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clean energy news and insights

India

SPECIAL EDITION

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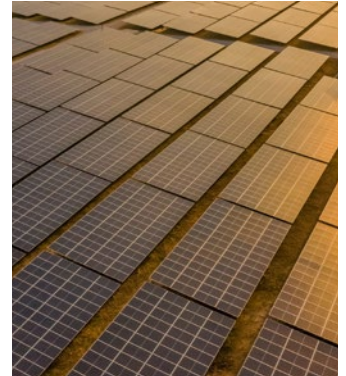


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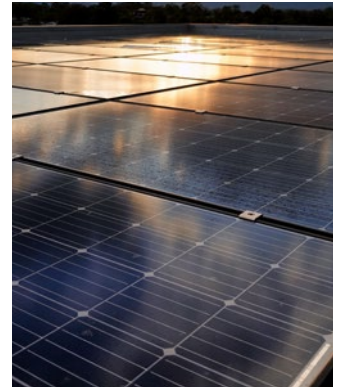


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Foreword



Over the past year, India's renewable energy industry has made remarkable strides. This progress is especially evident in the solar sector, which has experienced a wave of policy changes since our annual Mercom India Renewables Summit last April. These policy shifts reflect a solid commitment to advancing renewable energy, positioning India as a key player in the global energy transition.

The solar sector in India is on the brink of its most significant year yet, with projections estimating over 20 GW of new installations. For the first time since the inception of the National Solar Mission, we are seeing a robust pipeline and clear visibility, thanks to the Ministry of New and Renewable Energy's (MNRE) 'Bidding Trajectory.' This trajectory mandates implementation agencies to tender 50 GW of renewables annually, with 10 GW specifically allocated for wind energy.

The results are already promising. In the fiscal year 2024, most of the Bidding Trajectory targets were met, demonstrating a strong commitment from government agencies. This dedication is crucial as we strive to achieve the ambitious goal set by the Modi administration: installing 500 GW of non-fossil fuel energy by 2030, with 280 GW of that coming from solar power.

Despite the promising framework of tender trajectories, auctions have not kept pace. Only 56% of the tenders have actually been auctioned. While the concept of a tender trajectory is commendable, auctions are the true driving force behind progress. The government must mandate that implementing agencies auction these tenders within a set timeline. This will give the market and the investment community a clearer view of the demand outlook, which is crucial for strategic planning and investment decisions.

Moreover, this clarity is essential for domestic manufacturers who need to anticipate and meet the demand generated by these projects. Without timely auctions, the entire supply chain, from investors to manufacturers, is left in a state of uncertainty. The government's commitment to a structured auction timeline will bolster confidence and ensure that the renewable energy sector continues its rapid advancement, supported by a robust and predictable market environment.

Domestic manufacturing capacity in the renewable energy sector is rapidly increasing, a promising sign of progress. However, supply bottlenecks persist, posing significant challenges. The key issue is building a robust domestic supply chain without compromising the speed of renewable energy deployment, which is essential for meeting the government's ambitious 2030 targets.

Accelerating domestic manufacturing is crucial for reducing dependence on imports and fostering local industry growth. On the other hand, any delays or inefficiencies in the supply chain can hinder the deployment of renewable energy projects, putting the 2030 targets at risk.

Expanding domestic manufacturing capacity is a step in the right direction, and it must be accompanied by strategic efforts to eliminate supply bottlenecks.

At the Mercom India Renewable Summit 2024, we will leverage Mercom's data, expertise, and research to thoroughly examine the current issues and develop constructive solutions that benefit all stakeholders. By delving into every detail and fostering a consensus between the demand and supply sides, we aim to craft strategies to propel the renewable energy sector forward.

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Renewable Energy Push Likely to Continue in Modi 3.0

The government in its third term has shown all signs that it will continue to promote non-fossil energy sources and unlike other elements of the government's economic agenda, renewable energy has not faced political opposition in India

By: B.S. Nagaraj



W

ith India's long-winded election process coming to a close and Narendra Modi sworn in as Prime Minister for a third consecutive term, the country's aggressive renewable energy push is likely to continue.

In the Bharatiya Janata Party's (BJP) second term in office, renewable energy was one of the cornerstones of the government's economic agenda. The government undertook a series of initiatives to strengthen India's energy security by augmenting solar and wind capacity to complement coal-based thermal, which is still the country's primary energy source. India displaced Japan to become the third-largest solar energy producer in 2023.

Going into the elections, the BJP had outlined its ambitious clean energy vision in its manifesto. It promised 'energy independence' by 2047 and a reduction in petroleum imports through a mix of electric mobility, a network of charging stations, renewable energy generation, and improved energy efficiency.

Much before the election schedule was announced, the government approved the ₹750.21 billion (~\$9.05 billion) PM-Surya Ghar: Muft Bijli Yojana, a program to install rooftop solar on 10 million households.

Among other significant promises, the BJP emphasized incentivizing private sector investment in large-scale battery energy storage systems infrastructure to foster renewable energy integration, grid stability, and resilience.

Expanding green hydrogen production, developing technologies to make India a major green hydrogen production hub, and positioning the country as a global manufacturing hub for wind, solar, and green hydrogen were also part of the BJP's manifesto.

Unlike other elements of the

government's economic agenda, renewable energy has not faced political opposition in India. Many states have also embarked on clean energy programs. For instance, Tamil Nadu and Karnataka, where non-BJP parties are in power, are among the leading states in the country for wind and solar energy.

The Opposition Congress Party's manifesto also devoted significant space to renewable energy. Committing itself to mobilizing the massive capital required for India's green energy transition and achieving the goal of net zero by 2070, it had vowed to set up a Green Transition Fund of India together with state governments and the private sector.

Interestingly, one of the allies in the new government will be the Telugu Desam Party of Andhra Pradesh. Its leader, N Chandrababu Naidu, who has assumed office as the chief minister of the state for a fourth time, has the reputation of being a forward-looking, industry-friendly politician. Andhra Pradesh added the fifth-largest solar capacity of 4.9 GW in the first quarter of 2024, according to Mercom India's Q1 2024 India Solar Market Update.

With the political consensus about the need to integrate more renewable energy capacity into the country's power mix, the BJP-led coalition government can be expected to help sustain the growth trajectory the sector saw in the party's earlier two terms in office.

Addressing the party after the BJP and its alliance partners won enough seats to form a government, Modi hinted at policy continuity regarding clean energy. He spoke about India's commitment to the clean energy transition, green industrialization, and green mobility.

Pralhad Joshi has been appointed the Minister of New and Renewable Energy and Manohar Lal Khattar as the

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Pralhad Joshi has assumed office as the Minister of New and Renewable Energy

new Minister of Power. Shripad Naik has been given charge as Minister of State for both the ministries.

In the previous government, R K Singh held both the Power and MNRE portfolios as Cabinet minister. This time, two Cabinet ministers will handle the two portfolios separately.

The Prime Minister's decision to appoint a cabinet minister for each of the two portfolios comes as a surprise, considering that the Ministry of Power and MNRE share a lot of synergies. Many of the ministries' functions and policies overlap, which is perhaps why R K Singh was made the sole minister of both ministries in Modi's last dispensation.

However, given India's aggressive renewable energy push in the last few years, it could well be that the Prime Minister has decided to give more importance to MNRE by designating a Cabinet minister exclusively to be in charge of the ministry.

Joshi, Minister of Coal and Mines in the previous government, will be expected to sustain and build on these ongoing renewable energy initiatives. He also held the portfolio of Parliamentary Affairs, which has helped build a rapport with all political parties, some of whom are in government in the states. This experience should help him push through renewable energy programs requiring buy-in from parties across the board. ☺



Corporates Need Enabling Policies to Embrace Clean Energy in India: Interview

In an exclusive interview with Mercom India, Divya Sharma, India Executive Director of Climate Group, outlines Climate Group's activities in India, including the progress achieved under the RE100 program and other decarbonization initiatives

Substantial savings on energy bills and the clean energy transition goals have led to a growing number of commercial and industrial (C&I) entities in India adopting renewable energy sources for their

electricity needs.

Several large companies have signed up to RE100, a global corporate renewable energy initiative bringing together hundreds of businesses committed to 100% renewable electricity. In India, the RE100 program

is driven by the Climate Group.

In this exclusive interview with Mercom India, Divya Sharma, India Executive Director of Climate Group, outlines Climate Group's activities in India, including the progress achieved under the RE100 program and other

decarbonization initiatives aimed at reducing emissions by industries in various sectors.

Here are excerpts from the interview:

Can you tell us about Climate Group's initiatives in India? How many companies in India have joined the RE100 initiative anchored by Climate Group?

We've been in India for over 15 years, worked with 15 governments, and engaged with more than 190 businesses. We believe in the power of collective action. We've brought governments and companies together to drive climate action where emissions are highest. We've been running large initiatives on renewable energy procurement (RE100), energy productivity (EPI100), decarbonization of the steel industry (SteelZero), and making electric vehicles the new norm (EV100 and EV100+ for medium to heavy-duty vehicles).

RE100 is among our largest initiatives in India. As part of the program, the businesses are committing to using 100% renewable electricity by 2050 at the very

latest. Our goal is to accelerate the transition to zero-carbon grids. RE100 members represent diverse sectors, from cement to paper and automotive to IT services. Fourteen Indian-headquartered businesses are members.

Globally too, RE100 is the leading initiative for corporates looking to switch to renewables. With over 400 companies signed up, our members' total electricity consumption is now greater than that of France. What's remarkable for us is that by signing up for RE100 and EPI100, the businesses are not only doing their bit towards climate change mitigation; they are sending a strong signal to governments and other businesses alike that the transition to renewable energy (RE) is possible, and that the transition is urgently needed.

How have Indian companies performed on the goal of increasing renewable energy sourcing to meet their electricity needs?

The progress in our EPI100 and RE100 initiatives is important to share. We're encouraging a comprehensive approach, urging businesses to

procure renewable electricity and increase their energy productivity. We've recently released our annual disclosure report for RE100. More than 180 major Indian and global businesses in India reported procuring almost a quarter of their electricity from renewable energy in 2022. The total electricity demand of RE100 members stood at 17 TWh in 2022. Also, 48% of renewable electricity purchased by the members was from wind/solar projects. Hydropower was second at 39%.

Similarly, ten businesses are on track to double their energy productivity within 25 years of joining EPI100. The cheapest energy is the one you don't use, so energy efficiency can hugely impact a company's bottom line.

It is heartening to see businesses committing and acting on these goals.

What are some of the reasons for companies to delay the adoption of renewable energy? How can this be overcome?

In the last decade, RE adoption in the C&I segment was triggered by





strong fiscal benefits. With the gradual fall in solar and wind prices, subsidies have been curtailed for the C&I sector. The first preference of C&I consumers is to save on costs, and the benefits are low. An interplay of the right procurement option and innovation in RE technology is needed to support cost optimization for the consumer.

While the national government's interventions like the Green Energy Open Access Rules, 2022, and recent Resource Adequacy guidelines have supported the creation of new market mechanisms and brought robustness to power markets, we also see policy and regulatory barriers persist in their implementation in states. We need to strengthen state-level regulatory planning.

The integration of storage infrastructure can help add reserves for peak load management. Banking can serve as a short-term alternative for intermittent RE but lacks a coherent framework today.

What actions are being taken by Indian companies in hard-to-abate

sectors like cement and steel to decarbonize their operations?

We are seeing our members firmly set out on the path to decarbonization. For example, five top cement companies in the country have committed to RE100. Four have also committed to EPI100. Under the SteelZero Initiative, we're bringing onboard leading organizations to accelerate the transition to net-zero steel. We want to increase its demand. In India, the SteelZero initiative is also developing a Corporate Green Steel Procurement Framework (aligned to the Green Public Procurement Framework) to address policy barriers and develop the business and economic case for enhancing India's scrap steel availability from ship recycling.

Is there enough awareness among Indian companies about the pressing need to decarbonize their operations by responsibly sourcing electricity?

What is Climate Group's strategy to get more Indian companies to

commit to RE100?

We have seen a rise in interest among Indian companies wanting to join RE100. Backed by CDP's accountability framework, it has built trust over the years. Regular forums have also offered opportunities for companies to share challenges and learn about achieving 100% RE. Companies are showing more confidence. RE100 is being seen as a serious commitment, even though uncertainties can dampen their interest. These uncertainties are mainly related to policy, regulations, new technologies (low or carbon-free), and financial aspects of round-the-clock RE. However, as I keep saying, we need more businesses to commit to 100% RE to curb climate change. India has the potential to lead the way in global sustainability in business, and companies can support the country's commitments to net zero.

What recommendations can you offer to India's policymakers and electricity regulators to create a more enabling environment for companies to switch to renewables and achieve the goals of a just transition?

We need to speed up policy change to factor in climate change. Policy is key. It will incentivize and guide market reform and can determine how fast or slow businesses adopt RE. Some Indian states still lack core state-level renewable energy policies, which will facilitate development if guided by waivers or incentives, especially in states with high renewable energy potential.

We see a just transition as an essential element of the switch to renewables and have started work on this piece. We are building a roadmap that can support businesses in their responsible RE journey. Policymaking can also contribute to adopting responsible renewable energy and making it people and environment-focused. For example, policies and laws that can lead to job creation in the RE sector. This is especially important to provide opportunities for workers from the conventional energy sector. ☺

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Harnessing Sun and Farm Waste for Clean Hydrogen Fuel

Researchers develop innovative method to convert farm byproducts into clean hydrogen fuel using solar energy

By: Gautamee Hazarika

Engineers from the University of Illinois Chicago (UIC) have developed a novel method to produce hydrogen from water utilizing only solar power and agricultural waste such as manure or

husks.

This novel technique claimed to reduce the energy required to extract hydrogen from water by 600%, holds significant potential for sustainable and climate-friendly chemical production.

Hydrogen-based fuels are widely regarded as one of the most promising clean energy sources. However, producing pure hydrogen gas is traditionally an energy-intensive process that often depends on coal or natural gas, necessitating

large amounts of electricity.

This conventional method poses significant environmental challenges.

The multi-institutional research team, led by UIC engineer Meenesh Singh, detailed the new process for green hydrogen production in a paper published in "Cell Reports Physical Science."

This method leverages a carbon-rich substance known as biochar to reduce the electricity required for water electrolysis significantly—the process of splitting water into hydrogen and oxygen.

The process achieves net-zero greenhouse gas emissions by utilizing renewable energy sources such as solar power and capturing byproducts for other uses.

"We are the first group to show that you can produce hydrogen utilizing biomass at a fraction of a volt," said Singh. "This is a transformative technology."

Electrolysis, the cornerstone of

the hydrogen production method, typically requires an electric current generated by fossil fuels at an industrial scale.

Recent scientific advancements have decreased the voltage necessary for water splitting by introducing a carbon source into the reaction. However, this process usually involves coal or costly chemicals and emits carbon dioxide as a byproduct.

The researchers altered the process using biomass from common waste products instead. Mixing sulfuric acid with agricultural waste, animal waste, or sewage produces a slurry-like substance rich in carbon, termed biochar.

The team experimented with biochar derived from sugarcane husks, hemp waste, paper waste, and cow manure.

All these biochar variants reduced the power needed for water conversion to hydrogen. Cow dung

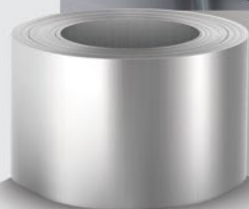
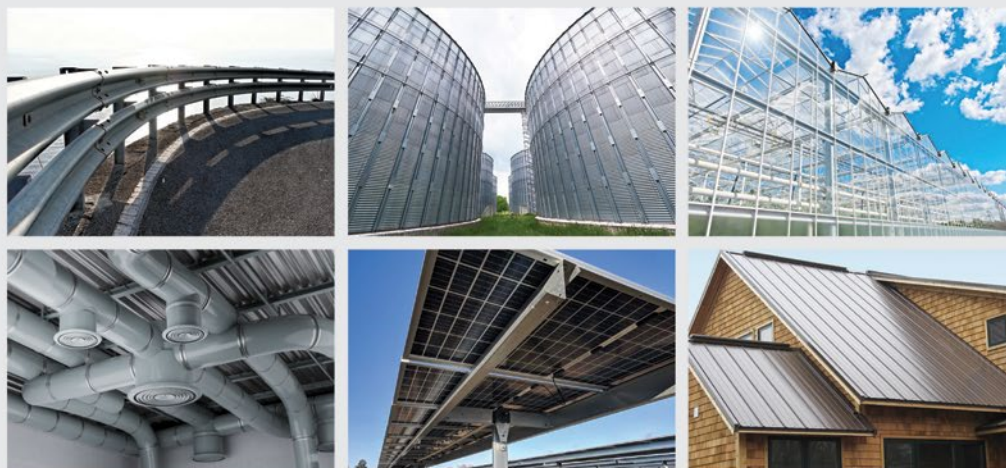
is the most effective, decreasing the electrical requirement sixfold to approximately one-fifth of a volt.

The researchers demonstrated that the reaction could be powered by a standard silicon solar cell generating roughly 15 milliamps of current at 0.5 volts—less power than an AA battery. "It's very efficient, with almost 35% conversion of the biochar and solar energy into hydrogen," noted co-author Rohit Chauhan.

"This method not only diversifies the utilization of biowaste but also enables the clean production of various chemicals beyond hydrogen," said Nishithan Kani, co-lead author of the paper.

Research sponsor Orochem Technologies has filed for patents on the processes for producing biochar and hydrogen. The UIC team plans to test these methods on a larger scale, potentially revolutionizing the clean energy landscape. ☀

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Delhi Proposes New Green Energy Open Access Rules

Following the central government's policy promoting green energy open access in 2022, several states and union territories have issued rules aligning with the central policy providing corporates lucrative avenues to adopt clean energy

By: Gautamee Hazarika

The Delhi Electricity Regulatory Commission (DERC) has proposed new rules for Green Energy Open Access.

The Commission has invited stakeholders to submit feedback on the draft.

These rules apply to Green Energy Open Access (GEOA) sought by licensees, green energy generators, and consumers with a contracted demand or sanctioned load of 100 kW

or more through a single connection or multiple connections within the same electricity division.

These regulations aim to facilitate non-discriminatory open access to green energy for utilizing Intra-State Transmission System(s) (InSTS) and/or distribution system of licensees within the State, including Intra-State Transmission or distribution system related to Inter-State Transmission of electricity.

They include provisions for granting

open access, determining open access charges, and determining banking charges for consumers who are availing green energy open access.

Criteria for Permitting Green Energy Open Access

- I. Long-Term Green Energy Open Access will be granted based on adherence to the transmission planning criteria and distribution planning code outlined in the State



- Grid Code.
- II. Short-Term/Medium-Term Green Energy Open Access will be approved if the request can be accommodated by utilizing:
 - Inherent design margins
 - Margins available due to variations in power flows
 - Margins available due to spare transmission system capacity and/or distribution system capacity built to accommodate future load growth
 - III. Installation of energy meters, specifically ABT-compliant meters at the generator's end and at the consumer's end, for requests of 1 MW and above. For consumers seeking open access below 1 MW, installation of Special Energy Meters capable of recording energy on a 15-minute time block basis is required.
 - IV. No outstanding dues owed to the licensee concerned and/or SNA (System Network Agency).

Classification of Green Energy Open Access

Green Energy Open Access consumers are categorized based on the duration of their usage of the intra-state transmission and/or distribution system:

- I. Long-term Green Energy Open Access: Entitles users to the intra-state transmission and/or distribution system for over seven years but not exceeding 25 years.
- II. Medium-term Green Energy Open

“

Distribution licensees have the highest priority over other Green Energy Open Access consumers

Access: Grants the right to utilize the intra-state transmission and/or distribution system for a duration exceeding three months but not extending beyond five years.

- III. Short-Term Green Energy Open Access: Allows open access for up to one month.

Upon the expiration of a granted Short-term Green Open Access, consumers must file a fresh application to continue to avail the service.

Application Procedure

- I. All Green Energy Open Access applications must be submitted in the prescribed format along with necessary documents and fees, if applicable, to the Nodal agency as per the Regulations.
- II. Applicants seeking Green Energy Open Access must provide an undertaking stating that they have not entered into more than one power purchase agreement (PPA)

or any other bilateral agreement for the capacity for which Green Energy Open Access is sought.

Eligibility Criteria

- I. Consumers with a contracted demand or sanctioned load of 100 kW or more, either through a single connection or multiple connections totaling 100 kW or more within the same area of a distribution licensee, are eligible for Open Access to source Green Energy under these Regulations.
- II. Captive consumers have no load limitations regarding contract demand/sanctioned load with Discoms.
- III. Consumers, licensees, and/or generating companies are eligible for Green Energy Open Access to the intra-State Transmission System of the State Transmission Utility or any Transmission Licensee(s) and/or Distribution System(s) of the Distribution Licensee within the State, subject to the Regulations and system availability.
- IV. Every person who has constructed a captive generating plant can avail open access as per the provisions of the Electricity Act, Rules, Regulations, and Orders of the Commission.

Allotment Priority

Distribution licensees have the highest priority over other Green Energy Open Access consumers.

Policy

Green Energy Open Access consumers have a preference over regular Open Access consumers in the same category. Priority is given to Long-Term Green Energy Open Access consumers, followed by Medium-Term and Short-Term Green Energy Open Access consumers, subject to system capacity availability.

Procedure for Grant of Green Energy Open Access

The applicant must submit a complete application as specified by the Central Nodal Agency on the central portal. The application will be forwarded to the State Nodal Agency for verification and decision within 15 days.

Applicants must access the Central Portal to apply for Day Ahead Green Energy Open Access Transactions. The State Nodal Agency must convey approval or denial to the applicant before the day of scheduling for the transaction. A non-refundable processing fee of ₹5000 (~\$59.84) per transaction is applicable.

Banking Facility and Charges

The provision for banking facility for consumers availing Green Energy Open Access is outlined as follows:

Consumers are permitted to utilize the banking facility, which refers to the surplus green energy injected into the grid on a 15-minute time block basis. This surplus energy is credited to the distribution licensee by the Green Energy Open Access consumers and can be drawn upon,

“

Energy banking is assessed for energy accounting on a 15-minute time block basis

along with charges to compensate the distribution licensee.

Energy banking is assessed for energy accounting on a 15-minute time block basis. The difference between the injected energy from the green energy generator available at the consumption point and the consumer's actual consumption in the same 15-minute time block is considered banked energy.

Banked energy consumption is allowed on a billing cycle basis. During the billing cycle, any banked energy available during peak periods (as specified in the Tariff Orders of the Commission) can be utilized during both peak and off-peak periods by the Green Energy Open Access consumer.

The quantum of banked energy permitted for Green Energy Open Access consumers must be at least 30% of the total electricity consumption from the distribution licensee during the billing period.

The Banking Charge, calculated at

8% of the banked energy, is adjusted accordingly.

In cases where the generator is situated within or outside the State and connected with the Inter-State Transmission System/Grid, the banking facility is governed by applicable CERC Regulations and MoP Rules.

The credit for banked energy cannot be carried forward to subsequent billing cycles and must be adjusted within the same billing cycle as per the regulations.

Unutilized surplus banked energy is considered lapsed at the end of each billing cycle, and the renewable energy generating station is entitled to receive Renewable Energy Certificates for the lapsed banked energy.

These provisions ensure efficient utilization and management of surplus green energy injected into the grid by Green Energy Open Access consumers.

Metering

Green Energy Open Access consumers with a contract demand of 1 MW and above must provide ABT-compliant meters. Consumers with demand below 1 MW can use special energy meters capable of energy recording on a 15-minute time block basis.

These regulations aim to ensure fair access to green energy and efficient energy transmission and distribution system management. ☺

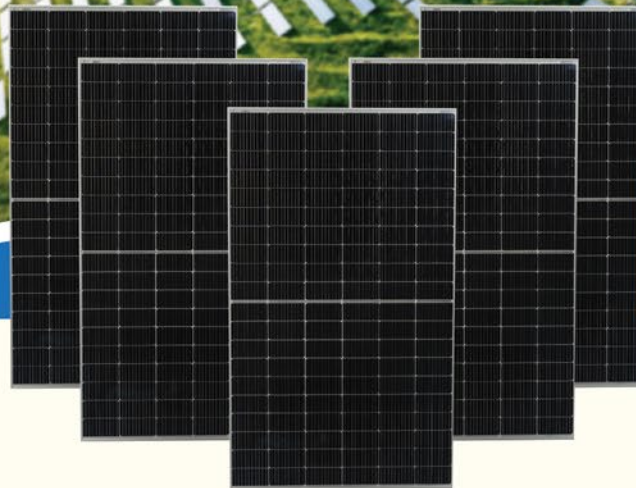




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Stanford Scientists Advance Liquid Battery for Energy Storage

Funded by the National Science Foundation, the team of researchers has uncovered a process to convert electricity into liquid fuel without generating gaseous hydrogen

By: Arshreet Singh

Researchers at Stanford University have made progress on an emerging technology that uses liquid organic hydrogen carriers (LOHCs) to essentially create a 'liquid

battery' for storing renewable energy from wind and solar power.

The team, led by chemistry professor Robert Waymouth, has developed a new catalytic system that can efficiently convert electricity

into the liquid fuel isopropanol, or rubbing alcohol, without generating gaseous hydrogen as a byproduct.

"We are developing a new strategy for selectively converting and long-term storing of electrical energy in



liquid fuels," said Waymouth. "We also discovered a novel, selective catalytic system for storing electrical energy in a liquid fuel without generating gaseous hydrogen."

Storing energy from renewable sources like solar and wind has been a major challenge, as production fluctuates based on sunlight and wind conditions. According to the California Energy Commission, the state alone is projected to need over 50,000 MW of battery storage capacity by 2045 to handle renewable energy generation.

While lithium-ion batteries are commonly used for storage, LOHCs like isopropanol could provide another solution acting as a liquid battery. Excess electricity could be stored in

liquid isopropanol, which can then be used in a fuel cell to generate electricity when needed.

"When you have excess energy, and there's no demand for it on the grid, you store it as isopropanol. When you need the energy, you can return it as electricity," explained Waymouth.

The key advance was using the inexpensive additive cobaltocene to enable an iridium catalyst to directly produce isopropanol from acetone using electrons and protons rather than first making hydrogen gas.

While still in the initial stages of research for now, the Stanford team believes liquid organic hydrogen storage could become an important energy storage technology

complementing batteries. The work was funded by the National Science Foundation.

Recently, researchers from the Korea Advanced Institute of Science and Technology (KAIST) and Lawrence Berkeley National Laboratory developed a high-energy, high-power hybrid sodium-ion battery through an innovative hybrid energy storage system that integrates anode and cathode materials.

Earlier, a team of researchers from the University of Adelaide in Australia and the University of Maryland in the U.S. claimed to have developed a new type of aqueous sodium-ion battery that they claim can last for over 13,000 charge cycles. ☺

Implementation Issues Disrupt PM Surya Ghar Yojana Rollout

The government initiative to promote residential rooftop solar adoption and streamline it through an online application is marred by glitches in the National Portal and delays in feasibility checks

By: Arshreet Singh



The PM Surya Ghar Yojana, an initiative by the government to install rooftop solar systems in 10 million households, has hit several roadblocks in its implementation across various states.

Despite ambitious targets, the program appears to be struggling due to many challenges stakeholders face, including state distribution companies (DISCOMs), installers, and consumers.

Data revealed during a recent webinar by REC highlights the stark disparity in the program's progress between states. While Gujarat has achieved an installation-to-application ratio of 19.45%, Rajasthan lags significantly behind at a mere 1.75% despite having fewer applications than Gujarat.

The Renewable Energy Association of Rajasthan (REAR) has attributed the poor implementation of the program to the "insensitive behavior" of DISCOM officials.

In a letter to the authorities, REAR said, "Despite efforts by the DISCOMs to sensitize field employees, many Assistant Engineer offices remain oblivious to the latest orders, rules,

“

Rajasthan lags in installation-to-application ratio

and regulations related to rooftop solar installations."

This lack of knowledge often results in delayed or improper handling of consumer and vendor requests.

The letter highlights the widespread non-compliance with the revised net metering timelines set by the DISCOMs. Despite an order issued on February 27, 2024, mandating a reduction in the net metering timeline from 80 days to 18 days, none of the Assistant Engineer offices have adhered to the new guidelines.

Approximately 70% of consumers require load extensions to accommodate their solar installation requirements. However, the DISCOMs' load extension procedures are cumbersome, often taking months to complete, even in cases where

no physical alterations to cables or meters are required onsite.

For the past two months, the PM Surya Ghar National Portal, which serves as the program's backbone, has been plagued by glitches, causing issues for consumers, vendors, and DISCOM officials. REAR has suggested temporarily allowing offline net metering processes to help prevent further delays.

Meanwhile, various installers told Mercom they could not edit capacity details after submission. They also complained about difficulties in tracking application progress at the portal.

"If a customer makes a mistake in entering the capacity of the solar system, they can't edit it once after submission. The edit option is not available on the site, and they have to raise a request for it, which is taking more than two weeks to get approved," said an installer from Telangana.

The installers also described the loan process for consumers under the program as time-consuming, with extended processing times for approvals from institutions like the



Small Industrial Development Bank of India (SIDBI).

One vendor raised concerns about the lack of seamless integration between the national portal and the Jan Samarth portal, a platform for credit-linked government programs, and the absence of certain banks and vendors from the latter.

In some states, DISCOMs require consumers to purchase and test meters, leading to delays in system commissioning due to meter availability issues. The Model Code of Conduct for the recently concluded general elections has also delayed customers' awaiting subsidy amounts.

"After the registration, feasibility approvals take a week or ten days. But in some places, it takes a month for the feasibility check," an installer said.

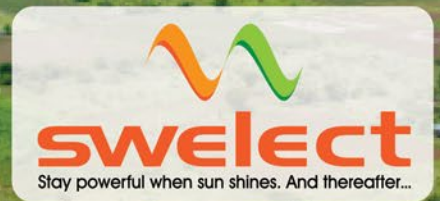
Meanwhile, another installer from Chennai rued about issues regarding feasibility approvals. "Under the PM Surya Ghar program, separate 2.5 kW and 3 kW projects were signed but not started due to the subsidy feasibility and portal issues."

"A 3 kW rooftop solar system can be installed in 10 days, but the state approval process takes 45 to 60 days to do the feasibility check," an installer from Rajasthan added.

An installer from Telangana also reported availability issues for DCR (Domestic Content Requirement) panels, particularly mono-facial panels, which are preferred for smaller installations due to cost considerations.

"Since we need a supply of 30 kW to 100 kW only, distributors are lagging behind our orders. They are now asking for large orders," he said.

As the challenges mount, REAR has recommended establishing a committee comprising representatives from DISCOMs, vendors, and associations to address issues and explore solutions. It has called for assigning specific targets to the implementing authorities with performance evaluations, clarifying the escalation process for grievances, and introducing state subsidy provisions to incentivize solar energy adoption further. ☺



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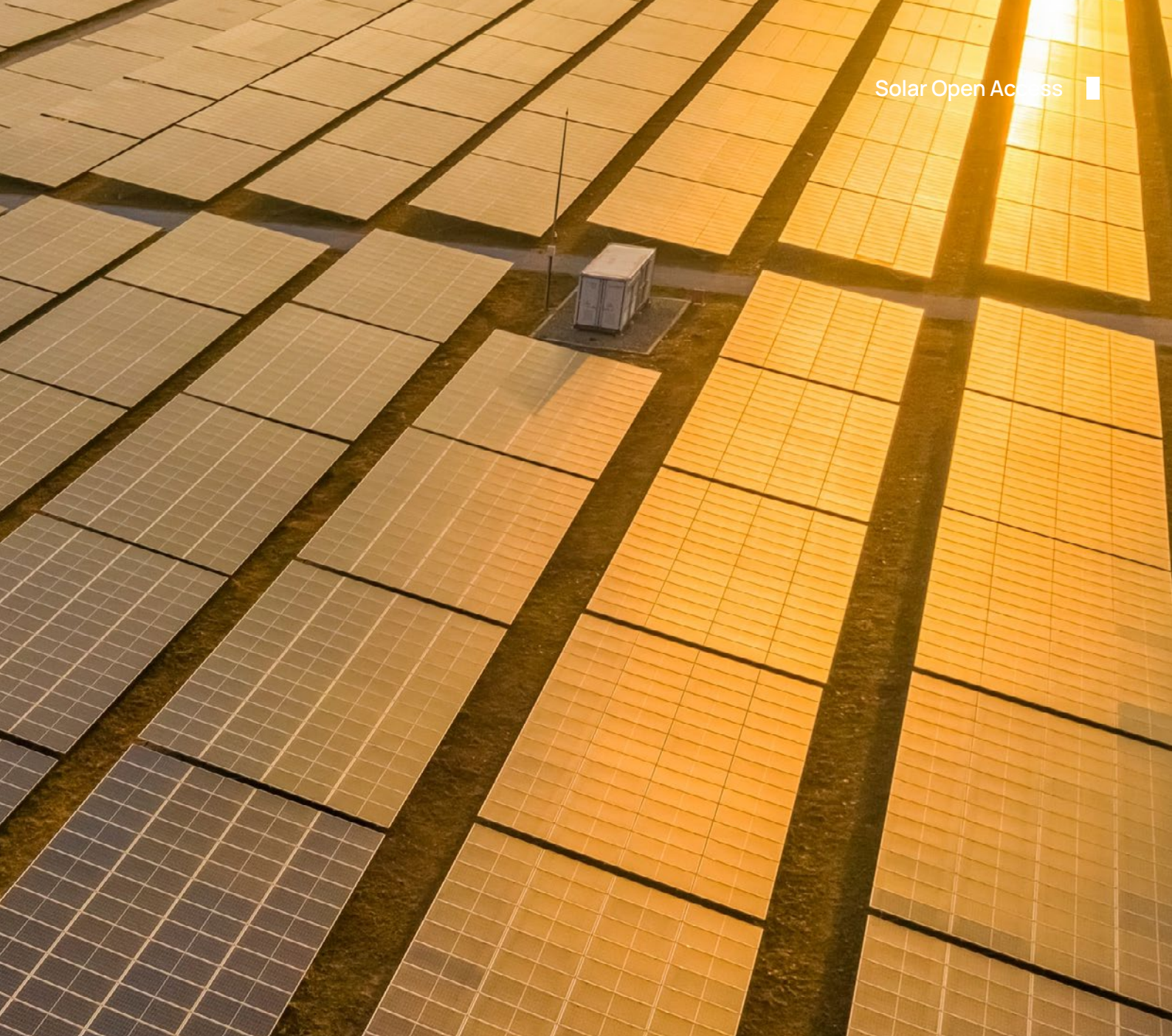
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Record Solar Open Access Capacity Added in Q1 2024

Fueled by falling module prices and suspension of the ALMM Order, solar open access installations saw a nearly 152% increase year-over-year

By: Arjun Joshi



India added over 1.8 GW of solar open access capacity in the first quarter (Q1) of the calendar year (CY) 2024, a nearly 152% increase year-over-year (YoY) compared to 722 MW, according to the newly released Q1 2024 Mercom India Solar Open Access Market Report.

The installations also represent a two-fold quarter-over-quarter (QoQ) increase from 909.3 MW.

Falling module prices drove the rise in installations due to surplus production in China and the suspension of the Approved List of Models and Manufacturers order for

projects commissioned until March 2024. This allowed developers to import modules and commission projects at a reduced cost.

Many developers delayed their module procurement until Q4 2023, anticipating lower prices, and commissioned projects in Q1 2024, significantly increasing installations. Additionally, lower power purchase agreement (PPA) prices, due to reduced project costs, further encouraged consumers to adopt solar open access.

"There is a huge demand for solar open access because most corporations have their carbon emission reduction targets. Many

state governments are coming up with green energy policies and offering charges waivers," commented Priya Sanjay, Managing Director at Mercom India.

In Q1 2024, Rajasthan led the way in solar open access capacity additions, accounting for nearly 28% of the installations. Andhra Pradesh and Maharashtra followed, contributing 21% and almost 12% respectively.

As of March 2024, the total installed solar open access capacity reached 14.3 GW.

Karnataka remained the leading state, accounting for nearly 30% of the cumulative installed capacity. Maharashtra and Tamil Nadu followed



Lower PPA prices further encouraged consumers to adopt solar open access

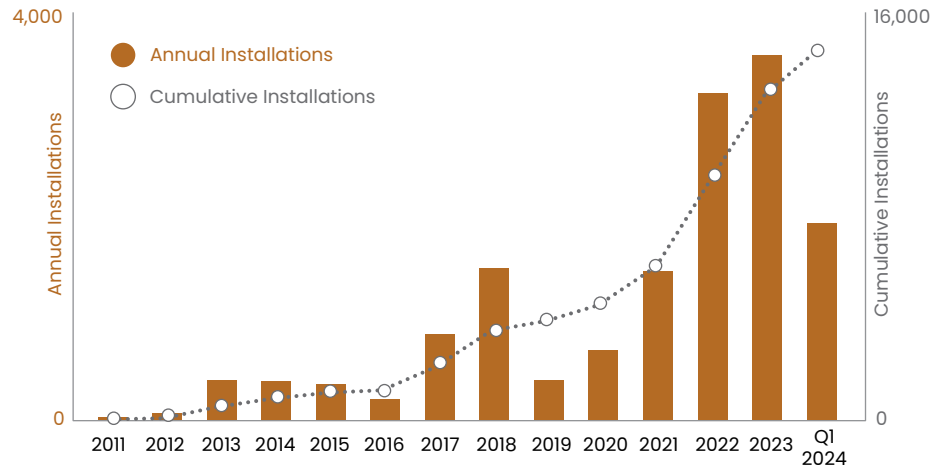
with 13% and 11% respectively.

The project pipeline, including those under development and in the pre-construction stage, stood at over 18 GW as of March 2024. Nearly 74% of these pipeline projects were located in Karnataka, Rajasthan, Maharashtra, Tamil Nadu, and Andhra Pradesh.

According to Sanjay, these states have a high percentage of projects under development because of conducive policies and low landed cost. These states also have better land and infrastructure availability.

"Policies need to make economic sense ultimately; the landed cost should be far lower than the grid price, and approvals should be seamless. Preferably there must be consumers within the state who can procure this

Solar Open Access Installations* (MW)



* Previous years may have been updated based on late announcements and inclusions

Source: Mercom India Research

power," she said.

Adani Hybrid Energy emerged as the top seller in the Green Day-Ahead Market (G-DAM), accounting for approximately 14% of the electricity sold. Arcelor Mittal was the leading buyer, purchasing around 36% of the electricity from G-DAM.

The volume of renewable energy certificates traded on the Indian

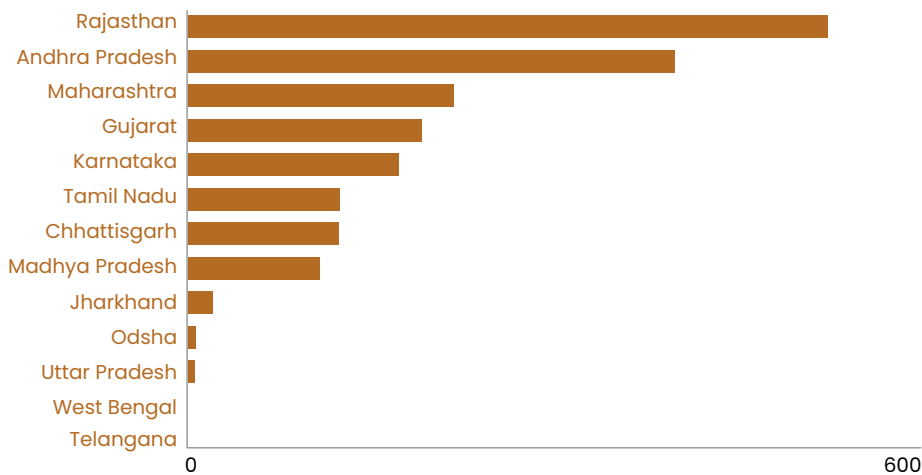
Energy Exchange (IEX) increased by over 133% QoQ. The volume traded in the Green Term Ahead Market on IEX rose by 14% QoQ.

"There has been a rise in both RECs and the G-TAM market, driven by demand. Many companies, especially those signed up for the RE100 initiative or those without consistent power demand, go for the exchange route.





State-wise Solar Open Access Installations in Q1 2024 (MW)



Source: Mercom India Research (Mar 2024)

The exchange is the best option for them to get green energy without committing to a long-term PPA," Sanjay said.

The report analyzes the solar open access market, retail electricity tariffs, PPA prices, and open access charges and costs across seventeen states.

The demand for open access power in India will remain high, driven by initiatives like RE100, responsible steel, and green cement. "For larger corporations, green targets are serious, and while price is a concern, policies and approvals are crucial. They may also look at green carbon credits and RECs to fully meet RE100 goals," Sanjay said. 📍

New Government Guidelines for Rooftop Solar Program

The government has issued guidelines for rooftop solar program implementation, addressing disbursement of central financial assistance, vendor selection, meter installation, inspection and approvals

By: Arjun Joshi

The Ministry of New and Renewable Energy (MNRE) has issued the operational guidelines to implement the PM Surya Ghar: Muft Bijli Yojana for the component "Central Financial Assistance (CFA) to residential consumers."

These guidelines pertain to implementing CFA to residential consumers under the capex mode for eligible consumer categories only. The guidelines for other components of the program will be issued separately.

The guidelines will be applicable for all applications received on the national portal from February 13, 2024. The implementation period of the program will be until March 31, 2027.

Eligible consumers can utilize the PM Surya Ghar national portal to receive program benefits.

Any consumer with a valid Consumer Account Number (or its equivalent) from a power distribution company (DISCOM) can apply on the portal. The portal generates an application ID and provides tools like informational aids and decision-making resources to aid in choosing rooftop solar configurations.

Transition from Existing Program

The Grid Connected Rooftop Solar Phase II Program, active since 2019 and proposed to run until 2025-26, is now integrated into the PM Surya Ghar: Muft Bijli Yojana. Until the new program's dedicated budget is operational, CFA and other financial releases for PM Surya Ghar will be funded from the Phase II Program's budget.

Once operational, the new program's funds will cover the ongoing liabilities of the Phase II Program.

Ongoing projects under Phase II will follow the guidelines of Phase II, but budgetary releases will come from the new program's outlay.

Central Financial Assistance

The program provides financial support for installing grid-connected rooftop solar projects in the residential sector. Eligible installations must be on a residential property's roof, terrace, balcony, elevated structures, and building integrated PV systems.

Installations under group net metering and virtual net metering are eligible if approved by the local





The implementation period of the program will be until March 31, 2027

DISCOM and located on specified structures.

CFA support is available for consumer-funded installations through personal capital or loans. RESCO and state-led aggregation models are excluded and will be addressed through separate guidelines.

Non-residential segments

(government, commercial, and industrial) are not eligible for CFA.

Connections eligible under the program are for shared facilities in group housing and residential welfare associations and not for individual residential consumers. CFA support is provided to entities responsible for maintaining common facilities, such as apartment owner associations and cooperative housing societies.

State and union governments may provide additional subsidies, which must align with program guidelines and integrate with the national portal for disbursement.

Benchmark costs will be revised during the program's midterm review or earlier if module prices change significantly, requiring budgetary adjustments with approval from the

Department of Expenditure.

Solar modules used in the installation must satisfy the Domestic Content Requirement condition, i.e., domestically manufactured modules manufactured from domestically manufactured cells. This is an essential condition for the installation to be eligible for the CFA.

Consumers can opt out of CFA to extend program benefits to more users, enabled through a "Give It Up" option on the national portal. Those opting out can use non-domestic modules.

Vendor Selection and Agreement

Consumers select a registered vendor from the national portal and can engage them at mutually agreed rates. There is no tendering process by



state DISCOMs, promoting consumer freedom in vendor selection. The portal includes vendor comparison tools to facilitate informed decisions.

Consumers collaborate on system design, components, quality, and financial terms with chosen vendors. They can sign agreements covering these aspects, ensuring mutual understanding and transparency. Although a sample agreement is provided, actual agreements vary case by case.

Consumer Protection

The portal offers comprehensive informational materials, decision-making tools, and vendor/system comparison resources. These empower consumers to make informed choices regarding their

“

Government, commercial, and industrial consumers are not eligible for CFA

rooftop solar investments.

Minimum technical specifications for all vendors installing rooftop solar systems are set under the program. DISCOMs verify compliance during inspections.

To prevent overcharging, the Ministry publishes indicative costs of system components (modules, inverters, etc.) on the portal, ensuring

transparency and consumer protection.

Implementation and Metering

As per Electricity (Rights of Consumers) Rules, applications for rooftop solar systems up to 10 kW capacity are accepted without DISCOMs' technical feasibility approval. Consumers upload required documents until this provision is operationalized.

Vendors install systems, conduct safety checks, and educate consumers on rooftop solar maintenance and safety. After installation completion, consumers update system details on the portal and upload necessary documents.

DISCOMs conduct physical inspections, sign metering



Policy

agreements, and approve applications on the portal for CFA release. CFA disbursement follows physical verification and portal process completion.

DISCOMs install meters after rooftop installation, and consumers sign appropriate metering agreements per state regulations. Net meters can be provided by DISCOMs or procured from enlisted vendors.

Smart meters are installed through the Advance Metering Infrastructure Service Provider (AMISP) in areas where RDSS Smart Metering works are ongoing.

In areas pending Smart Metering under RDSS, net meters (preferably Smart Meters with 4G Cellular NIC card) are installed per manufacturers' specifications listed by the Central Electricity Authority.

Non-Metered Grid Connected Systems are eligible for CFA under the program, subject to approval by Electricity Regulatory Commissions. In such cases, the DISCOM will inspect

“

CFA processing must be completed within 15 days of DISCOM approval

the installation, ensure the functioning of the reverse power relay protection, and incorporate suitable remarks in the report. However, off-grid connected installations will not be eligible for CFA under the program.

CFA release operates through an e-token system. After application submission on the portal and completion of DISCOM inspection, the e-token is activated with eligible CFA based on installed capacity. Consumers redeem the e-token through their portal profile, and CFA is transferred to their account.

Consumers can opt for financing

through the portal, accessing loan products from banks and financial institutions directly via the Jan Samarth portal integration. Standardized low-interest loan products are available for residential rooftop solar systems up to 3 kW, with similar options for larger, non-subsidized segments published on the portal.

All consumer details must be submitted on the portal, including bank account information and necessary proof. Consumers opting for loans include loan account details in their profile, facilitating direct CFA transfer to loan accounts upon e-token redemption.

CFA processing is completed within 15 days of DISCOM approval, ensuring timely financial support for rooftop solar installations.

Vendor Registration

The program mandates that only vendors registered on the national portal can participate, ensuring





consumers receive CFA under the program.

Vendors can register at the state level with DISCOMs/state agencies or at national/multi-state/state levels with the National Program Implementation Agency. State governments designate nodal DISCOMs/agencies to streamline vendor registrations across multiple DISCOMs.

Registered vendors maintain profiles on the national portal, detailing rooftop solar system specifications, offered prices, and contact information. Consumers can submit inquiries through the portal, and vendors are expected to respond promptly. Vendor profiles also feature ratings, consumer feedback, and performance data from completed or ongoing projects.

Service Quality

Vendors commit to providing free repairs and maintenance for rooftop solar projects during the comprehensive maintenance contract period, typically five years from commissioning. They replace or repair underperforming system components and honor warranties

provided by original equipment manufacturers. Any system deficiencies affecting CFA disbursal or non-commissioning are promptly rectified by vendors, adhering strictly to program technical specifications.

Implementing agencies such as state DISCOMs, MNRE officials, or designated agencies conduct inspections of ongoing or completed installations to uphold quality standards. Vendors failing to meet standards, delivering non-functional systems due to poor installation quality, or non-compliance with program guidelines face potential penalties, including deregistration and fines, following due notice.

National Portal Functionalities

The portal integrates seamlessly with State DISCOM portals, ensuring a harmonized experience for consumers across all stages of rooftop solar installations. From net metering requests to load sanctions and inspections, the integrated platform streamlines processes and enhances accessibility.

The portal welcomes applications, websites, financing intermediaries, and e-commerce sites through APIs.

This integration expands service offerings, providing additional benefits and convenience for citizens.

Augmented with GIS-based services, the portal facilitates informed decision-making and visualization of rooftop solar systems for vendors and consumers. Integration with the PM-Gati Shakti portal optimizes power system planning, leveraging spatial data for enhanced efficiency.

The portal is accessible via apps, chatbots, and WhatsApp. This multi-channel approach ensures broader outreach, facilitating timely communication and updates for all user segments.

The portal also offers value-added services like financial modeling and return period analysis for proposed systems. Integration with banking products simplifies access to loans and digital-only financial products, enhancing consumer convenience.

The national portal receives real-time generation data from connected inverters and smart meters, providing analytical insights to consumers and assisting DISCOMs in data collection. Vendors ensure data access via SIM, dongle, or Wi-Fi,



ensuring comprehensive tracking and reporting.

Inspection and Evaluation

The National Program Implementation Agency (NPIA) at the national level and State Implementation Agencies (SIAs) will conduct thorough inspections and evaluations. Inspections occur during the commissioning and post-commissioning to verify compliance with program guidelines and technical specifications.

The NPIA will establish a robust mechanism for independent third-party assessments covering at least 1% of installed rooftop solar systems across India. These assessments

ensure an impartial evaluation of installations, focusing on adherence to quality standards and operational efficiency.

SIAs may implement additional mechanisms for post-commissioning inspections on a sampling basis to monitor ongoing system performance. SIAs may also conduct independent third-party assessments to validate further the quality and performance of installed rooftop solar systems.

All vendors registered on the national portal will receive a vendor rating based on criteria such as installation scale, equipment quality, workmanship, and service quality, which will be visible to the consumers on the portal. Consumer visibility of

vendor ratings on the national portal enhances transparency, enabling informed decisions regarding vendor selection for rooftop solar installations.

Consumers and vendors can raise grievances through the national portal, which will be channeled for resolution by the SIA/NPIA. The grievances will be resolved within 30 days. Consumers and vendors will get regular updates regarding the status of grievances through SMS, emails, and other channels of communication.

The grievances may be raised through the national call center, national portal, or the portal app. In each case, a unique tracking ID will be created by the NPIA so that the consumer can track the status of the resolution of the grievance through an online system.

Release of Funds

Within three months of notification of the guidelines, a Memorandum of Understanding (MoU) between MNRE and state or UT energy departments is mandatory. Release of funds under various program components to state or UT entities is contingent upon MoU signing.

Implementation Agencies

Initially, REC will serve as the NPIA, managing the National portal, vendor registrations, and overall program operations.

DISCOMs or energy departments act as SIAs, responsible for ensuring service timelines, monitoring vendor performance, and coordinating with NPIA.

Program Monitoring

A group of ministers will provide guidance and coordinate with states. A steering committee chaired by the cabinet secretary monitors overall program implementation with representation from key ministries.

A mission directorate headed by a senior official not below the rank of Joint Secretary, will oversee program implementation within MNRE and direct NPIA activities. State and district-level coordination committees monitor local implementation, chaired by administrative heads. ☺



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Delhi's Plan to Deploy Renewables

Delhi Electricity Regulatory Commission aims to promote the generation and consumption of renewable energy among all obligated entities through the new regulations

By: Arjun Joshi

The Delhi Electricity Regulatory Commission (DERC) has issued the draft DERC (Renewable Purchase Obligation and Renewable Energy Certificate Framework Implementation) Regulations, 2024.

Stakeholders were asked to submit their suggestions and comments by July 2, 2024.

The regulations will apply to all obligated entities, including distribution licensees (DISCOMs), open access consumers, and captive users within the National Capital Territory of Delhi.

Captive power project owners

Any person owning a grid-connected captive generating project based on conventional fossil fuels with an installed capacity of 1 MW or more (or other capacities as stipulated by the Commission) and using the electricity for personal consumption is subject to Renewable Purchase Obligation (RPO) for a percentage of the consumption from this source.

Open access consumers

Any person with a contract demand of at least 1 MW who consumes electricity from conventional fossil fuel-based generation through

open access is subject to RPO for a percentage of the consumption from this source.

The Commission may modify the minimum capacities from time to time. Additionally, Green Energy Open Access Consumers are regulated under the Delhi Electricity Regulatory Commission (Terms and Conditions for Green Energy Open Access) Regulations, 2024.

RPO

From the commencement date of these regulations, there will be a uniform RPO for all obligated entities.

Entities, whether obligated or not, can choose to generate, purchase, and consume renewable or green energy according to their needs using the following methods:

Own generation from renewable sources

- There is no capacity limit for installing renewable energy power plants for self-consumption.
- These plants can be set up anywhere in India, and power can be transmitted using open access.
- The generating project can be set up by the entity itself or by a developer with whom the entity has a power purchase agreement.





Policy

RPO Targets for Obligated Entities Financial Year 2025–2026

Sr. No.	Year	RPO Targets			Total RPO Target
		Wind RPO	Other RPO	HPO Target (Only for Distribution Licensee)	
1	2024–25	2.46%	26.37%	108%	29.91%
2	2025–26	3.36%	28.17%	1.48%	33.01%

Source: DERC

Mercom India Research

RPO Targets for Obligated Entities Financial Year 2025–2026

Sr. No.	Year	Wind RPO	HPO	Distributed RPO	Other RPO	Total RPO
1	2026–27	1.97%	1.34%	2.70%	29.94%	35.95%
2	2027–28	2.45%	1.42%	3.30%	31.64%	38.81%
3	2028–29	3.95%	1.42%	3.90%	33.10%	41.36%
4	2029–30	3.48%	1.33%	4.50%	34.02%	43.33%

Source: DERC

Mercom India Research



The rules apply to all obligated entities, including DISCOMs, open access consumers, and captive users in Delhi

Procurement through Open Access

- Renewable energy can be procured through open access from any developer.
- This can be done directly, through a trading licensee, or via power markets.

Wind RPO must be met by energy from Wind Power Projects (WPPs) commissioned after March 31, 2022. Wind energy consumed above 7% from WPPs commissioned until March 31, 2022, also counts towards RPO.

Hydro Purchase Obligation (HPO) must be met by energy from hydropower projects, including Large Hydro Projects (LHPs), Pumped Storage Projects, Small Hydro Projects (SHPs), Mini Hydro, and Micro Hydro Power, commissioned after March 8, 2019.

Other RPOs must be met by energy from any renewable energy project not included in Wind RPO or HPO categories. This includes hydropower projects commissioned before March 8, 2019.

Any shortfall in the “Other RPO” category can be met with excess energy consumed from WPPs commissioned after March 31, 2022, beyond the Wind RPO, or from eligible LHPs commissioned after March 8, 2019, beyond the HPO, or a combination of both.

Shortfalls in Wind RPO can be met with excess energy from hydropower plants beyond the HPO for that year and vice versa.

Renewable Energy Certificates (RECs) will be considered according to the Central Electricity Regulatory Commission (Terms and Conditions



for RECs for Renewable Energy Generation) Regulations, 2022. Obligated entities may purchase RECs to cover any RPO shortfall within three months of the end of the financial year.

Hydropower imported from outside India does not count towards HPO. The HPO trajectory will be adjusted annually based on the revised commissioning schedules of hydro projects. Hydro Energy Certificate mechanisms can be used to comply with HPO requirements.

Targets specified for obligated entities for FY 2029-30 will be continued beyond FY 2029-30 unless specified by the Commission separately.

Wind energy component must be met by energy from WPPs commissioned after March 31, 2024.

Hydroenergy components must be met by energy from hydropower projects, including PSPs and SHPs, commissioned after March 31, 2024. This can also include free power provided to the State/DISCOM from hydropower projects commissioned after March 31, 2024. This can include energy from hydropower projects located outside India.

Distributed renewable energy components must come from renewable energy projects that are less than 10 MW, including solar installations (net metering, gross metering, virtual metering, group metering, behind-the-meter installations, etc.). Compliance is measured in energy (kWh units). If generation data is unavailable, the capacity is converted to energy using a 3.5 kWh/kW/day multiplier.

Other renewable energy components can include energy from any projects not covered in these components. This can comprise energy from all WPPs and hydropower projects, including free power, commissioned before April 1, 2024.

Shortfalls in wind renewable energy consumption can be met with excess hydro renewable energy and vice versa. Excess wind or hydro renewable energy can be counted towards the other renewable energy component. Excess energy in the other renewable

energy component can be used to meet shortfalls in wind or hydro renewable energy.

Open access consumers and captive power plants must meet the total renewable energy target regardless of the non-fossil fuel source.

Targets can be met directly or through RECs as per the Central Electricity Regulatory Commission (Terms and Conditions for RECs for Renewable Energy Generation) Regulations, 2022. Obligated entities can purchase RECs for any shortfall within three months of the end of the financial year.

Other conditions for compliance

Power purchased from renewable energy sources registered for RECs under the Central Electricity

“
RECs can be purchased to cover any RPO shortfall within three months of the financial year end”

Regulatory Commission (CERC) regulations will not count towards the RPO of Obligated Entities.

Obligated entities must provide an undertaking to the state nodal agency that the renewable component of purchased power has not been claimed for RECs by the generators.

Electricity generated by net



Open access consumers must meet the total renewable energy target from non-fossil fuel sources

metering consumers, eligible under DERC regulations or the Delhi Solar Energy Policy, will count towards the RPO compliance for the area's DISCOM.

DISCOMs must procure 100% of the power generated from waste-to-energy plants in proportion to their overall power procurement or as approved by the Commission.

Renewable energy bundled with coal/lignite power from generating

stations will count towards RPO compliance to the extent of the renewable power procured.

DISCOMs must submit quarterly progress reports to the Commission, including the RPO compliance status of open access consumers and captive users, and upload them on their website.

DISCOMs will issue green certificates annually to consumers for green energy supplied beyond the consumer's RPO.

Green energy star rating

Consumers will be categorized based on the percentage of green energy purchased, using a five-star rating system:

1. Green Star: Up to 25% renewable energy.
2. Green Stars: 26% to 50% renewable energy.
3. Green Stars: 51% to 75% renewable energy.
4. Green Stars: 76% to 95% renewable

energy.

5. Green Stars: 96% to 100% renewable energy.

Ratings will be displayed on consumer bills, online platforms, and energy monitoring interfaces and revised annually.

Open access consumers

Open Access Consumers receiving electricity from renewable sources are exempt from wheeling, transmission, cross-subsidy, and additional surcharges to the extent of their RPO compliance. These consumers must submit annual details of total electricity consumption and renewable energy purchases within 15 days of the notification of these regulations. Projections for the next financial year must be submitted by March 31.

- Bank Guarantee (BG) or Fixed Deposit Receipt (FDR): Open access



consumers must provide a BG or FDR, valued based on the weighted average price of RECs from the past three months, by April 30 each year.

- **Compliance and Reconciliation:** Details of RPO compliance must be submitted within two months of the financial year's end. The DISCOMs can encash the BG or FDR for any shortfall in RPO compliance and must purchase RECs within 30 days of receiving reconciled statements.

Captive users

Captive users must submit annual details of electricity consumption and renewable energy purchases within 15 days of the notification of these regulations. Projections for the next financial year must be submitted by March 31. The BG or FDR submission, compliance reporting, and reconciliation procedure follow the same steps as for open access consumers.

DISCOMs

DISCOMs can recover costs incurred to meet their RPO targets in their Aggregate Revenue Requirement (ARR). They must submit annual details of total electricity sales and REC purchases for RPO compliance within three months of the financial year's end to the state nodal agency and the Commission. They must also report the compliance of other obligated entities in their supply area.

Penalty for RPO non-compliance

Non-compliance with the RPO will result in penalties as follows:

- **DISCOMs:** Subject to a reduction in ARR at a rate of ₹0.10/kWh for the cumulative shortfall in total renewable energy procurement target for each year.
 - **Other obligated entities:** Subject to a penalty of ₹0.10/kWh for cumulative shortfall in total renewable energy procurement target for each year.
- Adjustments for shortfalls in

renewable energy procurement will be made by reducing ARR for DISCOMs and imposing penalties on other obligated entities.

If an obligated entity demonstrates that it could not meet RPO despite taking all possible measures, including procuring RECs, the Commission may reduce the penalty.

The penalty for open access consumers will be computed by the state nodal agency and billed by the DISCOMs. The state nodal agency will calculate penalties for other obligated entities, and the Commission will handle recovery mechanisms on a case-by-case basis. Penalties for DISCOMs will be determined by the state nodal agency and informed to the Commission for adjustment in the ARR determination process.

The Commission had issued the previous RPO and compliance regulations, establishing the RPO trajectory for the national capital territory until the financial year 2025-26, in April 2023. ☺



Nextracker Powers Indian Utility-Solar with Next-Gen Technologies



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Andhra's Solar Open Access Market Turnaround

Andhra Pradesh is an attractive state for solar open access considering the supportive infrastructure and the presence of several large power-intensive industries. The lack of regulatory approvals for long-term solar open access agreements had hindered progress in the past

By: Tarun Kothamasu

Andhra Pradesh experienced renewed growth in solar open access capacity additions in Q1 2024, after a weak four quarters in 2023. The state accounted for the second-highest solar open access capacity (21%) in Q1 after no solar open access projects were commissioned in the previous quarter.

India added 1.8 GW of new solar open access capacity in Q1 2024, the most in any quarter to date, with the top five states accounting for 79.3% of the new installed capacity, according to the recently released Q1 2024

Mercom India Solar Open Access Market Report.

The installation numbers in Andhra were skewed by a large captive project, which was an anomaly but a welcome break after a year (2023) that recorded one of the lowest solar open access capacity additions since 2013.

Andhra Pradesh climbed from the seventh to sixth position as the cumulative installed open access capacity rose 67.1% QoQ as of March 2024, accounting for 6.7%

of the country's cumulative capacity.

Policy Support

After a year (2023) of low installations, the state government has been taking policy measures to promote green energy open access. Energy banking on a monthly basis, exemption of open access projects from additional surcharge, and reduction in the wheeling charges





The state provides the third-lowest landed cost for HT industrial consumers

in the range of 19-44% year-over-year are some factors that could drive the growth in the coming months.

The state's infrastructure and renewable energy resource availability make Andhra Pradesh a favorable destination for solar open access. The captive and group captive projects offer the highest savings in the state due to the exemptions from cross-subsidy

Andhra Pradesh (APEPDCL): Estimated Net Savings under Captive/ Group Captive Models of Solar Open Access for FY 2023-24

Charges & Savings	₹/kWh	~\$/kWh
State Transmission charges	0.26	0.003
Wheeling Charges	0.68	0.008
Cross Subsidy Surcharge*	-	-
Additional Surcharge*	-	-
PPA Price**	3.37	0.040
Net landed Cost	4.31	0.052
Industrial Consumers' Electricity Tariiff	5.67	0.085
Commercial Consumers' Electricity Tariiff	6.89	0.098
Savings - Industrial	1.36	0.016
Savings - Commercial	2.57	0.031

*Cross Subsidy Surcharge and Additional Surcharge are exempted for Captive/ Group Captive models

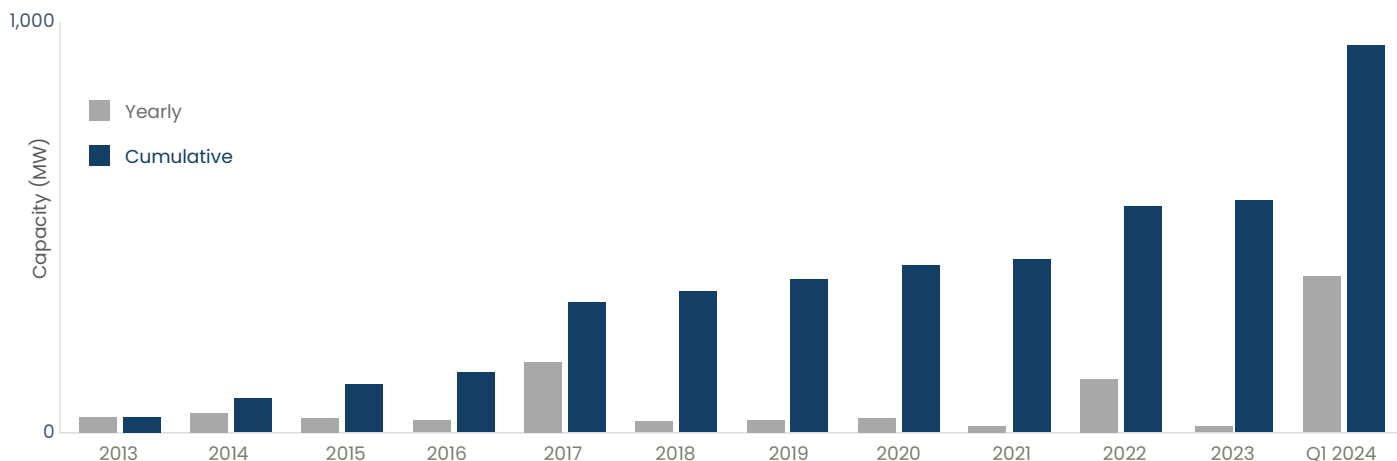
**The PPA price assumption is as per the Q1 2024 market analysis"

Source: APERC

Mercom India Research (Mar 2024)



Andhra Pradesh Solar Open Access Market (MW)



Source: Mercom India Research (Mar 2024)

and additional surcharges. Under the third-party open access model, the state provides the third-lowest landed cost for high-tension industrial consumers.

Captive solar open access allows industrial consumers in the state to save up to ₹1.36 (~\$0.016)/kWh, nearly 24% of the DISCOM's tariff at 11 kV. Similarly, commercial consumers can save up to ₹2.57 (~\$0.031)/kWh, almost 37% of the electricity tariff levied by the DISCOM.

The three Andhra Pradesh DISCOMs appear more amenable to approving open access installations than before, thanks to improved ratings as a result of reduced AT&C losses, higher

collection efficiency, and a narrower ACS-ARR gap.

Eastern Power Distribution Company of Andhra Pradesh (APEPDCL) was upgraded from a B in FY23 to an A rating in FY24. However, its ACS-ARR gap increased by ₹0.01 (~\$0.00012)/kWh to ₹-0.07 (~\$-0.00084)/kWh, AT&C losses reduced to 5.9% from 7.8% YoY as its collection efficiency improved to 100% from 98.8% YoY.

Central Power Distribution Company of Andhra Pradesh (APCPDCL) improved its rating from C to B- in 2024. Its ACS-ARR gap narrowed ₹0.57 (~\$0.0069)/kWh to ₹0.07 (~\$0.00084)/kWh.

Southern Power Distribution Company of Andhra Pradesh (APSPDCL) improved from a C in FY22 to a B- in FY23. Its ACS-ARR gap was reduced by ₹0.92 (~\$0.011)/kWh to ₹0.04 (~\$0.0048)/kWh. AT&C losses decreased to 8.1% from 13.6% YoY.

As of March 2024, open access accounted for 19.6% of the state's cumulative installed large-scale solar capacity. Wind-solar hybrid power projects accounted for 40% of the solar open access installations, and floating solar projects accounted for 0.5%. Standalone solar projects accounted for the rest. 🌞



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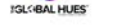
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The Lucrative Short Term Green Energy Market

The green day-ahead and term-ahead markets facilitate short term transactions, providing a platform for generators and DISCOMs to trade surplus power, and creating new prospects for renewable energy developers

By: Tarun Kothamasu



Markets



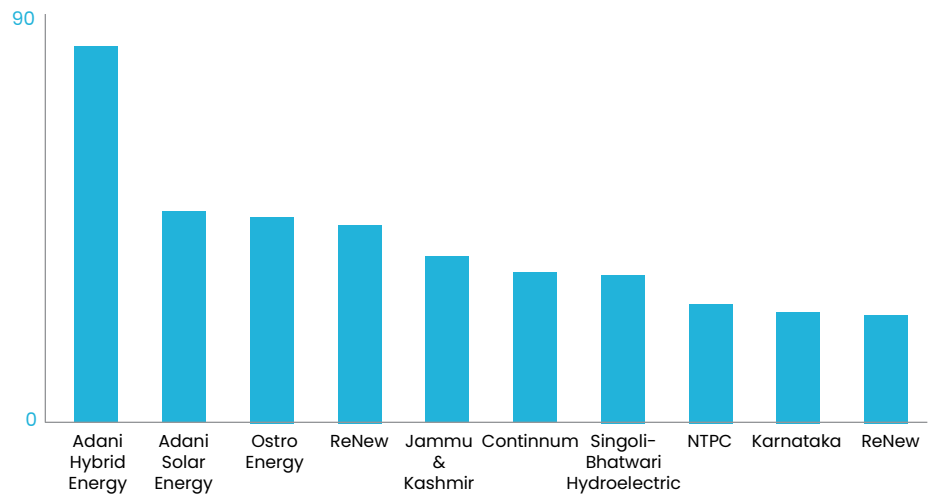
Green Day-Ahead Market (GDAM) has provided new opportunities for renewable energy generators and distribution companies (DISCOMs) to trade surplus power on exchanges.

Power generators affected by long-delayed payments from DISCOMs and those with surplus power from projects linked to power purchase agreements (PPA) can sell their excess power on exchanges, preventing it from going to waste.

GDAM reduces green power curtailment, ensures instant payments for power sold on the same day it is delivered, and opens a new market for untapped renewable energy potential. It has also created new opportunities to develop merchant renewable energy capacity without the need for long-term PPAs.

An added advantage is that obligated entities (DISCOMs and captive power consumers) can meet their renewable power

Electricity Sold in G-DAM Through Power Exchanges in Q4 2023 (MUs)



Source: CERC

Mercom India Research (Mar 2024)

purchase obligation (RPO) mandate by directly buying green power from the exchanges.

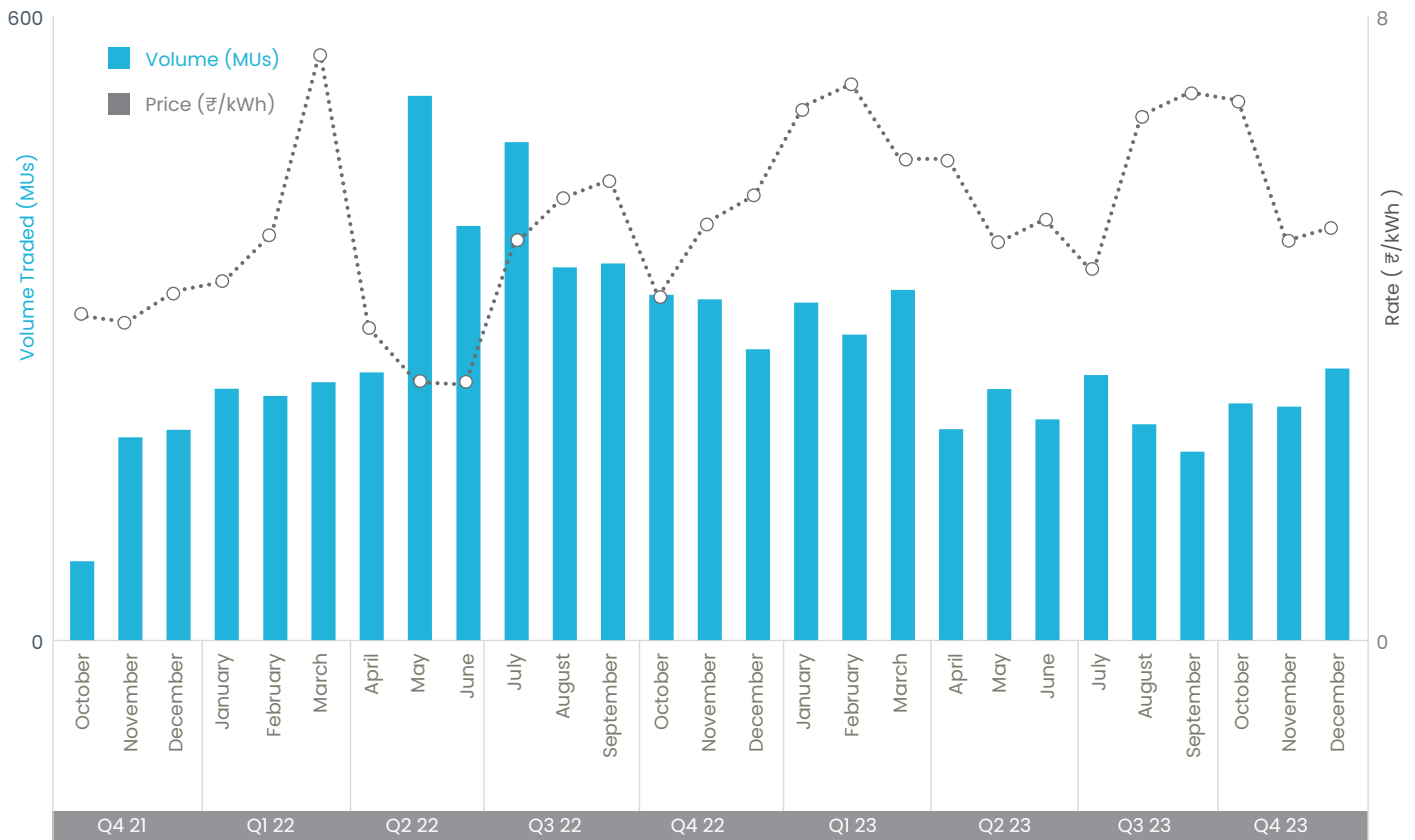
Before the introduction of GDAM, renewable power was mainly procured through the Green Term-Ahead Market (GTAM).

Top Sellers in the Green Day-Ahead Market

In the fourth quarter (Q4) of the calendar year (CY) 2023, Adani Hybrid Energy was the top entity selling power through the exchanges, accounting for 14.2%, followed by



Monthly Volume and Price of Electricity in G-DAM at IEX



Source: CERC

Mercom India Research (Mar 2024)





Arcelor Mittal was the leading energy procurer, with a market share of 36.4%

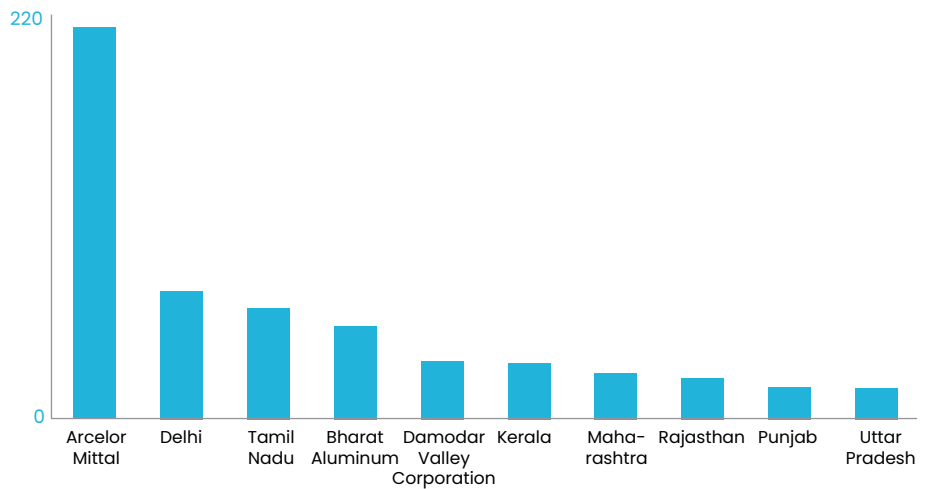
Adani Solar Energy (8%). Ostro Energy, ReNew, and Jammu & Kashmir represented 7.8%, 7.5%, and 6.3%, respectively, as the entities selling power in the GDAM.

These numbers were revealed in Mercom India Solar Open Access Market Report Q1 2024. The top five states accounted for 43.8% of power sold in the GDAM in Q4 2023.

Top Buyers in the Green Day-Ahead Market

Arcelor Mittal was the leading energy procurer from GDAM with 36.4% of the total market share, followed by Delhi at 12%. Tamil Nadu, Bharat Aluminium, and Damodar

Electricity Purchased in G-DAM Through Power Exchanges in Q4 2023 (MUs)



Source: CERC

Mercom India Research (Mar 2024)

Valley Corporation were the other major buyers, accounting for 9.7%, 8.3%, and 4.9%, respectively. The top ten states made up 88% of the total energy procured through GDAM.

Volume vs. Price in the GDAM Market

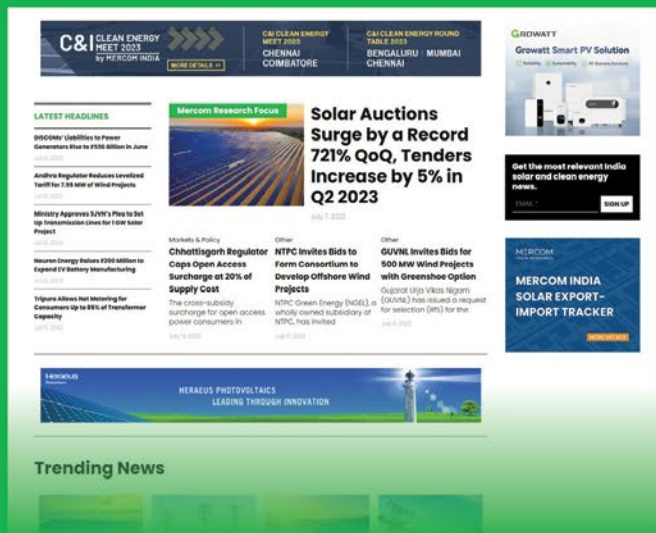
In GDAM, the highest trading was observed in December, and the highest weighted average price was

realized in October. In Q4 2023, trading volume increased 14% quarter-over-quarter, while the highest weighted average price fell 1.5%.

The Indian Energy Exchange (IEX) traded green energy in the GDAM at a weighted average price of ₹6.37 (~\$0.0766)/kWh in October, ₹4.69 (~\$0.0564)/kWh in November, and ₹4.86 (~\$0.0584)/kWh in December. 📉



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Offshore Wind Gets ₹74 Billion VGF Boost

The government is exploring offshore wind energy to meet its growing energy demand and mitigate the requirement of large tracts of land. Considering that the cost of offshore wind is relatively higher, the government has announced funding to support deployment

By: Arjun Joshi

The Union Cabinet has approved a Viability Gap Funding (VGF) program with a total outlay of ₹74.53 billion (~\$893.34 million) for offshore wind energy projects.

The program includes ₹68.53 billion (~\$821.43 million) for installing and commissioning 1 GW of offshore wind energy projects, split equally between the coasts of Gujarat and Tamil Nadu.

An additional ₹6 billion (~\$71.92 million) will go towards upgrading two ports to support the logistics requirements of these projects.


The VGF program aligns with the National Offshore Wind Energy Policy, which aims to utilize the vast offshore wind energy potential within India's exclusive economic zone. By providing financial support, the government seeks to reduce the cost of power

from these offshore projects, making them viable for purchase by power distribution companies.

Private developers, selected through a transparent bidding process, will establish these projects. Power Grid Corporation of India will construct the necessary power evacuation infrastructure, including offshore substations. The Ministry of New and Renewable Energy, serving as the nodal ministry, will coordinate with other ministries and departments to implement the program.

Developing offshore wind energy projects requires specialized port infrastructure to handle heavy, large-dimension equipment storage and movement. The program will support two ports, which will be upgraded by the Ministry of Ports, Shipping, and Waterways to meet these demands.

Offshore wind energy offers several advantages over onshore wind and solar projects, including higher adequacy and reliability, lower storage requirements, and greater employment potential. The sector's development is expected to attract investments, foster indigenous manufacturing capabilities, and promote technology development for offshore wind in India.

The commissioning of 1 GW of offshore wind projects is projected to produce approximately 3.72 billion units of renewable electricity annually, reducing 2.98 million tons of CO₂ equivalent emissions over 25 years. This initiative is anticipated to create an ecosystem supporting an initial 37 GW of offshore wind energy, attracting investments of around ₹4.5 trillion (~\$53.94 billion). 

Shortage of Power Transformers Clouds Solar Expansion

The rising demand for power transformers has intensified supply chain challenges driven by increased development of solar projects across India

By: Arshreet Singh

Solar developers are facing longer lead times for power transformers as manufacturing capacity for this key component in large-scale solar projects has failed to keep pace with demand, slowing solar deployment in India.

With approximately 143 GW of large-scale solar projects under various stages of development and another 96 GW of solar projects tendered and pending auction, the demand for transformers is exploding, according to the Q1 2024 India Solar Market Update from Mercom India Research.

The lead time for procuring 220 kV transformers has increased from 8-9 months to nearly 14 months, according to Ashish Agarwal, Head of Solar and Storage at BluePine Energy, a renewable energy developer.

"The rapid expansion of railways, metro systems, power transmission infrastructure, power projects, and solar projects has driven up the demand and pricing for transformers," said Agarwal. "Additionally, many Indian engineering, procurement, and construction (EPC) contractors are undertaking projects overseas and utilizing the Indian supply chain,

leading to increased exports of power transformers."

Similarly, a spokesperson for Hartek Group, another EPC firm, told Mercom that they have also seen longer delivery times for power transformers, much like the rest of the industry.

"This is due to several reasons, including global supply chain hiccups, copper volatility, raw material shortages, and the booming demand for transformers driven by the rapid expansion of renewable energy projects," the spokesperson said, adding that when it comes to Balance of System (BoS) components, power transformers often take the longest to deliver.

"While inverters, mounting structures, and electrical wiring usually have more predictable schedules, transformers are complex and take longer to manufacture. Their lead times sometimes stretch several weeks or even months longer than other BoS items."

Transformers are essential components in electrical systems. They ensure the efficient transfer of electricity safely across long distances with minimal energy losses at stable voltage levels.

Electrical steel and copper are





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Transformer prices have risen 60% to 80% since 2020

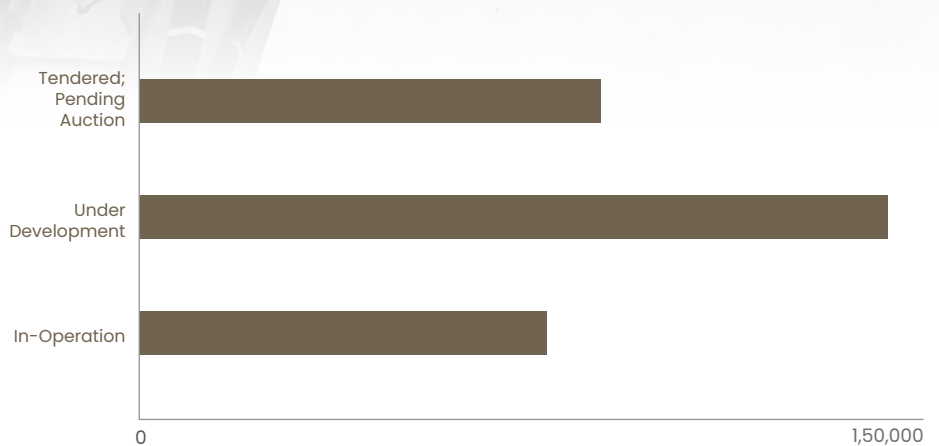
two crucial raw materials in a power transformer. Bushings, transformer oil, and insulation are other materials used.

According to a recent report by Wood Mackenzie, the lead time for procuring transformers has steadily risen over the past two years, ranging from 120 to 210 weeks globally. Transformer prices have risen 60% to 80% on average since January 2020, driven by higher copper prices, which have increased more than 40% over the same period.

The research firm estimates that 25% of global renewable projects are at risk of delays due to transformer lead times.

This bottleneck in transformer availability is expected to have ripple effects across India's infrastructure

India : Utility - Scale Solar Projects by Status (MW)



Source: Mercom India Research (Mar 2024)

buildout, potentially delaying the timelines for solar project construction and other energy projects.

At the same time, transformer manufacturers are also grappling with a surge in orders.

"The primary reason for extended delivery times globally is the high demand coupled with limited availability of specific components like bushings and sensors," a spokesperson from Shirdi Sai Electricals (SSEL), a transformer

manufacturer, said. The scarcity is largely due to the execution time required by manufacturers for these specialized components, which remain limited worldwide.

The company said this has stretched the delivery time frame to nearly three years in the U.S. and over a year in India. While SSEL claims its lead times of 10-12 months for power transformers and 3-4 months for distribution transformers are manageable, the firm called for



government intervention to ease import policies for key raw materials that are in shortage in India. Indian transformer industries are operating at only 60% to 70% of their capacity.

"Furthermore, meeting short circuit criteria, as outlined by the Central Electricity Authority of India's (CEA) guidelines, presents a challenge due to the diverse range of ratings and voltage classes selected by developers to optimize the overall costs. Although CEA has expanded its guidelines to accommodate these requirements, many solar developers insist on strict compliance, reducing the pool of available suppliers and exacerbating demand and lead times," the company said.

Faced with this mounting demand, some transformer manufacturers have expanded their production capacity or announced plans to meet the growing market requirements.

Transformers and Rectifiers India, a manufacturer of a wide range of transformers, in a recent earnings call, said that it plans to use a part of the ₹5 billion (~\$60 million) it raised to expand capacity. Additionally, the

company is also trying to reduce the time it takes to make a transformer since it's challenging to increase capacity quickly. "We are putting all our efforts into reducing the cycle time... we have successfully reduced the cycle time down from 55 days to 40 days. So, now we are trying to reduce it further down to 32 days, or 35 days," said Jitendra Mamtora, Chairman of Transformers and Rectifiers India. The company noted that 60% to 70% of their transformer order book is for renewable energy projects, especially solar ones.

"We are mainly focusing on green hydrogen transformers and for solar parks transformers... the demand is going to be very high... 80 to 100 transformers per month," added Mamtora.

Hitachi Energy, a subsidiary of Japan-based conglomerate Hitachi, recently said it will ramp up its global manufacturing capacity for transformers with a \$1.5 billion investment by 2027, as a long queue for grid interconnections, particularly from renewables, is driving up demand.

“

Lead time for 220 kV transformers has touched 14 months

Expanding production also presents challenges. SSEL claims that the industry has always experienced an up-and-down pattern in the demand for transformers. During periods of high demand, many manufacturers have expanded their capacities, only for the demand to decrease. Consequently, manufacturers tend to exercise caution due to this inherent unpredictability.

As India aims to install 450 GW of renewable energy by financial year 2031-32 under its climate commitments, ensuring a steady supply of transformers and other balance-of-system components will be crucial for timely project execution across the solar, wind, and energy storage sectors. 🌞

Compensating Transmission Line Right-of-Way

After examining that inefficient Right-of-Way compensation has impeded transmission line projects, the Ministry of Power has issued new guidelines to expedite the process and ensure timely project completion

By: Arjun Joshi

The Ministry of Power has issued new guidelines addressing the payment of Right-of-Way (RoW) compensation for transmission lines, including those in urban areas. These guidelines aim to streamline transmission line construction and ensure timely completion by effectively addressing RoW issues.

The compensation guidelines apply to transmission lines supported by tower bases with a voltage level of 66 kV and above, excluding sub-transmission and distribution lines below 66 kV.

The District Magistrate, District Collector, or Deputy Commissioner will determine the compensation.

Determination of Compensation

Compensation is based on the

circle rate, guideline value, or Stamp Act rates of the land. If the market rate exceeds these values, the land value is determined based on the prevailing market rate, as ascertained by the District Magistrate, District Collector, or Deputy Commissioner. This determined land value serves as the basis for compensation and is communicated by the respective authority.

The compensation for the tower base area is set at 200% of the land value. The tower base area includes the area enclosed by the tower's four legs at ground level, plus an additional one-meter extension on each side.

Compensation for the RoW corridor is 30% of the land value. The land within the RoW corridor, defined in Schedule VII of the Central Electricity Authority (Technical Standards for

Construction of Electrical Plants and Electric Lines) Regulations, 2022, is eligible for this compensation. This amount addresses the potential reduction in land value due to the presence of overhead lines or underground cables.

No construction activity would be permitted within the RoW of the transmission line. States can decide on higher rates depending on the area and urgency of the work.

In areas where landowners accept other compensation methods, such as through the states' and union territories' transfer of development rights policy, the licensee or utility must deposit the compensation amount with the relevant corporation, municipality, local development authority, or the state government.

In areas with RoW constraints,

various technologies can be employed to optimize space usage. These include steel pole structures, narrow-based lattice towers, multi-circuit and multi-voltage towers, single-side stringing with lattice or steel poles, cross-linked polyethylene underground cables, gas-insulated lines, compact towers with insulated cross-arms, and voltage source converter-based high-voltage direct current systems.

Landowner Identification

During the check survey at the execution stage, the names of landowners whose property falls within the transmission line's RoW are documented. This process adheres to Regulation 8a(B) of the Central Electricity Authority (Technical Standards for Construction of Electrical Plants and Electric Lines) Regulations, 2022.

Compensation payment is one-time and upfront, with digital payment methods such as the Aadhaar-Enabled Payment System and Unified Payments Interface being preferred.

Standard Operating Procedure

States, union territories, and transmission developers should refer to the following standard operating procedure for detailed guidelines on

“

Compensation is based on land's circle rate, guideline value, or Stamp Act rates

implementing these compensation measures:

- The Transmission Service Provider (TSP) is responsible for identifying the landowners and issuing the notice to proceed. The TSP will then collect necessary documents from the landowners, such as proof of identity and ownership.
- Revenue officials will verify land records against revenue maps. In cases involving multiple landowners, the TSP must obtain a no-objection certificate from all co-owners, which needs to be attested by the sarpanch and the revenue office.
- The TSP will measure the tower footing and corridor area in the presence of landowners, obtaining their signatures along with those of revenue officials. If there are grievances related to land rates,

the district magistrate or an authorized magistrate will issue orders to resolve the matter and fix the compensation.

- The TSP is responsible for compensation, which covers tower footing, corridor surface, working area, and access roads. The compensation includes any permanent and temporary structures such as hutments, houses, and line shifting based on the assessment. The measurement sheet must be verified by the project RoW lead and countersigned by the landowner and the concerned revenue officials.
- Finally, the TSP will disburse the payment and collect receipts from the landowners, ensuring all transactions are appropriately documented and acknowledged.

States can adopt these guidelines entirely or issue modified guidelines. In the absence of state-specific guidelines, the guidelines issued by the central government will apply.

Disputes over right of way and difficulties in land acquisition are often cited as challenges coming in the way of faster development of renewable energy projects. 🗣️



SEZ Developers Can Now Go Solar

Recognizing the need for sustainable energy solutions in SEZs, the Ministry of Commerce has issued directions streamlining the process for SEZ developers to install and procure solar power

By: B.S Nagaraj

The Ministry of Commerce has allowed developers of Special Economic Zones (SEZ) and units in SEZs to install solar systems for captive consumption, following demands from the Export Promotion Council for Export Oriented Units and SEZs (EPCES).

In a clarification, the ministry said that duty benefits under Section 26 of the SEZ Act are allowed for SEZs to install, operate, and maintain renewable energy equipment like solar panels exclusively for captive use on the condition that the power generated is not wheeled out to the domestic tariff areas (DTA). The solar

equipment will be treated as capital goods.

The ministry has also directed Development Commissioners of SEZs to consider requests from SEZ developers/co-developers to set up non-conventional power plants as part of infrastructure with fiscal benefits. However, no fiscal benefits will be available for the solar systems' operation and maintenance.

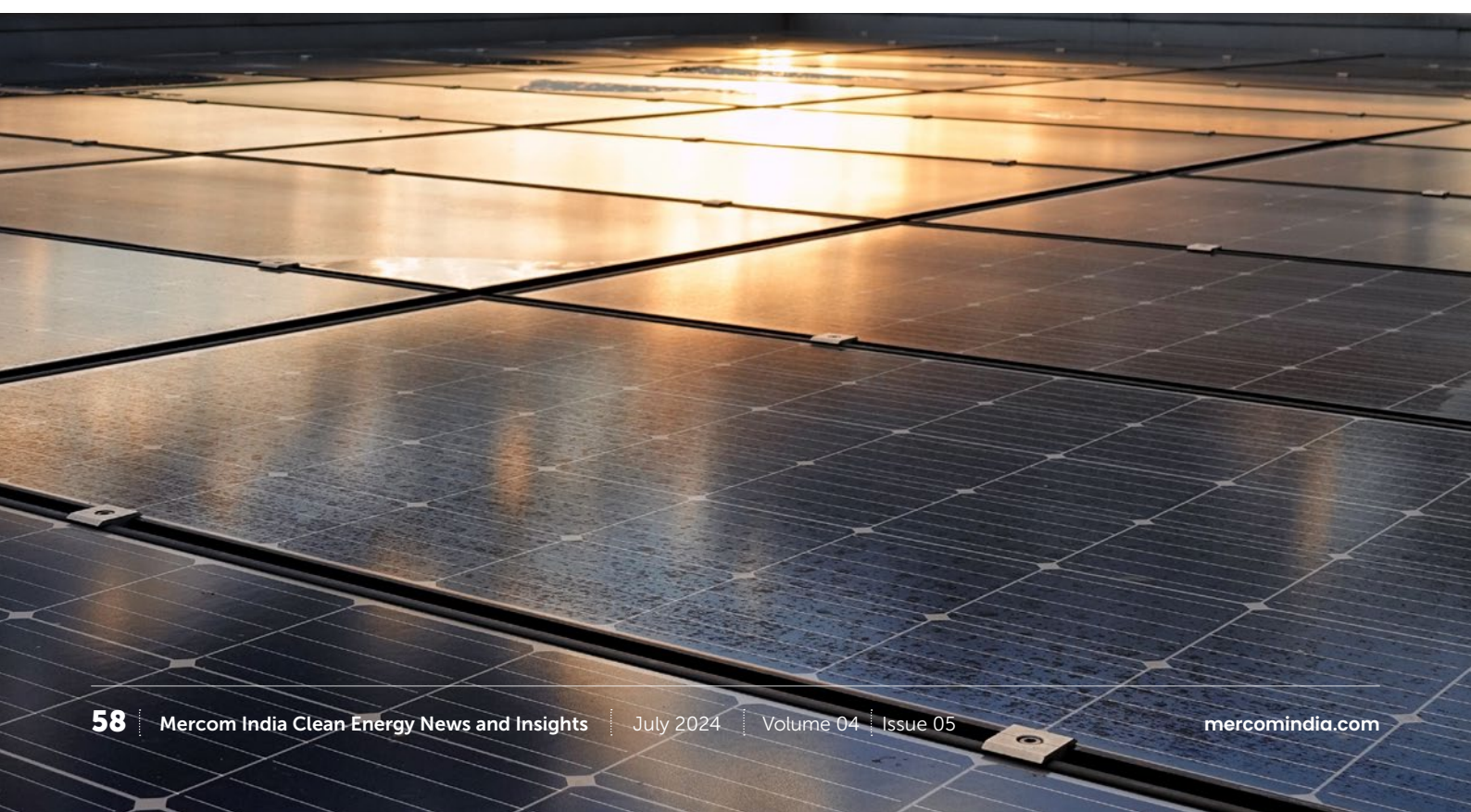
According to EPCES, various IT/ITES developers had requested that they be allowed to import solar panels without duties and procure them from DTAs without payment of GST to install them in their buildings to provide power supply to common areas of

SEZs.

Units in SEZs had raised a similar demand but there was no clarity in this regard in the SEZ power guidelines. According to existing provisions, SEZ and IT/ITES developers can set up units in SEZ processing areas with fiscal benefits but under the Net Foreign Exchange (NFE) obligation.

EPCES had contended that it was difficult for SEZ units to operate with the NFE obligation. However, municipal and development authorities had made it mandatory for the units to install solar power systems before commencing their operations.

The matter was resolved after



“

Section 26 of the SEZ Act allows for the installation of solar systems

EPCES brought the difficulties faced by its members to the attention of the Commerce and Power ministries and the Directorate General of Export Promotion, Central Board of Indirect Taxes and Customs.

In May, the Ministry of New and Renewable Energy had exempted renewable energy projects located inside SEZs and EOUs and supplying power exclusively to green hydrogen (or its derivatives) projects, also located in an SEZ or set up as an EOU, from the purview of Approved List of Models & Manufacturers for solar modules. ☺



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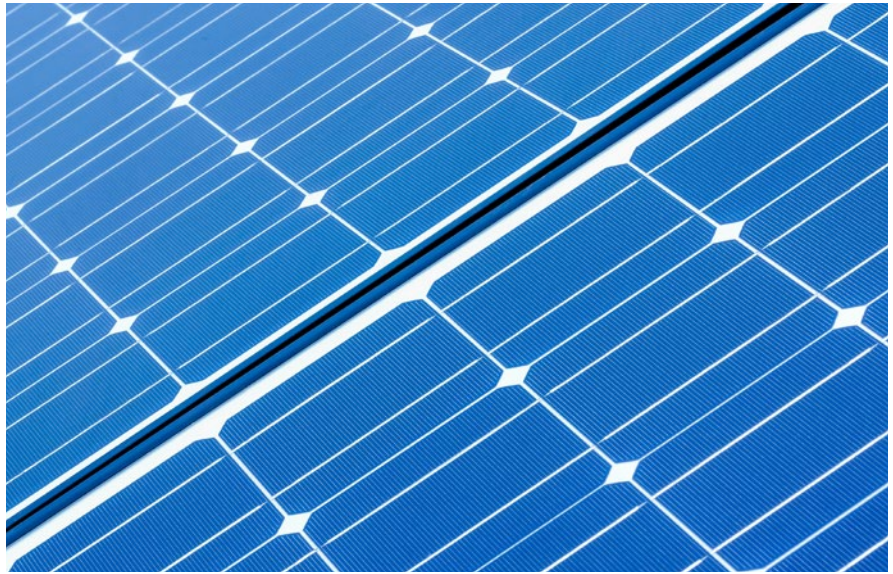
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India imported solar cells and modules totaling over \$2 billion (~₹167 billion) in the first quarter of the calendar year 2024, up 147.5% year-over-year, according to data from the Department of Commerce. Solar cells accounted for 21% of the quarter's imports, and solar modules 79%. Module and cell imports fell 2.1% quarter-over-quarter from \$2.05 billion (~₹170.9 billion). In March 2023, the **MNRE** held in abeyance the implementation of the **ALMM** for all large-scale, rooftop, and solar open-access projects commissioned until March 31, 2024.



candi solar, a solar solutions provider for commercial and industrial consumers, **secured \$38 million in equity investment** in its Series C funding round led by Norfund, Kyuden International, and STOA. This investment will support candi solar's growth plans in India and Africa, financing an additional 200 MW of **solar projects** for C&I consumers and bolstering hiring initiatives to sustain its expansion.



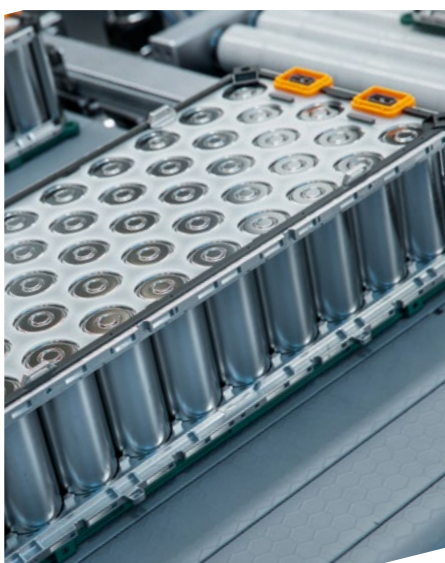
Hero MotoCorp has increased its stake in electric mobility firm **Ather Energy** by 2.2% by purchasing shares worth ₹1.24 billion (~\$14.85 million). The indicative period for the completion of the acquisition is July 31, 2024. The transaction will be made on an arm's length basis. Ather Energy, an existing associate company of Hero MotoCorp, designs, manufactures, sells, and services **electric two-wheelers**.

The **International Finance Corporation** will partially finance a **550 MW solar power project** being developed by **Brookfield Asset Management** in Bikaner, **Rajasthan**, with a \$105 million investment. The investment will be through long-term non-convertible debentures assigned to the project's special purpose vehicles, which will implement the project.

The **Ministry of Mines** launched the fourth tranche of e-auction for **critical and strategic minerals**, offering concessions for 21 mineral blocks, even as it canceled the auction of 14 mineral blocks from the second tranche. The ministry attributed the cancellation due to poor response. In February, the ministry issued the second tranche to grant concessions for 18 critical and strategic mineral blocks across eight states, with 17 designated for composite licenses and one for a mining lease. According to a notice on the MSTC website, five of these 14 blocks received no bids.



Battery Smart, a battery swapping network for **electric two- and three-wheelers**, secured **\$65 million** in a Series B funding round led by **LeapFrog Investments**. This equity round included both primary and secondary investments and saw participation from new and existing investors, such as MUFG Bank, Panasonic, Ecosystem Integrity Fund (EIF), Blume Ventures, and British International Investment (BII).

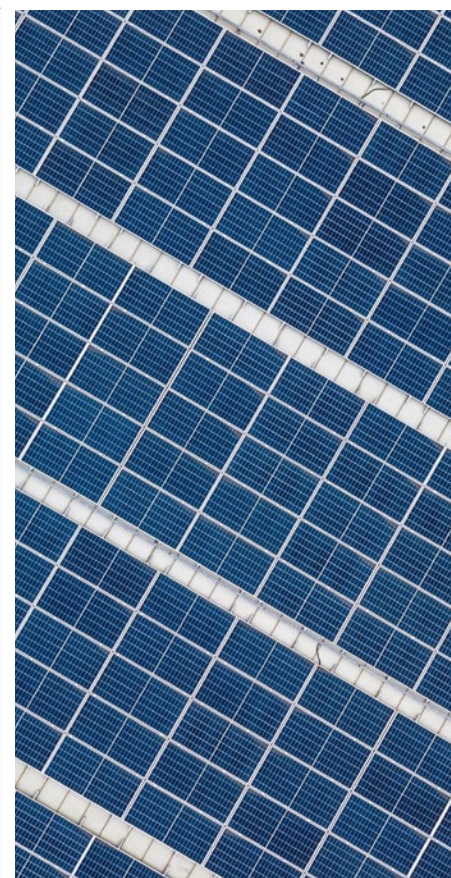


Battery manufacturer **Amara Raja Energy & Mobility** invested an additional €20 million (~\$21.4 million) in electric vehicle (EV) battery firm **InoBat**, Norway, for a 4.5% equity stake. Amara Raja's stake in the Slovakia-headquartered InoBat now stands at 9.32%. It had earlier invested €10 million in the company to enable it to secure a foothold in the **European EV ecosystem**.

The **Government of India** greenlighted new Interstate Transmission System (ISTS) programs totaling ₹135.95 billion (~\$1.63 billion) to evacuate 9 GW of renewable energy from Rajasthan and **Karnataka**. The first program focuses on the **Rajasthan renewable energy zone**, designed to evacuate 4.5 GW of renewable power. This includes 1 GW in Fatehgarh Complex, 2.5 GW in Barmer Complex, and 1 GW in Nagaur (Merta) Complex.

IREDA raised **₹15 billion** (~\$179.5 million) through bonds, reflecting strong investor confidence in India's **renewable energy** sector. The bond issuance, which included a base issue of ₹5 billion (~\$59.8 million) and a green shoe option of ₹10 billion (~\$119.7 million), received an overwhelming response from investors. The bonds were oversubscribed by 2.65 times. The funds have been raised at an annual interest rate of 7.44% for ten years and two months.

Cleantech Solar, a provider of renewable energy solutions in India and Southeast Asia, secured **₹8.55 billion** (~\$103 million) in long-term green financing from **Aseem Infrastructure Finance**. The financing will support Cleantech Solar's open-access portfolio in India, specifically for constructing and operating solar and wind power projects across multiple states.



Renewable energy solutions provider **KPI Green Energy** secured a credit facility of **₹6.86 billion** (~\$82.1 million) to develop a **200 MW** solar photovoltaic power project in Khavda, Kutch District. The credit facility comes after the company recently raised ₹3 billion (~\$36.08 million) through qualified institutions placement. The company's board had approved the issuance and allotment of 2.54 million equity shares to qualified institutional buyers at the issue price of ₹1,183 (~\$14.23) per equity share against the floor price of ₹1,245 (~\$14.97).

Policy Briefs

Center

The Ministry of New & Renewable Energy (**MNRE**) constituted a mission **director**ate to implement the **PM-Surya Ghar: Muft Bijli Yojana** to ensure the achievement of the goals and oversee the day-to-day operations. The joint secretary in the MNRE in charge of the **rooftop solar** division will head the directorate. The directorate will be responsible for issuing the program guidelines and amendments, coordinating with stakeholders, including program implementation agencies in the states and, issuing them advisories, and issuing orders for the release of funds to the national program implementation agency.



The **MNRE** amended the process document for implementing the PM-Surya Ghar: Muft Bijli Yojana by allowing multi-state **vendor registration** on the National Portal for the **residential rooftop solar program**. Following suggestions from stakeholders, MNRE has said there will now be multi-state registration of vendors in addition to a national registration.

The Central Electricity Regulatory Commission (**CERC**) directed that a **transmission license** be granted to **Pachora Power Transmission** to establish the transmission system for evacuation of power from renewable projects in **Rajgarh** (1,000 MW) Solapur Solar Energy Zone (SEZ) in **Madhya Pradesh**-Phase II.



The **Bureau of Indian Standards** unveiled two standards, IS 18590: 2024 and IS 18606: 2024, aiming to enhance the safety of **electric vehicles** across various categories. These new regulations, targeting the EV powertrain, ensure stringent safety measures and battery performance criteria. The IS 18590: 2024 and IS 18606: 2024 standards relate specifically to vehicles in the two-wheelers, passenger four-wheelers, and goods-carrying four-wheelers categories, covering a broad spectrum from two-wheelers to commercial trucks. The **CERC** granted a transmission license to **Solapur Transmission** to establish an inter-state transmission system for the evacuation of 1,500 MW of power from renewable energy projects in the Solapur SEZ in **Maharashtra**.

The **MNRE** released a framework to enlist **solar photovoltaic modules and inverters** under the PM-Surya Ghar: Muft Bijli Yojana to assist consumers in making informed choices when selecting high-efficiency products with better warranties for their rooftop solar installations.

The Appellate Tribunal for Electricity (**APTEL**) quashed an order by the Karnataka Electricity Regulatory Commission that rejected a solar developer's petition asking for Bangalore Electricity Supply Company (**BESCOM**) not to reduce the tariff of the delayed solar project from ₹7.05 (~\$0.084)/kWh to ₹6.51 (~\$0.078)/kWh. The Tribunal directed BESCOM to refund any liquidated damages recovered, with interest. BESCOM must also pay the tariff at ₹7.05 (~\$0.084)/kWh, including any differential amounts due from the date of commissioning, with interest.



Policy Briefs

State

The **Maharashtra Electricity Regulatory Commission** ruled in favor of TP Saurya (TPSL), a subsidiary of **Tata Power Renewable Energy**, declaring the increase in Goods and Services Tax rates as a "Change in Law" event for its 300 MW wind-solar hybrid power project. The ruling will allow TPSL to claim compensation to offset the financial and commercial impact incurred due to the tax hike.



The **Tamil Nadu Electricity Regulatory Commission** (TNERC) released a draft of the grid-interactive Solar Photovoltaic Energy Generating Systems Regulations, 2024, aimed at streamlining the integration of **solar PV systems** into the grid and ensuring regulatory clarity. The draft regulations allow domestic consumers to opt for net metering, net billing, or feed-in arrangements where imported energy is charged at retail rates, and exported solar energy is credited at feed-in tariffs determined by TNERC.

TNERC released draft regulations aimed at tightening the process to verify if power projects qualify as **captive generating projects** (CGP). The draft regulations have proposed that distribution licensees conduct an annual verification after each financial year to assess compliance with ownership and consumption criteria per the Electricity Rules, 2005. CGPs must maintain the minimum 26% ownership requirement throughout the financial year to establish ownership.



Gujarat Electricity Regulatory Commission (GERC) recently finalized tariffs for three solar power projects in the state with a cumulative capacity of 1,200 MW and authorized **Gujarat Urja Vikas Nigam** to sign the power purchase agreements with the developers. SJVN Green Energy has been contracted to supply 500 MW of solar power at ₹2.54 (\$0.0304)/kWh. SAEL Industries will supply 200 MW of solar power, with an option to provide an additional 200 MW if required. The tariff rate for the initial 200 MW is ₹2.55 (\$0.0305)/kWh. The greenshoe capacity will be supplied at ₹2.54 (\$0.0304)/kWh.

The **Jharkhand State Electricity Regulatory Commission** recognized **Bokaro Steel's** cogeneration plants as fulfilling renewable purchase obligations, citing their environmental benefits such as reduced emissions and fossil fuel conservation. As a result, the captive power project at Bokaro Steel will count towards the renewable power purchase obligation from FY 2013-14 to FY 2020-21.



GERC adopted tariffs of ₹3.42 (~\$0.04)/kWh for Alfanar Power's 50 MW **wind power** project and ₹3.44 (~\$0.041)/kWh for Juniper Green's 90 MW of wind power projects in response to a petition filed by **GUVNL**. The Commission also allowed GUVNL to sign power purchase agreements with the project developers.

Major Tender and Auction Announcements in June

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



Top Large-Scale Solar Tenders

Rajasthan Urja Vikas and IT Services (**RUVITL**) launched a tender for developers to set up **8,000 MW** solar power projects in the state.

SJVN invited bids from developers for **1.2 GW** interstate transmission system (ISTS)-connected solar power projects anywhere in India under tariff-based competitive bidding.

Solar Energy Corporation of India (**SECI**) issued a tender to develop **1.2 GW** of interstate transmission system (ISTS)-connected solar photovoltaic projects across India under **Tranche XVI** on a build, own, operate basis.

REC Power Development and Consultancy

(**RECPDCL**) invited bids for the design, engineering, supply, construction, erection, testing, and commissioning of a **200 MW** ground-mounted solar power project at **Jhansi**, Uttar Pradesh.

Coal India Limited (**CIL**) invited bids to commission **20 MW (10 MW x 2)** of solar power projects along with the associated transmission system in Jagannath and Lakhanpur, **Odisha**.

The Agency for New and Renewable Energy Research and Technology (**ANERT**) launched a tender for a **1.5 MW** ground-mounted solar power project with grid connectivity under the RESCO model in the Central University of Kerala, Kasaragod.

Other Tenders

Energy Efficiency Services (**EESL**) invited bids for supplying domestic content requirement (DCR)-compliant **2 GW** of monocrystalline modules for solar power projects across India.

TREDCO Rajasthan launched a tender to engage consultants to acquire land to develop **2,000 MW** ultra mega renewable energy parks in Jaisalmer, **Rajasthan**, under the Ministry of New & Renewable Energy's solar park program.

NTPC invited bids to select developers to supply **1,200 MW** of firm and dispatchable power (assured peak power supply) from ISTS-connected renewable energy projects anywhere in India on a built-own-operate arrangement.

NTPC Renewable Energy released a tender for a Balance of System (BoS) package for a **1 GW** ISTS-connected wind energy project in the Davangere region, Karnataka (Tranche-IV).

NTPC Renewable Energy invited bids for a BoS package for a **1,000 MW** ISTS-connected wind energy

project in the Bellary region, Karnataka (**Tranche-V**).

Renewable energy developer **Serentica Renewables** invited expressions of interest (Eoi) to set up interstate transmission system-connected BESS to supply **800 MWh** of battery capacity to Serentica's round-the-clock projects.

HPCL Renewable and Green Energy (**HPRGE**) has announced a tender for land and EHV transmission system package for the development of ISTS-connected solar power projects of **600 MW** in Gujarat, Maharashtra, Andhra Pradesh, Rajasthan, Karnataka, and Tamil Nadu.

NTPC invited bids to develop **250 MW/500 MWh** standalone BESS at its thermal power stations in Gadawara and Solapur.

NVVN launched a tender to develop **100 MW** ISTS-connected wind-solar hybrid projects in India.

Maharashtra State Power Generation (**MAHAGENCO**) invited bids to select an EPC contractor for the design, engineering, supply,

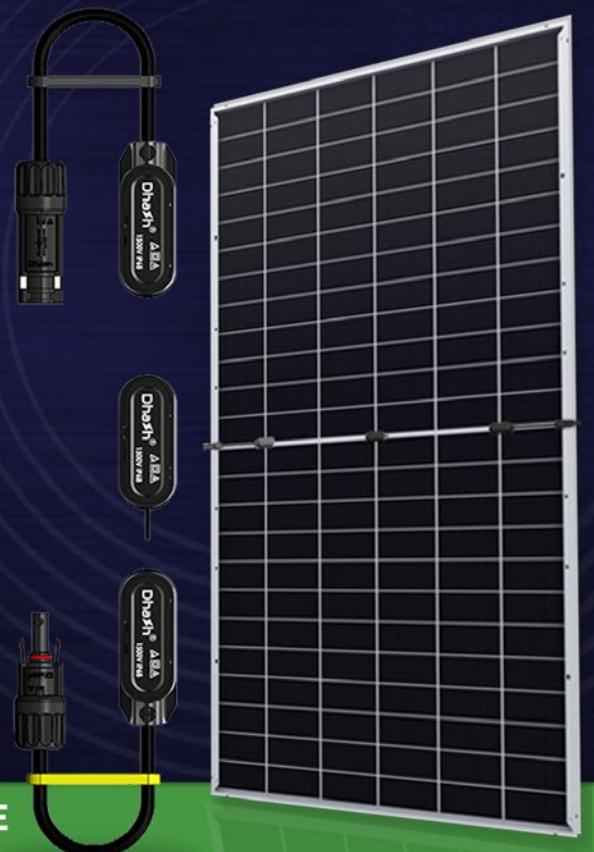
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Other Tenders

erection, testing, and commissioning of a **65 MW** solar project at Chandrapur.

Bihar Renewable Energy Development Agency (**BREDA**) invited bids for the design, supply, testing, installation, commissioning, and maintenance of **10 MT** solar cold storage units in Bihar.

Gujarat Power Corporation (**GPCL**) issued a tender for consultants to prepare a pre-feasibility report and detailed project report for a **5 MW** solar project with **15/20 MWh** storage at the Gujarat Solar Park in Charanka.

GPCL also announced a tender for a detailed geotechnical investigation and topographical and contour survey for solar, wind, wind-solar hybrid, and BESS projects at various locations in the state.

The Airports Authority of India (**AAI**) floated a tender for facility management and comprehensive maintenance of a **1.5 MW** grid-connected rooftop solar power project at the Integrated Cargo Complex, Chennai airport, for two years.

NTPC invited bids for the supply, installation, commissioning, and integration of a **600 kW/3000 kWh** Vanadium Redox Flow Battery storage system at the NTPC Energy Technology Research Alliance facility

in Greater Noida.

Odisha Renewable Energy Development Agency (**OREDA**) invited expressions of interest from consultants for a detailed survey and preparation of feasibility reports for grid-connected rooftop solar projects on government buildings.

SECI invited bids for the production and supply of green ammonia in India through cost-based competitive bidding under strategic interventions for the green hydrogen transition (SIGHT) program.

NVVN invited bids to select channel partners for installing grid-connected rooftop solar power systems under PM Surya Ghar Muft Bijli Yojana in the **Andaman and Nicobar Islands** and **Chhattisgarh**.

Railways issued a request for qualification to empanel agencies to implement rooftop solar projects for the Indian Railways in Rajasthan.

The Uttar Pradesh New & Renewable Energy Development Agency (**UPNEDA**) released a tender to select firms for the strategy, planning, and implementation of Information, Education, and Communication (IEC) activities aimed at increasing awareness of **PM Surya Ghar Yojana** benefits in Ayodhya, Gorakhpur, and Varanasi.



Rooftop Solar Tenders

Central Railway issued a tender for **2.742 MW** of rooftop solar projects of different capacities at station buildings, service buildings, residential buildings, and level crossings, and a ground-mounted 300 kW solar project.

Ladakh Power Development Department (**LPDD**) announced a tender for the design, supply, installation, and commissioning of **2.632 MW** grid-connected rooftop solar systems on government buildings, in the Kargil District, Union Territory of Ladakh.

NVVN invited bids from empaneled contractors to install **1,562 kW** of grid-connected rooftop solar projects in Telangana for the Indian Council of Medical Research (ICMR) and a **1,153 kW** grid-connected rooftop solar project in Maharashtra for ICMR.

Indian Telephone Industries (**ITI**) floated a tender to empanel agencies to implement grid-connected rooftop solar power systems of a cumulative capacity of **200 MW** on government buildings in Bihar.

Jammu and Kashmir Energy Development Agency (**JAKEDA**) released a tender for supplying, installing, and commissioning grid-connected rooftop solar power projects on government buildings in Jammu and Kashmir (J&K).

NVVN floated multiple tenders under the PM Surya Ghar: Muft Bijli Yojana; for the installation of grid-connected residential rooftop solar systems in the districts of Uttar Pradesh covered under four distribution companies (DISCOMs), in the districts of Andhra Pradesh and Telangana covered under two DISCOMs each, and Maharashtra.



Auctions

AMPIN Energy, Ganeko Solar (**Solarpack**), Inaayu Renewables (**EverGreen Power**), **Juniper Green Energy**, **Datta Power Infra**, **JSW Neo Energy**, and **Avaada Energy** have been awarded SJVN Green Energy's (SGEL) tender to develop **1500 MW** of ISTS-connected wind and solar hybrid power projects.

Juniper Green Energy, Asurarai Renewables (**UPC Renewables**), **AMPIN Energy**, Adyant Enersol (**Datta Infra**), **JSW Energy**, and **Avaada Energy** were winners in **SECI's** auction to develop **1,200 MW** of ISTS-connected wind-solar hybrid power projects (Tranche VIII).

KPI Green Energy, Avaada Energy, Solarcraft Power India 5 (**BluPine Energy**), **NRC Industries**, and **Hinduja Renewables** were winners in GUVNL's auction to supply power from **500 MW** grid-connected solar power projects with a **500 MW** greenshoe option (**Phase XXIV**).

KPI Green Energy, **Juniper Green Energy**, **Hinduja**

Renewables Energy, and **JSW Neo Energy (JSW Energy)** were declared winners in GUVNL's auction to supply power from **500 MW** grid-connected wind-solar hybrid projects with a **500 MW** greenshoe option.

Solar module manufacturer Vikram Solar secured a **393.9 MW** supply order from **NLC India** for its Khavda Solar Project in Gujarat.

Gensol Engineering won GUVNL's auction to set up pilot projects of **250 MW/500 MWh** standalone BESS in Gujarat under tariff-based global competitive bidding (Phase III).

Larsen & Toubro (**L&T**) secured an order to build a grid-connected 185 MW solar project with **254 MWh** BESS in Bihar's Lakshisarai district from the Bihar State Power Generation Company.

Jakson Green has been awarded a flue gas CO₂ to 4G ethanol project for a power project in Lara, Chhattisgarh, by NTPC.



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