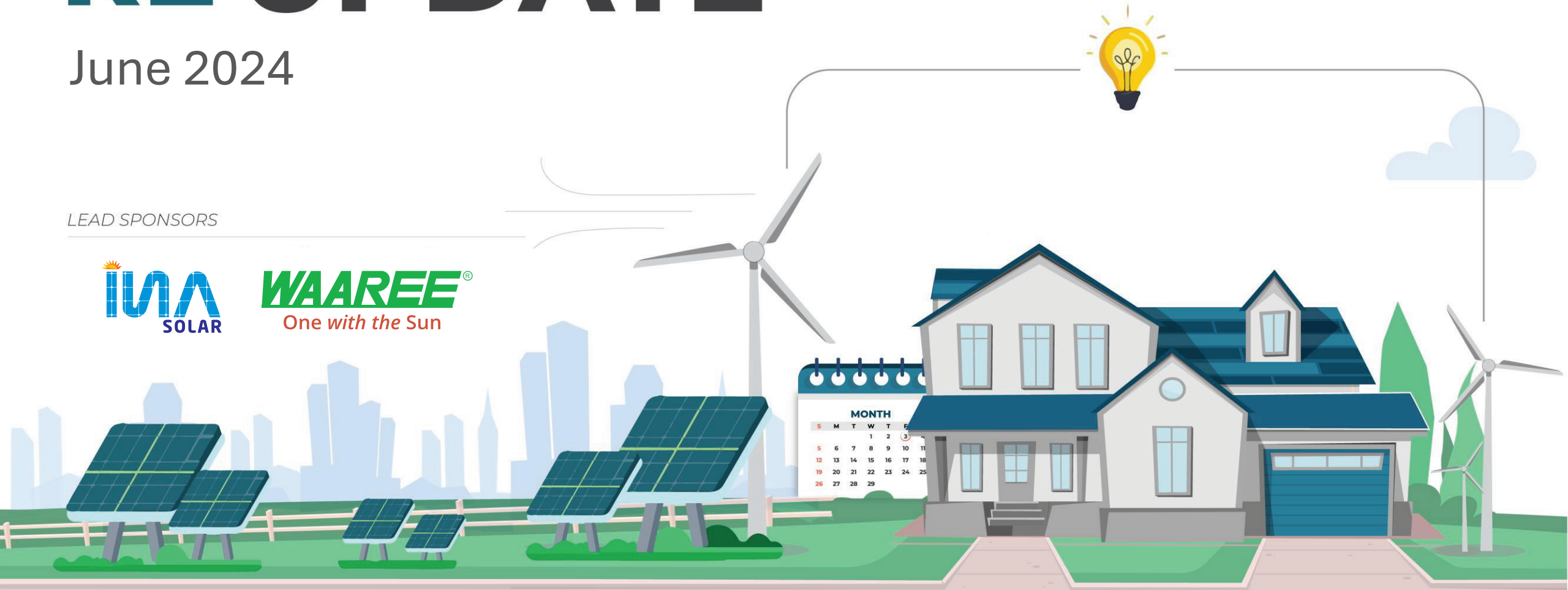


MONTHLY RE UPDATE

June 2024

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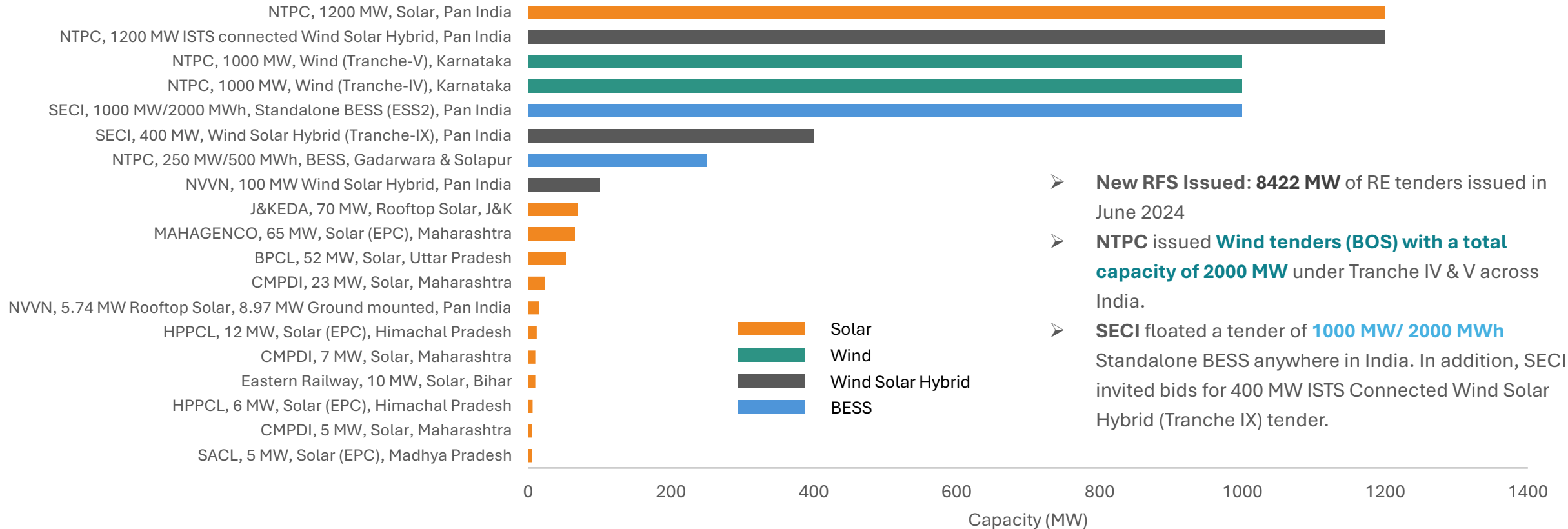
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TENDERS

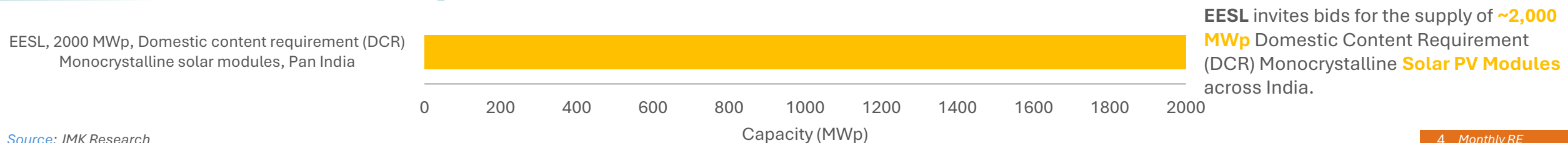


New RE Tenders



- **New RFS Issued: 8422 MW** of RE tenders issued in June 2024
- **NTPC** issued **Wind tenders (BOS)** with a total **capacity of 2000 MW** under Tranche IV & V across India.
- **SECI** floated a tender of **1000 MW/ 2000 MWh** Standalone BESS anywhere in India. In addition, SECI invited bids for 400 MW ISTS Connected Wind Solar Hybrid (Tranche IX) tender.

Module Supply Tender



Tender Name	Technology	Tender Scope	Capacity (MW)	Minimum CUF	Commissioning timeline from PPA signing (months)	Bid Submission Date
EESL, 2000 MWp, Domestic content requirement (DCR) compliant Monocrystalline solar modules, Pan India, June 2024	Module Supply	Supply of DCR Modules	2000 MWp	-	-	9th-Aug-2024
NTPC, 1200, ISTS Connected Solar, Pan India, June 2024	Utility Scale Solar	Project Development	1200	-	-	18th-Jul-2024
NTPC, 1200 MW ISTS connected, Wind-Solar Hybrid, Pan India, June 2024	Wind-Solar Hybrid	Project Development	1200	30%	24	7th-Aug-2024
SECI, 1000 MW/2000 MWh, Standalone BESS (ESS2), Pan India, June 2024	Battery Energy Storage System (BESS)	Project Development	1000 MW/2000 MWh	-	24	5th-Aug-2024
NTPC, 1000 MW, Wind (Tranche-IV), Karnataka, June 2024	Wind	Balance of System	1000	-	-	15th-Jul-2024
NTPC, 1000 MW, Wind (Tranche-V), Karnataka, June 2024	Wind	Balance of System	1000	-	-	15th-Jul-2024
SECI, 400 MW, Wind Solar Hybrid (Tranche-IX), Pan India, June 2024	Wind-Solar Hybrid	Project Development	400	30%	24	29th-Jul-2024
NTPC, 250 MW/500 MWh, BESS, Gadawara & Solapur, June 2024	Standalone BESS	Project Development	250	-	-	18th-Jul-2024
NVVN, 100 MW, Wind Solar Hybrid, PAN India, June 2024	Wind-Solar Hybrid	Project Development	100	35%	15	18th-Jul-2024

Tender Name	Technology	Tender Scope	Capacity (MW)	Commissioning timeline from PPA signing (months)	Bid Submission Date
JAKEDA, 70 MW, Rooftop Solar, J&K, June 2024	Rooftop Solar	Project Development	70	9	3rd-Jul-2024
MAHAGENCO, 65 MW, Solar (EPC), Maharashtra, June 2024	Utility Scale Solar	EPC	65	-	30th-Jul-2024
BPCL, 52 MW, Solar, Uttar Pradesh, June 2024	Utility Scale Solar	EPC	52	6	21st-Jun-2024
CMPDI, 23 MW, Solar, Maharashtra, June 2024	Utility Scale Solar	EPC	23	9	3rd-Jul-2024
NVVN, 5.74 MW (Rooftop Solar), 8.97 MW (Ground mounted), Pan India, June 2024	Utility Scale Solar & Rooftop Solar	Project Development	14.7	8	18th-Jul-2024
HPPCL, 12 MW, Solar (EPC), Himachal Pradesh, June, 2024	Utility Scale Solar	EPC	12	-	22nd-Jul-2024
Eastern Railway, 10 MW, Solar, Bihar, June 2024	Utility Scale Solar	Project Development	10	8	18th-Jul-2024
CMPDI, 7 MW, Solar, Maharashtra, June, 2024	Utility Scale Solar	EPC	7	9	3rd-Jul-2024
HPPCL, 6 MW, Solar (EPC), Himachal Pradesh, June 2024	Utility Scale Solar	EPC	6	-	20th-Jul-2024
SACL, 5 MW, Solar (EPC), Madhya Pradesh, June 2024	Utility Scale Solar	EPC	5	9	27th-Jul-2024
CMPDI, 5 MW, Solar, Maharashtra, June 2024	Utility Scale Solar	EPC	5	9	8th-Jul-2024

KEY ANNOUNCEMENTS

- **MECON** has invited bids for proposals (RFP) for pilot projects on hydrogen injection in sponge iron (DRI - direct reduced iron) plants and blast furnaces. The tender was issued on June 11, 2024, and proposals are to be submitted by July 8, 2024.
- **SECI** issued a tender for production and supply of green ammonia in India under strategic intervention for green hydrogen transition (SIGHT) scheme (Mode-2A-Tranche-I). The bidding for total available capacity of 5,39,000 Metric tonnes (MT)/annum of Green Ammonia intended for production and supply. The last date for bid submission is 29th July 2024. Bidders must submit an earnest money deposit of INR 5000 per MT and a performance bank guarantee of INR 12,500 per MT.
 - **SECI** cancelled the tender for the supply of 1.5 GW FDRE-II power from ISTS-connected RE projects in India. This tender was issued on July 31, 2023.
- **NTPC** has issued a bid for a 600 kW/3000 kWh Vanadium Redox Flow Battery (VRFB) storage system at its NETRA facility in Greater Noida. Bidders must submit a bid security of Rs. 20,00,000 with a deadline of July 8, 2024. The scope of work includes comprehensive tasks from design, engineering, procurement, and fabrication, to commissioning and performance tests of the VRFB system.
- **Serentica Renewables** is seeking expressions of interest (EOI) to establish interstate transmission system-connected battery energy storage systems (BESS) to provide 800 MWh of capacity for its round-the-clock green energy projects. This includes 200 MW/400 MWh of 2-hour storage and 100 MW/400 MWh of 4-hour storage, with at least 51% ownership by the BESS provider. Bids must be submitted by July 30, 2024.

Premium **RE**ports

RENEWABLE ENERGY SECTOR PREMIUM REPORTS

Open Access C&I RE Market in India

- C&I OA Market Size
- Policy Overview
- C&I RE OA market state attractiveness Index
- Open access project Cost and tariff analysis
- Emerging Business Models
- Investment trends in the C&I RE market
- Player-wise project pipeline
- State Profiles
- OA player profiles

Solar PV Manufacturing in India

- Global manufacturing landscape
- Domestic Manufacturing Landscape-Existing and Upcoming capacity
- Adoption of Evolved Technologies in domestic manufacturing Infrastructure
- Favourable policies supporting Solar PV manufacturing in India
- Domestic Manufacturing capacity vs dependency on imports
- Key Player profiles
- Key Challenges

Rooftop Solar Market in India

- Year-Wise Installation Trends
- State-wise installation trends
- Central and State Policy Scenario
- Rooftop market state-wise attractiveness index
- Emerging Market Trends
- Key player's profile
- Challenges for Rooftop solar sector in India
- Way Forward

Energy Storage Market in India

- Market Overview
- Government Initiatives for ESS
- Evolution of Grid Scale ESS Tenders in India
- Scope of Pumped Hydro Storage(PHS) in India
- Battery Manufacturing Landscape in India
- Market potential and Way Forward
- Key players profile (Indian Grid-Scale ESS market)

Wind Market in India

Trends and Outlook

- Year-Wise and State-wise installation trends
- Estimated Wind Potential across the states
- Policy and Regulatory Scenario
- Tendering Land scape
- Emerging Trends
- Risks & Challenges
- Leading Players' Profile

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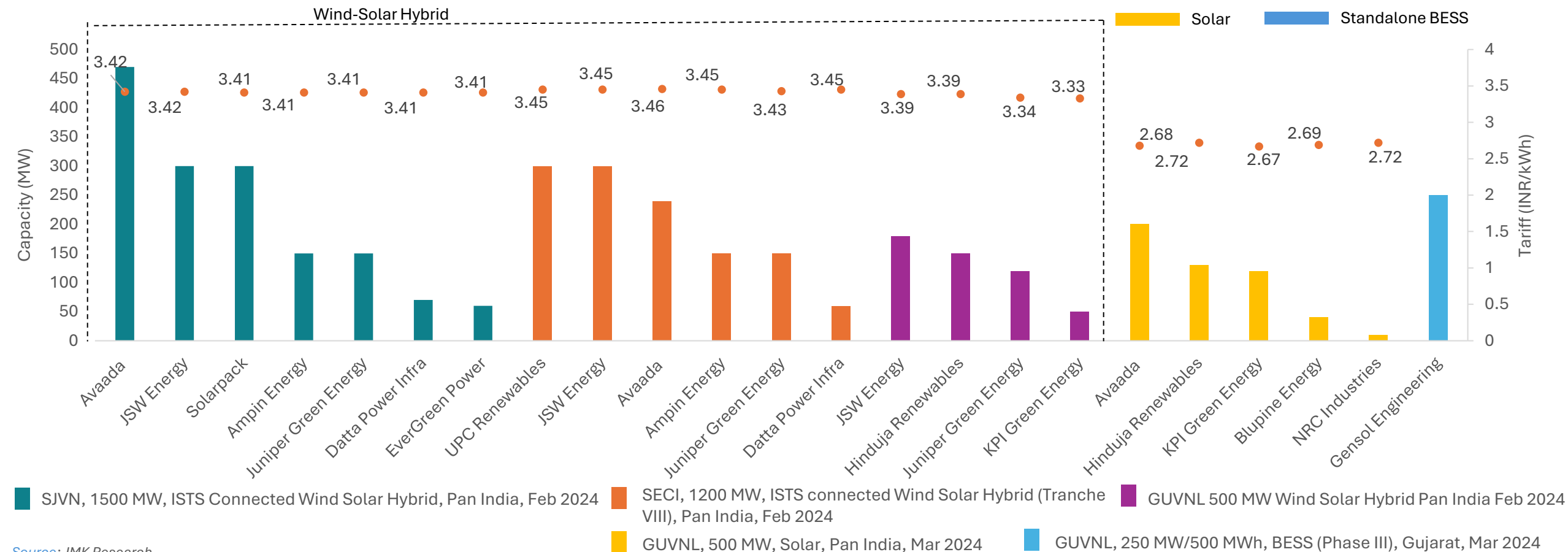
Phone: +91-7428306655

Tender Name	Technology	Capacity Tendered (MW)	Capacity Allotted (MW)	Minimum CUF	Commissioning Timeline(Months)	Winner Details
SJVN, 1500 MW, ISTS Connected Wind Solar Hybrid, Pan India, Feb 2024	Wind-Solar Hybrid	1500	1500	30%	24	<ul style="list-style-type: none"> Ampln Energy-150 MW (INR 3.41/kWh) Ganeka Solar (Solarpack)-300 MW (INR 3.41/kWh) Inaayu Renewables (EverGreen Power)-60 MW (INR 3.41/kWh) Juniper Green Energy-150 MW (INR 3.41/kWh) Datta Power Infra-70 MW (INR 3.41/kWh) JSW Energy-300 MW (INR 3.42/kWh) Avaada-470(INR 3.42/kWh)
SECI, 1200 MW, ISTS connected Wind Solar Hybrid (Tranche VIII), Pan India, Feb 2024	Wind-Solar Hybrid	1200	1200	30%	24	<ul style="list-style-type: none"> Juniper Green Energy-150 MW (INR 3.43/kWh) Asurari Renewables (UPC Renewables)-300 MW (INR 3.45/kWh) Ampin Energy-150 MW (INR 3.45/kWh) Adyant Enersol(Datta Power)-60 MW (INR 3.45/kWh) JSW Energy-300 MW (INR 3.45/kWh) Avaada-240(INR 3.46/kWh)

Tender Name	Technology	Capacity Tendered (MW)	Capacity Allotted (MW)	Minimum CUF	Commissioning Timeline(Months)	Winner Details
GUVNL 500 MW Wind Solar Hybrid Pan India Feb 2024	Wind Solar Hybrid	500	500	30%	24	<ul style="list-style-type: none"> KPI Green Energy-50 MW (INR 3.33/kWh) Juniper Green Energy-120 MW (INR 3.34/kWh) JSW Energy-180 MW (INR 3.39/kWh) Hinduja Renewables-150 MW (INR 3.39/kWh)
GUVNL, 500 MW, Solar, Pan India, Mar 2024	Utility Scale Solar	500	500	17%	24	<ul style="list-style-type: none"> KPI Green Energy – 120 MW (INR 2.67/kWh) Avaada – 200 MW (INR 2.68/kWh) Blupine Energy – 40 MW (INR 2.69/kWh) NRC Industries – 10 MW (INR 2.72/kWh) Hinduja Renewables – 130 MW (INR 2.72/kWh)
GUVNL, 250 MW/500 MWh, BESS (Phase III), Gujarat, Mar 2024	Standalone BESS	250	250	-	18	<ul style="list-style-type: none"> Gensol Engineer-250 MW (INR 3,72,978/MW/month)

WINNERS DETAILS IN LATEST RE TENDERS

- In June 2024, about **3200 MW of Wind-Solar Hybrid** and **500 MW of Utility Scale Solar** capacity was allotted to various RE developers.
- Additionally, **Gensol Engineering** secured GUVNL's 250 MW/500 MWh standalone battery energy storage systems in Gujarat.



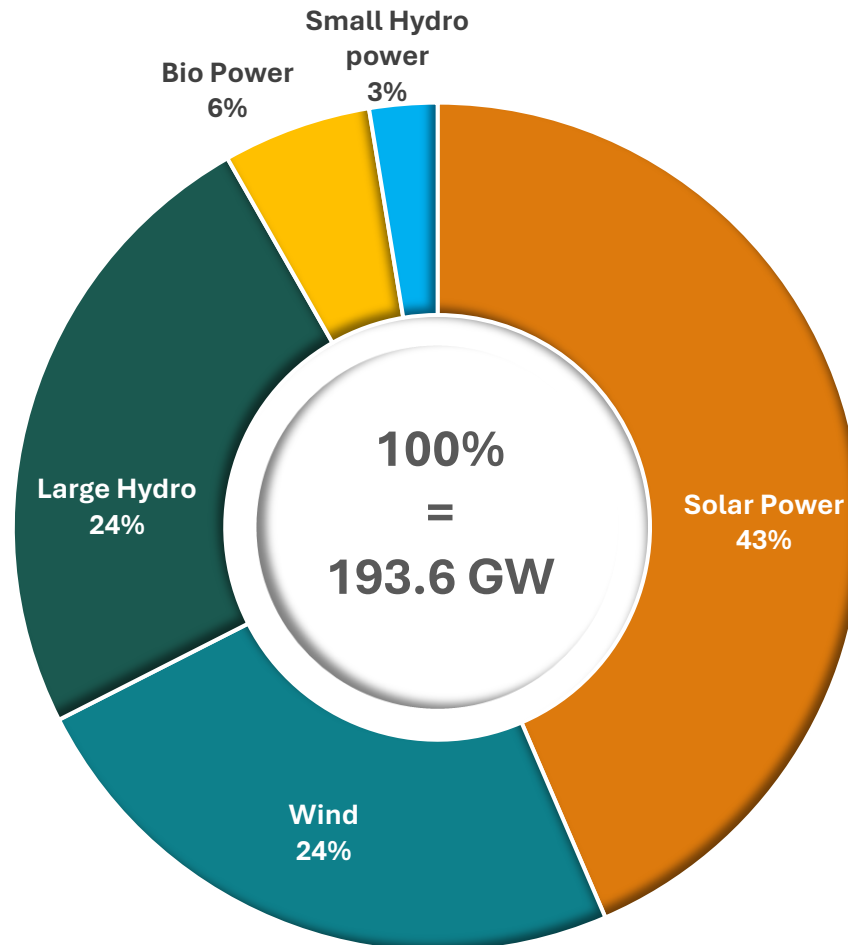
Source: JMK Research,

Note: Gensol Engineering won the entire hybrid project at INR 372,978/MW/month

INSTALLED CAPACITY

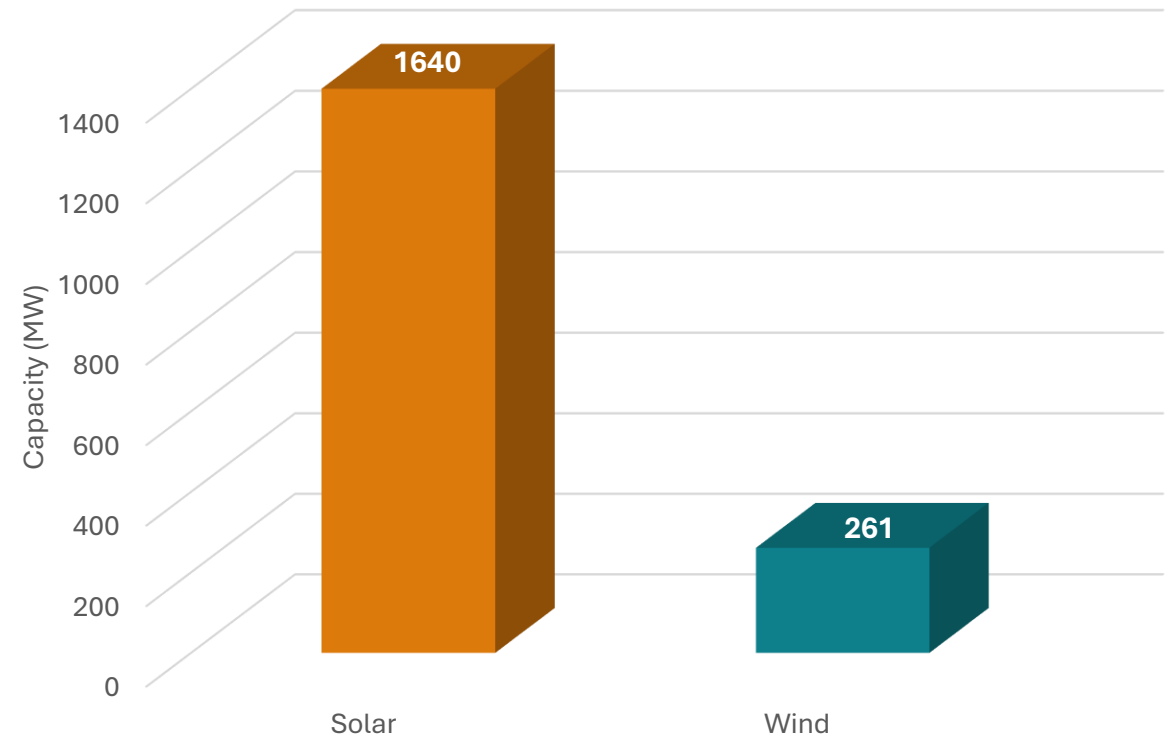


CUMULATIVE RE INSTALLATIONS AS OF MAY 31, 2024



- From January to May 2024, about **10,959 MW of Solar capacity** and **1,686 MW of Wind capacity** is added in the country, taking the cumulative **RE capacity to 193.6 GW**.
- In May 2024, a combined total of **1901 MW** of **solar and wind capacity** was added.

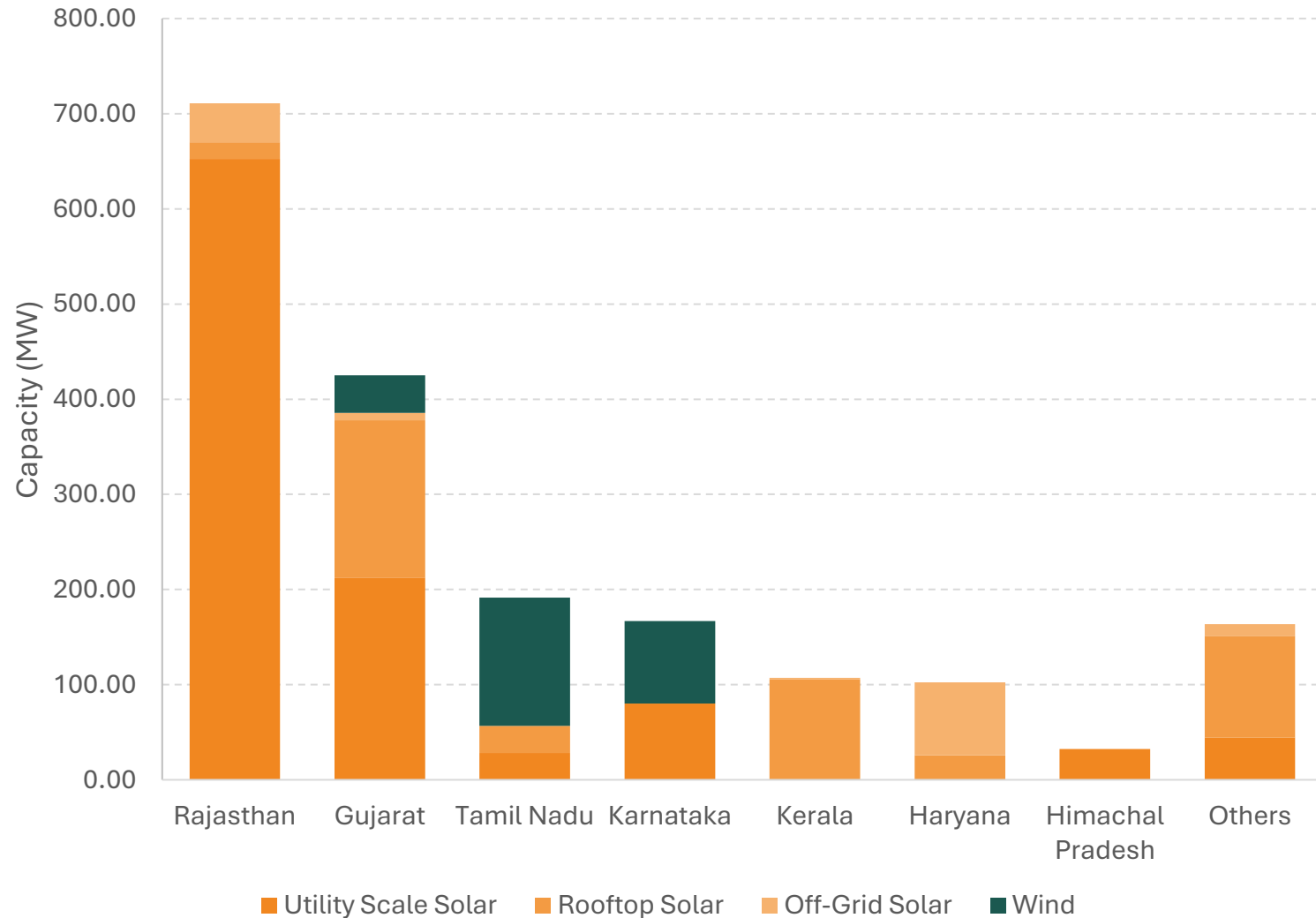
CAPACITY INSTALLED IN MAY 2024



Source: MNRE, JMK Research

Note: Solar includes utility-scale solar, rooftop solar and off-grid/distributed solar segments

STATE-WISE SOLAR AND WIND INSTALLED CAPACITY IN MAY 2024



- In May 2024, **Rajasthan** added the highest Utility-Scale Solar capacity of **652 MW** followed by **Gujarat 213 MW**. In addition, Gujarat added the maximum Rooftop solar capacity of **165 MW**.
- Haryana installed the maximum off grid solar capacity of **77 MW** in May 2024.
- In terms of wind installations, **Tamil Nadu** installed the maximum capacity of **135 MW**.

RE PROJECT UPDATES



LIST OF KEY RE PROJECTS COMMISSIONED IN JUNE 2024

Developer Name	Technology	Capacity	State
SunSource Energy	Solar(Open Access)	45 MWp	Uttar Pradesh
Central Railway	Floating Solar	10 MWp	Maharashtra
Lubi Pumps	Solar	4 MW	Gujarat

- Suzlon Group** secured an 81.9 MW wind energy project from Oyster Green Hybrid One Private Limited. The project will be in Agar, Madhya Pradesh, and will use 26 wind turbine generators (WTGs) from Suzlon's 3 MW product series, each with a rated capacity of 3.15 MW. This project will target the commercial and industrial (C&I) customer segment and is expected to generate enough electricity to power 67,000 households while reducing carbon emissions by 266,000 tonnes per year.
 - In addition, the company** has secured an order to develop a 103.95 MW wind power project for AMPIN Energy Transition in Fatehgarh, Rajasthan. This order is part of a larger hybrid project from SECI bids and C&I requirements, emphasizing the growing trend of hybrid renewable energy projects as key to effective energy transition.

- Emmvee Group** has secured a 795.4 MWp TOPCon module supply order from NTPC Renewable Energy Ltd (NTPC REL) for NTPC's 1,255 MW Khavda solar project in Gujarat, with modules meeting domestic content requirements (DCR). Emmvee will soon commission a 1.5 GW TOPCon wafer-to-cell manufacturing plant.
- Antaisolar** has signed an agreement of 294 MW of solar tracker projects with Larsen & Toubro (L&T). The project is among the largest utility solar power projects in India, underscoring the commitment of both companies to solar innovation and sustainability.

KEY ANNOUNCEMENTS

- **BluPine Energy** has signed a solar PPA with APL Apollo Building Products via a special-purpose vehicle (SPV) and will develop a 61.65 MW solar plant in Chhattisgarh for APL Apollo and other off-takers under a group captive structure, with APL Apollo and others holding a 26% stake in the SPV.
 - **BluPine Energy** has also signed a PPA with Dalmia Cements Limited (Bharat) to develop a 46.8 MWp solar project in Karnataka. Under a captive open-access model, Dalmia Bharat holds a 26% stake in the BluPine Energy SPV. This agreement boosts BluPine Energy's renewable capacity to 2.4 GW, including approximately 400 MW of C&I projects in Karnataka, Maharashtra, and Chhattisgarh.
- **The Rajasthan government** has approved the allocation of 4,780 hectares for four solar projects. The Rajasthan Solar Park Development Company will develop three solar parks totaling 2,450 MW in Bikaner, with specific allocations of 1,881 hectares in Surasar for a 1,000 MW park, 2,000 hectares split between Surasar and Bhanavatawala for another 1,000 MW park, and 900 hectares in Sardarpura for a 450 MW park. Additionally, NTPC Renewable Energy Ltd will set up a 500 MW solar project on 910 hectares in Phalodi. The state will see an investment of around INR 10,000 crore, with 33% grants from the MNRE, and completion expected in two years.
- **GameChange Solar** has secured a contract with SAEL to supply its single-axis Genius Tracker products for 500 MWp of SAEL's PV project within the Khavda Mega Solar Park in Gujarat. The Khavda Ultra Mega Solar Park, with a total capacity of 3,325 MW, is a significant part of India's renewable energy goals and is located within the 30 GW Renewable Energy Park developed by Gujarat Power Corp. Ltd.
- **Vikram Solar** secured a 394 MWp module supply order for NLC India's project at GSECL's Solar Park (Stage 2) in Khavda, Gujarat, increasing its total PV module supply to the Khavda Solar Park to over 1 GW. Vikram Solar will supply ALMM listed 580 Wp and n-type TOPCon bifacial modules from its manufacturing facilities.
- **Ampin Energy transition** plans to establish a 246 MW wind-solar hybrid project across different locations in India with an investment of INR 1300 crore and this amount will be a mix of debt & equity.
- **Juniper Green Energy** has signed a PPA with SECI for a 150 MW wind-solar hybrid project in Gujarat and Rajasthan. Additionally, Juniper secured a PPA with GUVNL for a 90 MW standalone wind project in Gujarat, generating 293 MUs annually, offsetting 266,002 tonnes of CO₂.

KEY ANNOUNCEMENTS

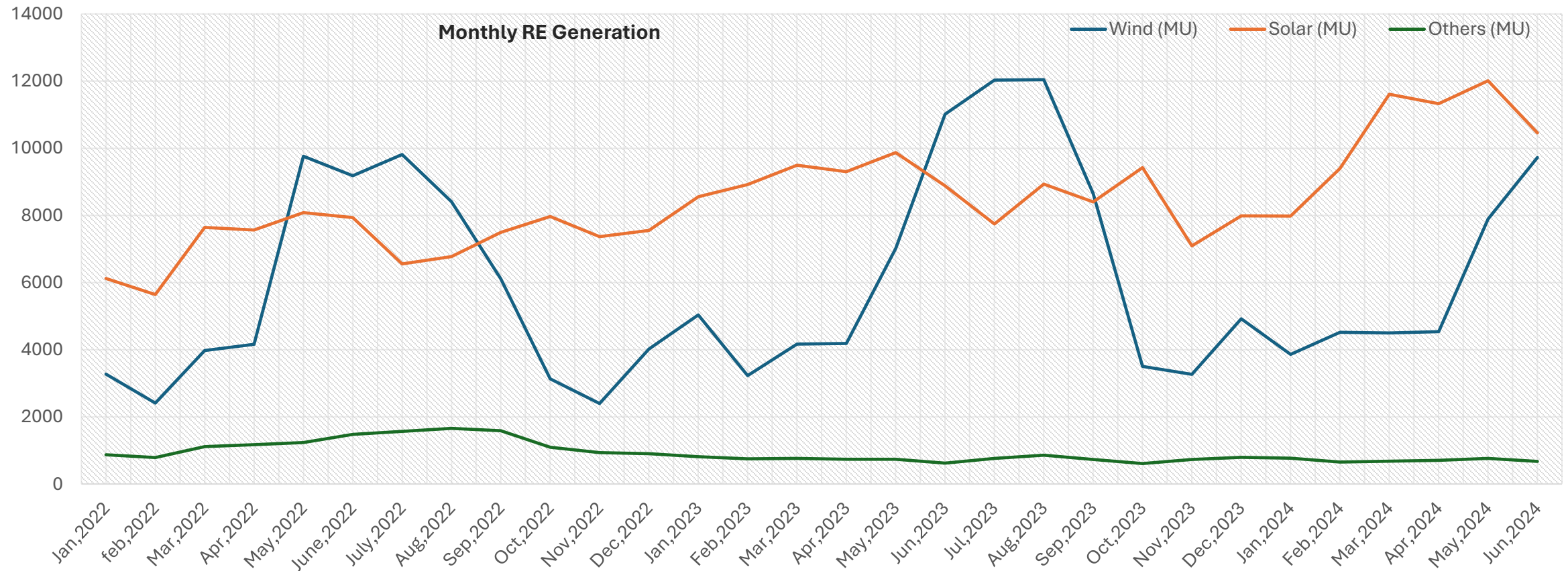
- **JSW Energy** has signed RE Power Purchase agreements with a total capacity of 1,325 MW. Of this, 1025 MW is signed with SECI, and 300 MW is signed with Gujarat Urja Vikas Nigam (GUVNL). This brings JSW Energy's total locked capacity to 13.6 GW. The wind PPA is signed with SECI and is the largest single tranche at 1,025 MW. It has a blended tariff of Rs 3.62 per unit for 25 years, and it will be commissioned within 24 months in Gujarat and Karnataka. The solar PPA is signed with GUVNL at a tariff of Rs 2.66 per unit for 25 years, and it will be commissioned within 21 months in Gujarat.
- **Larsen & Toubro (L&T)** has secured a domestic contract to construct a 185 MW grid-connected solar PV plant and a 254 MWh battery energy storage system (BESS) in Kajra, Lakshisarai district, Bihar. The BESS will store solar energy during low demand and discharge during peak demand, aiding in generation fluctuation smoothing, frequency regulation, voltage support, and providing black start capability for grid re-energization post-outage.
- **ENGIE** has signed a power purchase agreement (PPA) for a 200 MW solar project as part of the GUVNL's 1,125 MW grid-connected solar power initiative at the Gujarat State Electricity Corporation's renewable energy park in Khavda, Gujarat. ENGIE secured this project at a tariff of Rs. 2.62 per unit. This project increases ENGIE's total capacity in Gujarat to 830 MW, contributing to its overall portfolio of 2.3 GW capacity.
- **Waaree Renewable Technologies** has received a Letter of Award (LOA) for a 1.090 MWp DC capacity floating solar power project from a leading company in metal recycling, specialty chemicals, metal intermediates, mining, industrial gas production, mineral exploration, and engineering services. The project, valued at Rs. 4.122 crore, involves engineering, procurement, and construction (EPC) services using high-density polyethylene (HDPE)-based floats. The project is slated for completion in the financial year 2024-25.
 - In addition, **Waaree Energies** has secured a contract to supply bifacial solar modules for Acciona Energy's 412.5 MWp (335 MW AC) project in Kawani village, Rajasthan, awarded by Acciona's subsidiary Juna Renewable Energy. The utility-scale solar project, set for commissioning in March 2025.
 - **Waaree Energies** has signed an agreement with Mahindra Susten to supply 280 MW (DC) of advanced solar modules for PV projects in Bikaner, Rajasthan. Waaree Energies will provide its ELITE Series n-type TOPCon 580 Wp modules, with deliveries starting in December.
 - **The company** has also completed the delivery of 68 MW of Bi-55 bifacial dual-glass framed solar modules to Gensol Engineering Ltd for the Mahagenco solar PV project.

MONTHLY RE GENERATION



SOURCE-WISE RENEWABLE ENERGY GENERATION (MU) - INDIA

- In June 2024, Renewable energy sources generated **20,861 MU**, which is around 1% higher than the RE generation in May 2024.
- Solar energy generation decreased by 13% and wind energy generation increased by 23.16% on a month-on-month basis in June 2024.



INVESTMENTS AND DEALS



In June 2024, a total of about **\$207 million** was raised in the RE sector in India. The key investments during the month were:

- **Cleantech Solar** has secured \$103 million in debt finance from Aseem Infrastructure to advance its Open access portfolio in India.
- The **International Finance Corporation (IFC)** has committed to invest \$105 million to partially finance a 550 MW solar power project in Rajasthan which is developed by Brookfield Asset Management.

INVESTMENTS AND DEALS

Company Name	Deal Type	Sector	Investor	Deal value
Brookfield Asset Management	Debt	Solar	International Finance Corporation	\$105 million
Cleantech Solar	Debt	Renewable Energy	Aseem Infrastructure Finance Ltd	\$102.49 million

- **Maruti Suzuki India** announced an investment of Rs 450 crore over 3 years starting FY25 for renewable energy projects, including solar power and biogas. In FY24, the company invested Rs 120.8 crore in this sector. With plans to double production capacity to 4 million units by 2030-31, the company is enhancing its renewable energy use. Additionally, Maruti expanded its solar capacity to 43.2 MW in FY24 and plans to add 15 MW at Manesar and 20 MW at Kharkhoda, aiming for a total of 78.2 MW by FY26.

- **HomeScape by Amplus Solar** has partnered with SBI to offer financing options for residential solar installations. Customers can secure loans up to Rs. 200,000 for systems up to 3 kW and Rs. 600,000 for systems up to 10 kW, with interest rates of 7% and 10.15%, respectively. Home loan customers benefit from a reduced rate of 9.15%, with a repayment tenure of up to 120 months. This financing is accessible via the Jan Samarth portal after registering on the PM Surya Ghar portal and is available to individuals up to 65 years of age across India.

Source: JMK Research

KEY ANNOUNCEMENTS

- **The PLI scheme** is anticipated to attract Rs 3-4 lakh crore in investments and generate 2 lakh jobs in the next 4 years, with large projects in semiconductors, solar modules, and pharmaceutical intermediaries. It highlights the need for tax breaks to boost private sector capex, expected to rise in sectors like oil and gas, metals and mining, healthcare, and cement, focusing more on green energy and electric vehicles. The PLI scheme, launched in 2021 for 14 sectors with an outlay of Rs 1.97 lakh crore, has already seen over Rs 1.03 lakh crore in investments.
- **Tata Power Renewable Energy** plans to raise Rs 1,000 crore (\$119.90 million) through two separate bond issues with maturities of five and ten years. Each issue aims to raise Rs 500 crore, with a coupon rate of 7.93% expected for both. These bonds are rated AA+ by India Ratings and Research.
- **Hero Future Energies** is planning to invest over \$2 billion in the next 30 months to significantly increase its generation capacity. Currently operating at 1.8 GW, the company aims to implement projects totaling 2.6 GW within this period, leveraging the recent sharp decline in battery prices. A substantial portion of these projects will incorporate battery energy storage systems, secured through auctions by SECI.
- **Gujarat Energy Transmission Corporation (GETCO)** plans to invest Rs. 96,000 crore over the next 8 years to build transmission infrastructure to support the state's growing renewable energy capacity, according to GUVNL. The new wind and solar capacity are being developed in Kachh and northern Gujarat, while consumption centers are in Ahmedabad, Morbi, Rajkot, and Vadodara.
- **BioCompute** won India's largest non-equity climate entrepreneurship grant of Rs 31 lakh at the SusCrunch 2024 event organized by Sustainability Mafia (SusMafia). The "Big Pie" grant, provided by the Pilani Innovation and Entrepreneurship Development Society and SusMafia, aims to position BioCompute at the forefront of the climate change fight. Supported by government and private partners, the summit featured pitches from 10 other revenue-generating, scalable climate action startups. Highlights included Planet Electric's high-performance electric trucks and CleanMax's renewable energy insights.
- **NTPC** is planning to raise up to Rs. 12,000 crore through the issuance of bonds. The bonds will be secured or unsecured, redeemable, taxable or tax-free, cumulative or non-cumulative, and non-convertible debentures, pending approval from shareholders at the upcoming Annual General Meeting.
- **British International Investment (BII)** has announced a commitment of \$75 million (approximately Rs. 625 crore) to the second green basket bond facilitated by Symbiotics Investments. This green lending program aims to boost financing for small-scale green projects across Africa, South Asia, and Southeast Asia, with a significant portion of 50% allocated to India.

KEY ANNOUNCEMENTS

- **Adani Group** plans to invest over \$100 billion in energy transition and digital infrastructure over the next decade and plans for the company's expansion in renewable energy, aiming to produce the world's least expensive green electron and build the largest single-site renewable energy park in Khavda, Kutch, with a capacity of 30 GW. This project will boost Adani's total renewable capacity to 50 GW by 2030. Adani noted the growing demand for green energy, particularly for AI data centers, and mentioned the global energy transition market's projected growth from \$3 trillion in 2023 to \$6 trillion by 2030.

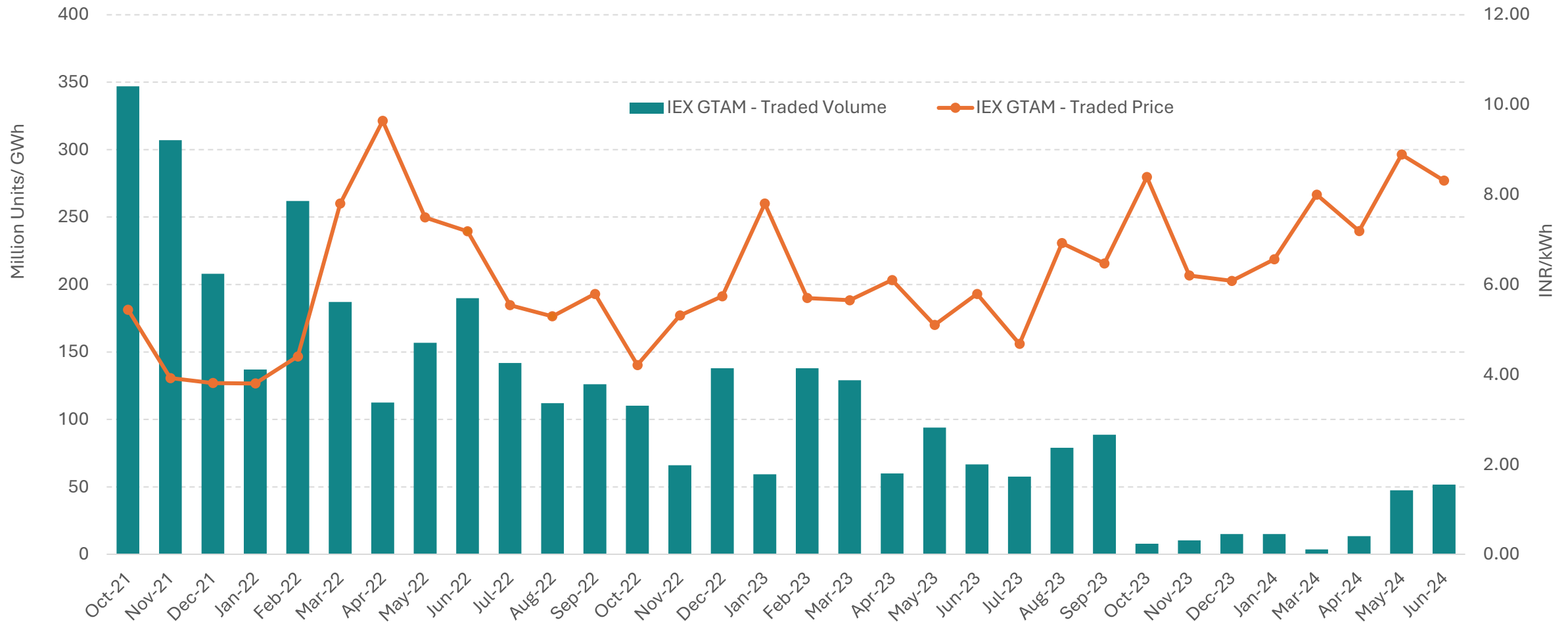
- **The World Bank** approved \$1.5 billion to accelerate India's low-carbon energy development, focusing on scaling renewable energy, green hydrogen, and climate finance. This follows a similar \$1.5 billion financing in June 2023, which supported waiving transmission charges for renewable energy in green hydrogen projects. The second phase aims to boost green hydrogen and electrolyzer production, incentivize battery energy storage, and amend the Indian Electricity Grid Code for better renewable integration.

GTAM TRADED VOLUME



GTAM TRADED VOLUME AND PRICE TREND

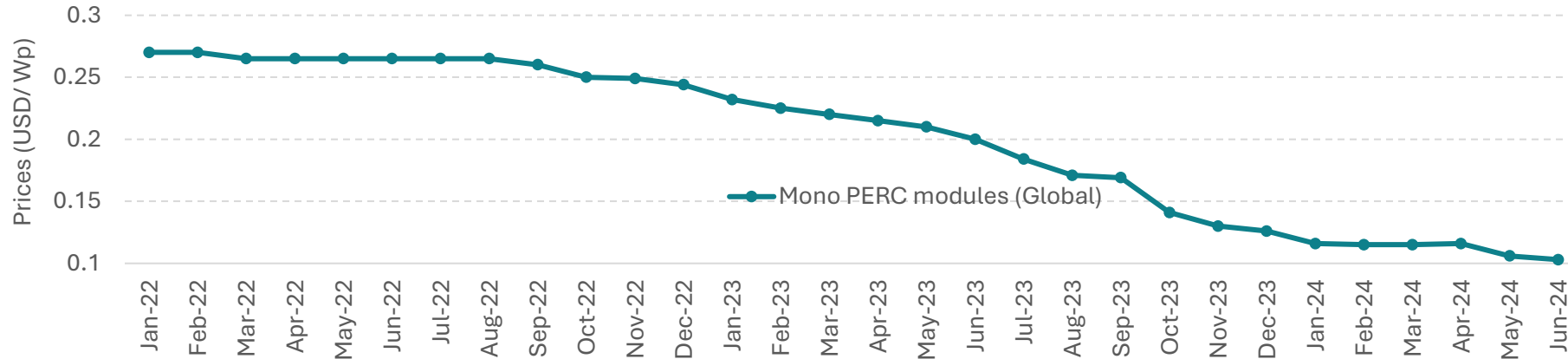
- The **IEX** traded a total of **52 MU**s in **GTAM** in **June 2024**, which is **9% higher** than the volume traded in the previous month.
- The average trade price in IEX-GTAM for June 2024 is INR 8.31/kWh.



MODULE PRICE TRENDS

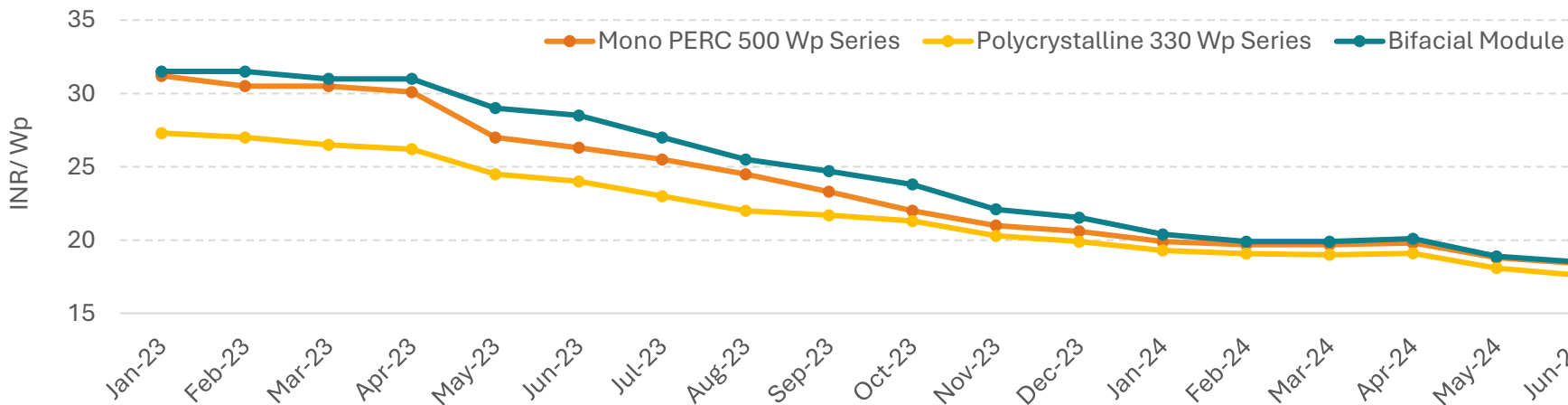


GLOBAL SOLAR MODULES PRICE TRENDS



Comparing on m-o-m basis, price for global mono PERC modules have decreased by 2.8% in June 2024

AVERAGE PRICE TRENDS FOR DOMESTIC MODULES



Comparing on m-o-m basis, prices for domestic modules have decreased in June:

Mono PERC 500 Wp – INR 18.4/Wp (down by 2.1%).

Polycrystalline 330 Wp – INR 17.6Wp (down by 2.76%).

Bifacial Modules – INR 18.5/Wp (down by 2.1%).

MARKET UPDATES



SOLAR MANUFACTURING

India is set for five-fold growth in solar cell manufacturing which will reduce imports from China

- India's renewable energy sector is set for significant growth in domestic solar cell manufacturing capacity, with plans to increase it five-fold to around 30 gigawatts per year by March 2025, according to Renewable Energy Secretary.

Cliantech to supply 1.2 GW automated production line for Alpex Solar

- Cliantech Solutions will install a 1.2 GW fully automated solar panel manufacturing line for Alpex Solar's new facility in Mathura, Uttar Pradesh, partnering with companies like Gaorun to provide the latest technology at low costs.
- The suppliers for this project include Gaorun (line automation), Visual (laminators), Asicpy (EL tester), and HSPV (Sun simulator/IV tester). This new facility will boost Alpex Solar's total PV module capacity to 2.4 GW by the end of 2025, benefiting from excellent logistics and vendor support.

GREEN HYDROGEN

SGEL partners with AM Green Ammonia to supply renewable energy

- SJVN Green Energy Ltd (SGEL) has signed an MoU with AM Green Ammonia for the long-term supply of renewable energy to AM Green's upcoming green ammonia plants in Kakinada, Andhra Pradesh.
- AM Green Ammonia is developing a large green ammonia platform in two phases, starting with a capacity of 1 million tons per annum (MTPA) and scaling up to 5 MTPA by 2030, equivalent to 1 MTPA of hydrogen.
- This MoU marks SGEL's entry into the commercial and industrial segment, with plans to set up 4.5 GW of renewable energy projects, including 2.5-3 GW of solar and 1.5-2 GW of wind projects, ensuring the annual supply of about 11,500 million units of renewable power.

Airox Nigen commissions green hydrogen pilot project in Himachal Pradesh

- Airox Nigen Equipments has commissioned its indigenously built alkaline electrolyzer and fuel cell for SJVN's multi-purpose green hydrogen pilot project in Jhakri, Himachal Pradesh, and utilizes renewable energy from a 1.31 MW solar power plant to produce green hydrogen.
- The project includes a production capacity of 14 kg of green hydrogen per day during 8 hours of operation, an alkaline electrolyzer capacity of 20 Nm³/hour, fuel cell capacity of 25 kW, and six storage tanks. The green hydrogen will be used as a clean fuel source for a thermal spray coating facility that treats underwater turbine parts and power generation through the 25-kW fuel cell.

GREEN HYDROGEN

Jakson Green secures contract from NTPC for world's first flue gas to ethanol project

- Jakson Green has secured a contract from NTPC to establish the world's first flue gas CO₂ to 4G ethanol project at NTPC's Lara superthermal power station in Chhattisgarh, India. The plant, designed by NTPC's R&D arm NETRA, will capture 25 tons per day of CO₂ using Veolia Carbon Clean technology and produce 10 tons of 4G ethanol daily through advanced microbial fermentation by LanzaTech Inc.
- Additionally, it will generate 3 tons per day of green hydrogen via a 7.5 MW electrolyzer. Scheduled to be operational within 2 years, the project aims to reduce greenhouse gas emissions and support sustainable aviation fuel production.

Greenko plans to secure Rs. 2,200- 2400 crore for green hydrogen and ammonia projects

- Greenko group is in discussions with REC to secure Rs. 2,200-2,400 crore for its 600 MW green hydrogen and green ammonia project. Upon achieving financial closure, Greenko will finalize agreements with REC. The project with an offtake agreement with Norway's Yara received pre-certification for ammonia. Greenko signed a term sheet with Yara Clean Ammonia in May for the supply of renewable ammonia from Phase 1 of AM Green's production facility in Kakinada, Andhra Pradesh.
- The funding under AM Green aims to support India's first green hydrogen and green ammonia project, with a long-term supply agreement for up to half of the renewable ammonia from Phase I of the 1 MT per year facility.

Sembcorp is set to export 200,000 metric tonnes per annum of green ammonia to Japan

- Sembcorp Green Hydrogen will export 200,000 metric tonnes per annum of green ammonia from a plant in India to Japan under an agreement signed with Sojitz Corporation and Kyushu Electric Power Co Inc.
- Sembcorp will use renewable energy to produce the green ammonia, with land for the facility already secured and front-end engineering design underway.

Wartsila unveils the world's first large-scale 100% hydrogen-ready engine power plant

- Wartsila has unveiled the world's first large-scale 100% hydrogen-ready engine power plant, marking a significant advancement in energy technology. Based on the Wartsila 31 engine platform, the plant can operate on natural gas and blends containing up to 25% hydrogen.
- Wartsila 31 engine synchronizes with the grid in just 30 seconds from start command, offering high flexibility in fuel use and superior load-following capabilities.
- The engines are set to be available for orders starting in 2025, with deliveries commencing from 2026.

GREEN HYDROGEN

Kalpataru projects expand its manufacturing footprint in the green hydrogen electrolyser market

- Kalpataru Projects International aims to expand its manufacturing footprint by entering the green hydrogen electrolyser market. The company is keen on enhancing its EPC value chain in emerging energy sectors, including hydrogen and nuclear power. They are exploring joint ventures or foreign collaborations for electrolyser manufacturing, leveraging their existing giga factories in Raipur and Gandhinagar. Additionally, they are interested in nuclear energy EPC packages as part of their broader energy EPC portfolio.

Adavait Infratech is set to expand its electrolyser manufacturing capacity to 200 MW by 2025

- Advait Infratech Ltd plans to expand its electrolyzer manufacturing capacity to 200 MW per year by 2025, following its 2023 entry into the green energy sector through the special purpose vehicle Green Energy. The plant has a capacity of 120 MW per year, producing 0.3/0.5/1 MW electrolysis cell stacks and 2/4/8 MW modules.

Cere wins 10 MW SOEC Module contract from shell for solid Oxide elctrolyser

- Shell has awarded a new contract to Ceres for the second phase of their collaboration on a solid oxide electrolyzer (SOEC) module. This module is designed for large-scale industrial applications such as producing synthetic fuels, ammonia, and green steel. The new contract will focus on developing a pressurized module design that can be scaled up to hundreds of megawatts and integrated into industrial plants for sustainable fuel production.

Essar Group plans to invest INR 30,000 crore to set up Green hydrogen plant in Gujarat

- Essar Group plans to invest Rs. 30,000 crore over the next 4 years to establish a green hydrogen plant in Jamnagar, Gujarat, aiming for 1 GW hydrogen capacity and 1 million tonnes per annum of associated green molecules. This project will utilize 4.5 GW of renewable energy from Essar Renewables to split water molecules into hydrogen and oxygen, focusing on biofuels for export rather than green ammonia due to cost efficiency.
- The group also aims to decarbonize long-haul heavy trucks through an LNG and electric ecosystem, operating a fleet of 450-500 LNG-powered trucks and developing a retail LNG supply network.

Hygenco Green Energies partners with Ameropa for the supply of green ammonia

- India's Hygenco Green Energies has signed a term sheet with Ameropa for the potential supply of green ammonia from its planned plant at Gopalpur port in Odisha. The project has an initial production capacity of 600 tpd by 2027, doubling to 1,200 tpd by early 2028, and reaching 1.1 mtpa by 2030.
- Hygenco plans to invest \$2.5 billion in green hydrogen and green ammonia projects in the next three years. The partnership will focus on exporting green ammonia to Europe and Asia, targeting the low-carbon ammonia markets enhancing its sustainable agricultural practices, and reducing emissions.

GREEN HYDROGEN

Avaada Partners with Mysore ammonia to supply 100,000 MTs of Green ammonia annually

- Avaada Group has signed a MoU with Mysore Ammonia for the long-term supply of 100,000 metric tons of green ammonia annually. The MoU, signed by Avaada Green Fuels and Mysore Ammonia and Chemicals, marks a significant step in promoting sustainable energy. Avaada plans to establish a 0.5 mtpa green hydrogen and ammonia facility at Tata Steel SEZ Industrial Park in Odisha. In 2023, Avaada secured \$1.3 billion in international investments, including \$1 billion from Brookfield's Energy Transition Fund and \$300 million from GPSC, PTT Group of Thailand.

STORAGE

Global hydropower increases to 1412 GW and pumped storage hydropower reaches 182 GW in 2023

- In 2023, global hydropower capacity increased by 13.5 GW to 1,412 GW, with pumped storage hydropower (PSH) rising by 6.5GW to 182GW, according to the International Hydropower Association (IHA).
- To meet net-zero targets, an annual growth rate of over 26GW until 2030 is required, necessitating cumulative investments of approximately \$3.7 trillion, or \$130 billion annually, more than double current funding levels.
- China accounted for nearly half of the new capacity, while sub-Saharan Africa and South America rely significantly on hydropower, with vast untapped potential and ongoing projects.

JSW Energy commences construction of 1 GWh BESS

- JSW Energy has commenced construction of a 1 GWh battery energy storage system (BESS) awarded by SECI which is going to be commissioned by June 2025. The project includes two installations, each with 500 MWh capacity for 2-hour cycles, under a build-own-operate-transfer (BOOT) model with a 12-year transfer period.
- Concurrently, JSW Energy is leading India's largest green hydrogen project, supplying 3,800 tons per annum (tpa) of green hydrogen to JSW Steel Ltd by Q4 FY 2025, and has been allocated 6,800 tpa capacity under SECI's SIGHT program. An MoU with JSW Steel Ltd will add 85,000 to 90,000 tpa of green hydrogen and 720,000 tpa of green oxygen by 2030.

BSES is developing India's first utility-scale BESS project in Delhi

- A survey by Luminous Power Technologies, involving 4,318 respondents from five metros and eight non-metro cities in India, identified high installation costs and a lack of skilled workforce as major barriers to rooftop solar adoption.
- About 90% of respondents acknowledged the need for specialized skills in solar panel installation, with 45% indicating a local shortage of skilled labor.
- Additionally, 59% of respondents were concerned about the high initial installation costs, perceiving solar power as more expensive than traditional energy sources.

Carbon Pricing gains wider adoption globally and gains momentum in India

- Carbon pricing generated \$104 billion in revenues in 2023, with increasing adoption in middle-income countries like Brazil, India, Chile, Colombia, and Turkey, as reported by the World Bank. Traditionally dominant in sectors like power and industry, carbon pricing is expanding into aviation, shipping, and waste.
- India, having laid the legal foundation for a carbon market in 2022, plans to implement a Carbon Credit Trading Scheme by 2026, featuring both voluntary and compliance elements.
- Globally, 75 carbon pricing instruments are in operation, but coverage and pricing remain insufficient to achieve the Paris Agreement goals, with less than 1% of emissions priced at the recommended level to limit temperature rise to well below 2°C.

Solar module prices continue to decline in the coming years

- Concerns about overcapacity, declining panel prices, and expected PV demand for the coming years are prevalent. Chinese module procurement schemes are currently seeing extremely low bids.
- The \$0.08/W threshold may now be hard to exceed, leading many manufacturers to reconsider their capacity expansion plans and renegotiate module supply contracts.

India aims to boost wind energy capacity by 25 GW with the help of INR 2 lakh crore investment

- According to Crisil Ratings, India is set to significantly boost its wind energy capacity by nearly 25 GW between fiscal years 2025 and 2028, up from 9 GW added between 2021 and 2024, with capital expenditures ranging from INR 1.8 lakh crore to INR 2 lakh crore.
- Despite a slowdown from 1.7 GW annual additions (2018-2023) compared to 3.0 GW annually (2014-2018) due to site and return challenges, government policies now aim to auction 50 GW of renewable projects annually, including 10 GW for standalone wind.
- From fiscal 2023, 5 GW of standalone wind projects and 18 GW of hybrid and storage-linked projects were auctioned, up from 3 GW and 4 GW respectively in fiscal 2021 and 2022. Average tariffs stabilized at INR 3.2 per unit in 2023-2024, expected to continue into 2025, making projects viable for developers.

SIDBI introduces various lending products to facilitate energy-efficient transitions for MSMEs

- SIDBI has introduced various lending products to facilitate energy-efficient transitions for MSMEs and launched projects like the Partial Risk Sharing Facility for an energy efficiency program, supported by the World Bank with a \$37 million corpus.
- The MSME sector is encouraged by SIDBI to adopt low-emission pathways and assess energy efficiency in business processes. Mandal also urged MSMEs to leverage schemes for technology upgrades, innovation promotion, and credit-linked capital subsidies for sustainable growth.

India requires 517.34 GW RE capacity to meet RPO targets by 2030

- India needs 517.34 GW of installed renewable energy (RE) capacity by 2029-30 to meet the renewable purchase obligation (RPO) targets of its 30 states and union territories as per the NITI Aayog report. As of July 2023, India has 177.74 GW of installed RE capacity, including 71.14 GW of solar energy.
- India needs to install 339.6 GW more RE capacity by 2029-30, including 262.24 GW of solar, 60.22 GW of wind, 13.05 GW of hydro, and 4.1 GW of bioenergy. The government has set a year-wise RPO trajectory, requiring electricity distribution companies (DISCOMs) to increase their renewable energy purchases from 24.3% in 2023 to 43.3% in 2030.
- The study estimates that 269.79 GW of RE can be mobilized within states, while 69.81 GW needs to be procured from other states to meet the RPO targets. Of the 30 states and union territories, 21 can meet their RPO targets internally, while nine need to procure RE from surplus states.

Union Power Minister announces ambitious goal to replace diesel with renewable energy in agriculture by 2024

- Union Power Minister announced India's ambitious goal to eliminate diesel use in agriculture and transition entirely to renewable energy by 2024, emphasizing collaborative efforts between central and state governments.
- He underscored that achieving these targets is crucial for modernizing India's power systems and aligning with global climate commitments. He also urged compliance with energy conservation building codes for commercial and domestic buildings, with all power demands to be met through non-fossil fuel sources supported by energy storage technologies.

Annual India Solar Report Card: FY2024

- In FY2024, about 11.7 GW of utility-scale solar capacity and another 3 GW of rooftop solar capacity were added in India and the top three states with maximum installed solar capacity were Gujarat (4.8 GW), Rajasthan (3.4 GW), and Madhya Pradesh (0.8 GW).
- For next year i.e. FY2025, about 16.9 GW of new utility-scale solar projects and 4 GW of rooftop/ onsite solar projects are expected to be commissioned.
- Jinko, Longi, and Trina were the top three module suppliers in India in FY2024. The Chinese/ International players' module shipment capacity is anticipated to dip in the next quarter because of the imposition of the ALMM order for solar PV modules effective from April 1, 2024.

Shree Cement installed 50% of RE out of 1 GW of total captive power capacity

- Shree Cement Ltd has reached a total installed power capacity of 1 GW, including a recently commissioned 19.5 MW solar power plant in Andhra Pradesh. With Rs 4,000 crore invested in renewable energy, nearly 50% of its capacity (499 MW) is from renewable sources, including 244 MW from waste heat recovery.
- The company is planning to invest Rs.1000 crore to add 132 MW of solar capacity across five states(Jharkhand, Haryana, Rajasthan, UP & Uttarakhand) ,36 MW of wind capacity in Rajasthan and 34 MW of waste heat recovery in Karnataka & Rajasthan.
- Shree Cement aims for 100% renewable electricity by 2050 as part of the RE100 initiative and plans to increase production capacity from 56.4 MTPA to 80 MTPA by 2028.

Solar PV and Wind energy set to dominate renewable energy capacity with China leading from front

- According to the IEA, solar PV and wind energy are set to dominate global ambitions for renewable energy capacity expansion, while hydropower, bioenergy, and other renewables are comparatively less emphasized.
- In 2023, global renewable capacity additions surged to nearly 560 GW, marking a 64 % increase from the previous year and aligning closely with trajectories needed to achieve approximately 8,000 GW of installed capacity by 2030, as per current national policies and estimates.
- China led this growth by installing almost 350 GW of new renewable capacity in 2023, surpassing half of the global total. To meet their targets, around 50 countries are on track, but most nations, including major players like the EU, the US, and India, need to accelerate deployment significantly.

Haryana government announces abolition of monthly minimum charges for domestic consumers

- The Haryana government has announced the abolition of monthly minimum charges for domestic power consumers, with electricity bills now based solely on units consumed. The government also launched "Pradhan Mantri Surya Ghar Muft Bijli Yojana," providing a total subsidy of Rs. 1,10,000 for poor families earning less than Rs. 1,80,000 annually to install rooftop solar plants, covering the full installation cost.
- Families earning between Rs. 1,80,000 and Rs. 3,00,000 annually will receive Rs. 60,000 from the central government and Rs. 20,000 from the state. A new 800 MW ultra-supercritical thermal power unit at the Rajiv Gandhi Thermal Power Plant in Hisar, costing Rs. 7,250 crores was also announced.

POLICIES AND REGULATIONS



CENTRAL LEVEL REGULATORY UPDATES

Tender Name	Issuing Agency	Date of Issue
Grant of Transmission Licence to Solapur Transmission Limited for 1500 MW Project in Solapur SEZ, Maharashtra	CERC	23rd –June- 2024
MNRE issues Amendment guidelines for NGHM, revises production targets for green ammonia to 7,50,000 tonnes	MNRE	21st-June-2024
MNRE develops an online portal for verifying DCR in solar PV cells and modules	MNRE	19th-June-2024
CERC issued draft Indian Electricity Grid Code (First Amendment) Regulations, 2024	CERC	12th-June-2024
CERC issues Renewable Energy Tariff Regulations for 2024	CERC	12th-June-2024
Ministry of New & Renewable Energy (MNRE) appoints mission directorate for overseeing rooftop solar program	MNRE	29th-May-2024
Ministry of New & Renewable Energy (MNRE) appoints mission directorate for overseeing rooftop solar program	MNRE	29th-May-2024
The government allows for a multi-state vendor registration process for rooftop solar	MNRE	29th-May-2024

STATE-LEVEL REGULATORY UPDATES

Tender Name	Issuing Agency	Date of Issue
TNERC issued a draft amendment to the Regulation for Renewable Energy Purchase Obligation 2024	TNERC	26th-June-2024
Delhi Electricity Regulatory Commission (DERC) issued Peer to Peer energy transaction guidelines in 2024	DERC	24th-June-2024
BERC issued draft Green Energy Open Access Regulations, 2024	BERC	17th-June-2024
PSERC announces tariff hike of 10-15 paise per unit valid from June 2024 to March 2025	PSERC	14th-June-2024
GERC approves tariff for 1125 MW solar park in Gujarat	GERC	14th-June-2024
TNERC issues draft of Green Energy Open Access Regulations, 2024	TNERC	13th-June-2024
TNERC issued Draft Regulation for grid interactive solar photovoltaic(PV) energy generating Systems in 2024	TNERC	13th-June-2024
CERC issued draft Indian Electricity Grid Code (First Amendment) Regulations, 2024	CERC	12th-June-2024
CERC issues Renewable Energy Tariff Regulations for 2024	CERC	12th-June-2024
JERC determines the Retail Tariff for FY2024-25	JERC	10th-June-2024
Delhi Electricity Regulatory Commission(DERC) issues draft Green Energy Open Access Regulations, 2024	DERC	7th-June-2024
Haryana approves 800 MW purchase of renewable energy from SJVN	HERC	6th-June-2024

STATE-LEVEL REGULATORY UPDATES

Tender Name	Issuing Agency	Date of Issue
<u>GETCO determines the transmission tariff for FY 2024-25</u>	GETCO	1st-June-2024
<u>Chhattisgarh State Electricity Regulatory Commission (CSERC) grants approval to avail long-term open access for 3 MW solar plant</u>	CSERC	31st-May-2024
<u>RERC issues regulations for setting up grid interactive distributed renewable energy generating systems</u>	RERC	31st-May-2024
<u>RERC specifies regulations for RPOs for obligated entities for FY 2024-25 to 2029-30</u>	RERC	31st-May-2024
<u>Uttar Pradesh Electricity Regulatory Commission(UPERC) approves UPPCL's purchase of 450 MW wind power from SECI</u>	UPERC	24th-May-2024
<u>Bihar State Electricity Regulatory Commission (BERC) proposes new guidelines to accelerate Rooftop solar adoption</u>	BERC	22nd-May-2024
<u>Himachal Pradesh releases new Deviation Settlement Mechanism (DSM) regulation for maintaining grid discipline and security</u>	HPERC	20th-May-2024

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