximum allowed levelized tariff of ₹3.91 (-\$0.05)/kW and that any bids that exceed the limit would be rejected. The projects are to be developed under the RESCO model.

The **Central Electronics Limited** (CEL) invited bids for **1.6 MW** of rooftop solar projects to be installed atop various government buildings in Tamil Nadu.

The interested bidders will have to submit an amount of ₹750,000 (-\$10,533) as the earnest money deposit (EMD).

The **Smart Kalyan Dombivli Development Corporation Limited** (SKDCL) issued a Request for Proposal (RfP) for **1.3 MW** of grid-connected rooftop solar systems. The solar systems will be installed on the buildings owned by the Kalyan Dombivli Municipal Corporation (KDMC) in Maharashtra under the RESCO model. The Kalyan-Dombivli Municipal Corporation is one of the 100 smart cities launched under the government's Smart Cities Mission. The corporation has identified 35 prospective locations for the installation of these systems. Rooftop solar systems will be installed at premises of the municipal corporation, government buildings, water treatment plants, sewerage treatment plants, recreational places, and drains of the city.



Major Auctions

In the auction for **500 MW** of solar projects conducted by the **MSEDCL**, Juniper Green Energy Pvt Ltd has emerged as the lowest bidder. **Juniper Green** won 150 MW of solar projects in the auction at a tariff of **₹2.89 (\$0.0407)/kWh**. The remaining 350 MW has been bagged by Maharashtra State Power Generation Company Limited (MSPGCL) at a tariff of

₹2.90 (\$0.0409)/kWh through bucket filling method. It had bid for the entire capacity of 500 MW but has been awarded 350 MW. The MSEDCL had set a ceiling tariff of ₹2.90 (-\$0.0409) kWh in the tender. The tender for this auction was issued in November 2019 for the long-term procurement of power from 500 MW of intra-state solar power project (Phase-IV).

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Shri Narendra Modi

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