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COVER STORY



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Inside India's 2025 Investment Boom In The Sunrise Sector



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Chairman- Hindustan Power

Financing for solar-plus-storage projects in India is becoming increasingly diverse as the market matures

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INDIA SOLAR NEWS



Investment >

Avaada Signs ₹5,000 Crore MoU With Bihar To Set Up 1 GW Green Energy Projects

Avaada Group signed an MoU with the Government of Bihar to develop 1 GW of renewable energy (RE) capacity across the state. The agreement was formalized as part of the state's launch event for its new RE and Pumped Storage Policy (PSP). Under the terms of the MoU, Avaada will invest ₹ 5,000 crore to establish a mix of clean energy projects, including ground-mounted solar, floating solar, community solar plants, and battery energy storage systems (BESS). The Bihar government, through its nodal agency Bihar Renewable Energy Development Agency (BREDA), will support the initiative by facilitating necessary clearances and approvals from relevant departments.

Saatvik Green Energy Receives SEBI Nod For ₹1,150 Crore IPO

Saatvik Green Energy has secured approval from the SEBI to proceed with its ₹1,150 IPO. The offering includes a fresh issue of shares worth ₹850 crore and an Offer-for-Sale (OFS) component of ₹300 crore by existing promoters. A major portion, approximately ₹553 crore, is allocated toward the establishment of a new solar manufacturing facility in Odisha. Additionally, about ₹96 crore will be used to repay debt in its subsidiary, Saatvik Solar Industries, while ₹12.3 crore is earmarked for settling other financial obligations. Remaining proceeds will go toward general corporate purposes.

JKSH And NREDCAP Ink \$4 Billion Pact To Develop 3 GW Green Ammonia Facility In Andhra Pradesh

JK Srivastava Hynfra (JKSH) — a joint venture between Poland's Hynfra and the JK Srivastava Group — has signed a memorandum of understanding with NREDCAP, the renewable energy development agency of Andhra Pradesh. The MoU paves the way for a massive ₹35,000 crore (\$4 billion) investment to establish a green ammonia production facility near Visakhapatnam.

Bihar Unveils ₹5,337 Crore Renewable Push Targeting 2,357 MW of Green Power

The Bihar government has launched two landmark policies and signed investment agreements worth ₹5,337 crore, aiming to generate 2,357 MW of renewable power. The announcement was made during a high-profile event held in Patna. The new frameworks — the Bihar Renewable Energy Policy 2025 and the Pump Storage Policy 2025 — are designed to attract private investments, enhance energy infrastructure, and establish Bihar as a clean energy hub.



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INDIA SOLAR NEWS

Investment >

Massive Solar Push in UP: True Power Launches ₹100 Crore Plant in Barabanki, Generating 1 GW and Jobs

In a landmark stride toward Prime Minister Narendra Modi's 'Viksit Bharat' mission and India's clean energy transformation, True Power Limited has inaugurated one of Uttar Pradesh's largest solar panel manufacturing plants. With an investment of ₹100 crore, this ambitious project marks a significant milestone in the state's industrial and green energy landscape.

Candi Solar Raises \$24M To Expand Clean Energy Operations In India And South Africa Ahead Of 2026 Series D

Distributed energy solutions provider Candi Solar has secured \$24 million in funding from its existing investor base, taking its total capital raised to over \$140 million. The latest infusion includes a \$20 million convertible loan from Norfund and STOA, along with a \$4 million mezzanine top-up from the Energy Entrepreneurs Growth Fund (EEGF).

Minister Pralhad Joshi Highlights NCPRE's 29.8% Efficient Tandem Cell Breakthrough, ₹200 Cr MNRE Support for IIT Bombay

Union Minister Pralhad Joshi visited IIT Bombay's NCPRE, highlighting India's renewable energy push. He reviewed solar R&D progress and lauded ART-PV India's 4-Terminal Silicon/CdTe-Perovskite Tandem Solar Cell with 29.8% efficiency. NCPRE, funded with ₹200 crore by MNRE, supports India's 100 GW solar goal. ART-PV India will receive \$10 million (~₹83 crore) to set up a pilot manufacturing facility, advancing scalable, indigenous solar technologies under Aatmanirbhar Bharat.

NLC India Unveils ₹1.25 Lakh Crore Investment Plan To Reach 20 GW Capacity By 2030

NLC India Ltd (NLCIL), a prominent public sector enterprise, has announced an ambitious capital expenditure plan worth ₹1.25 lakh crore to be executed by 2030. The strategic move aims to scale up its total power generation capacity from the current 6.7 gigawatts (GW) to 20 GW over the next five years, with renewable energy emerging as the central focus of this expansion.

SAEL Plans ₹8,200 Crore Investment For Setting Up New Integrated Solar Facility In Uttar Pradesh

SAEL Industries Limited, through its subsidiary SAEL Solar P6 Private Limited, will invest approximately ₹8,200 crores to establish an integrated solar manufacturing facility under the Yamuna Expressway Industrial Development Authority (YEIDA). Shri Yogi Adityanath ji, Honourable Chief Minister of Uttar Pradesh, presented the Letter of Comfort to Mr. Sukhbir Singh Awla, Co-Founder and Director of SAEL Industries Ltd. The construction of the project is set to begin this year.

Policy & Regulation >

Ministry Of Power Mandates Indigenous Software And Quality Standards In BESS VGF Scheme Amendments

The Ministry of Power updated the Viability Gap Funding Scheme for Battery Energy Storage Systems, mandating indigenous software for Energy Management Systems, clarifying grid connectivity and land responsibilities, and banning refurbished battery cells to ensure quality. The changes, shared with key states and central officials, emphasize promoting self-reliance, safety, and expanding India's renewable energy capacity with reliable, homegrown technology.

MERC Issues Draft DSM Regulations 2025 To Ensure Grid Discipline And Penalize Deviations In Maharashtra

The Maharashtra Electricity Regulatory Commission released draft 2025 regulations for the Deviation Settlement Mechanism to ensure grid stability by penalizing deviations from scheduled electricity use. Applicable to most generators and buyers using intra-state transmission, the rules empower the State Load Despatch Centre to monitor and settle deviations every 15-minute block. Charges are calculated fairly using market prices plus ancillary fees, with strict measures against gaming to promote responsible grid management and reliable power supply.

INDIA SOLAR NEWS

Policy & Regulation >

JSERC Issues Draft Transmission Tariff Regulations For 2026-2031 Control Period In Jharkhand

The Jharkhand State Electricity Regulatory Commission released draft Transmission Tariff Regulations 2025, effective April 2026 to March 2031, replacing earlier rules. They apply to intra-state transmission licensees under cost or ARR-based tariffs, excluding tariff-based competitive bidding projects. The Multi-Year Tariff framework requires detailed financial submissions and enforces incentives, penalties, and true-up processes. Tariffs cover equity returns, loans, O&M, and taxes, with a 70:30 debt-equity ratio. A 98% system availability ensures full cost recovery, promoting efficient, transparent, and accountable transmission infrastructure development.

Chhattisgarh Issues Draft Regulations To Revise Renewable Purchase Obligations Effective April 2025

Chhattisgarh State Electricity Regulatory Commission released draft 2025 amendments on Renewable Purchase Obligation (RPO) and REC framework, aligning with India's net-zero goals. Key changes include a new Distributed Renewable Energy category, removal of RPO caps for captive consumers, and applying RPO to fossil fuel-based cogeneration users. RPO targets rise to 43.33% by 2029-30, with an added Energy Storage Obligation. Penalties apply for violations, effective April 2025 statewide.

MNRE Clarifies PM-Surya Ghar Rules: Rooftop Installations Made Mandatory For RESCO And Virtual Net Metering Models

The Ministry of New and Renewable Energy clarified the PM-Surya Ghar scheme, allowing ground-mounted solar only under the capex mode. Under RESCO and Virtual Net Metering models, installations must be rooftop-based, with non-roof setups allowed only via special Ministry approval. This update, replacing earlier rules, was shared with DISCOMs and key stakeholders to ensure consistent implementation, clear standards, and proper use of Central Financial Assistance for residential solar systems.

MNRE Issues Amendment Mandating ALMM Compliance For Solar PV Cells From June 2026

MNRE amended its ALMM policy to operationalize List-II for solar PV cells from June 1, 2026, requiring projects to use modules from List-I made with List-II cells. Projects bidding before the cut-off date are exempt. Post-June 2026, only modules using ALMM-listed cells remain in List-I; non-compliant modules move to List-I(a). Domestic Content Requirement norms remain unchanged, and thin-film modules in integrated units meet ALMM standards. Separate guidelines for cell enlistment will follow.



MNRE Clarifies ALMM Rules For Solar Projects Charging Energy Storage Systems

MNRE clarified that solar plants charging Battery Energy Storage Systems (BESS) supplying the grid are not behind-the-meter and must follow ALMM requirements. Exemptions depend on the ESS project's ALMM status: if the ESS is exempt from ALMM for cells, the solar plant is too; if not, both must comply. This ensures only approved solar modules and cells are used in grid-connected projects, clarifying ALMM rules for solar linked to energy storage.

GERC Approves Gujarat Discoms' Plan To Convert Off-Grid Solar Pumps To Grid-Connected Systems In Gujarat

The Gujarat Electricity Regulatory Commission approved a petition by four DISCOMs to implement government resolutions converting off-grid solar pumps to grid-connected ones. Farmers must install equipment at their cost, with surplus energy bought at ₹1.75/unit. Regular agricultural tariffs apply for net grid use. A one-time subsidy covers infrastructure. Despite objections on rates and contract terms, GERC upheld the proposal, aligning with PM-KUSUM, approving implementation across Gujarat's DISCOMs from July 2025.

INDIA SOLAR NEWS

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CSERC Allows Open Access for Captive Solar Use Without Dedicated Feeder

CSERC approved M/s SBT Textiles' request to draw solar power through existing feeders without a dedicated feeder, for its 2.1 MW captive solar plant. The company must install advanced metering and communication systems and accept conditions from distribution and transmission licensees. This ruling promotes flexible grid integration and supports industrial clean energy use while reducing costs.

MNRE Amends Guidelines For Disbursing Incentives To Local Bodies Under PM-Surya Ghar Yojana

MNRE amended PM-Surya Ghar guidelines, shifting fund disbursement from Urban Local Bodies and Panchayati Raj Institutions, uploading account details to direct transfers from the National Programme Implementation Agency to State Implementation Agencies. SIAs must then transfer incentives to ULBs and PRIs within 60 days, streamlining the process and improving efficiency, with approval from the Competent Authority.



MNRE Revises Guidelines For Model Solar Village Scheme Under PM-Surya Ghar Yojana

MNRE revised the PM-Surya Ghar "Model Solar Village" guidelines to address rollout challenges. The scheme targets one solar-powered village per district, focusing on rural areas with specific population criteria. Villages compete to install maximum solar capacity, with ₹1 crore central aid each. State agencies oversee implementation, promoting community ownership. Funds are released in stages tied to progress. The goal is 24x7 solar power for lighting, farming, and livelihoods, enhancing rural energy self-reliance.

MNRE Mandates Secure Inverter Connectivity Under PM Surya Ghar Scheme To Safeguard Grid And Data Integrity

MNRE issued new rules for inverters and communication devices in rooftop solar under PM Surya Ghar to enhance grid security and prevent cybersecurity risks. All data must be stored on a National Software Platform hosted in India, with communication via secure M2M SIM protocol. Manufacturers must connect devices to national servers, ensuring data stays under Indian control. Guidelines for standardized, vendor-neutral protocols will launch by September 2025, promoting secure, transparent solar monitoring.

KERC Introduces New Deviation Settlement Regulations 2025 to Strengthen Karnataka's Power Grid Stability

KERC's new Intra-State Deviation Settlement Mechanism, effective July 15, 2025, aims to balance Karnataka's power grid by managing deviations between scheduled and actual electricity use. Covering generators, utilities, open access, and captive users, deviations attract charges based on market prices. The State Load Despatch Centre oversees scheduling and dispatch. A Deviation Pool Account settles charges, with penalties for delays. Developed under the Electricity Act 2003, the regulation promotes grid stability, transparency, and accountability across all grid-connected entities in Karnataka.

MNRE Launches Revised Scheme For Hydrogen Valleys And Green Hydrogen Hubs Under National Green Hydrogen Mission

MNRE approved a revised scheme under the National Green Hydrogen Mission to establish Hydrogen Valley Innovation Clusters (HVICs) and Green Hydrogen Hubs. HVICs will test and showcase small-scale hydrogen technologies, managed by DST, with ₹172 crore funding for four projects. Green Hydrogen Hubs focus on large-scale commercial production, requiring at least 100,000 metric tonnes annually, supported by central and state governments and private industry. The scheme promotes cluster-based development to accelerate India's green hydrogen economy and clean energy self-reliance.

INDIA SOLAR NEWS

Policy & Regulation >



MNRE Invites Second Round Of R&D Proposals Under National Green Hydrogen Mission

MNRE launched the second call for proposals under the National Green Hydrogen Mission's R&D Scheme to boost indigenous green hydrogen technology. With ₹400 crore allocated for R&D, the scheme supports academia, government, PSUs, and industry, funding up to 100% for public and 80% for private entities. Focus areas include production, storage, and utilization. Proposals must be submitted by August 21, 2025, encouraging collaborative, scalable, and market-ready innovations.

MNRE Clarifies ALMM Rules For Government Solar Projects With Behind-The-Meter Installations

MNRE clarified that behind-the-meter solar PV projects by government and public sector entities must comply with ALMM rules. Projects commissioned before June 1, 2026, need ALMM-listed modules but not cells, while those after this date must use both ALMM-listed modules and cells. This update resolves confusion and ensures quality standards in government solar projects, supporting India's renewable energy goals. The clarification was approved by the MNRE's Secretary.

Karnataka Finalizes New Solar Tariffs And Reforms For FY26 To Boost Distributed Generation

Karnataka Electricity Regulatory Commission set 2025-26 tariffs: ₹3.07/unit for ground-mounted solar, ₹3.08/unit for distributed solar, and subsidized rates for domestic users under PM Surya Ghar. "Distributed Solar PV Plants" include rooftops and other structures with Virtual and Group Net Metering allowed. PPAs are waived for domestic systems up to 150 kW. Technical norms and costs remain stable, with no mandatory battery storage. Tariffs apply for projects commissioned July 2025–June 2026.

CERC Finalizes Renewable Energy Tariffs For FY 2025-26 Amid Stakeholder Concerns And Regulatory Clarity

CERC issued the levelized generic tariff order for renewable energy in FY 2025-26, covering small hydro, biomass, cogeneration, biogas, and municipal waste projects. Key parameters like debt-equity ratio, return on equity, and capacity utilization were set, with debates on Odisha's small hydro CUF and fuel pricing. Tariffs range from ₹4.95 to ₹11.28 per kWh. The order, effective from July 2025 to March 2026, ensures regulatory clarity within existing frameworks.

MNRE Amends PM-Surya Ghar Yojana To Simplify CFA Process For Residential Rooftop Solar Installations

MNRE updated PM-Surya Ghar guidelines to boost rooftop solar adoption with CFA for residential consumers via a national portal. Subsidies apply up to 3 kW, favor domestic modules, and include strict vendor maintenance rules. Applications, inspections, and payments are streamlined. Enhanced transparency, smart meters, and integration with financial platforms aim to achieve 1 crore installations by FY 2026-27, ensuring efficient subsidy delivery.



CEA Issues New Guidelines For Automatic Weather Stations To Boost Solar And Wind Power Efficiency

The Central Electricity Authority's July 2025 guidelines mandate Automatic Weather Stations (AWS) for renewable projects above 50 MW to ensure accurate, real-time weather data. AWS must have specific sensor placements, secure 10-meter masts, and advanced Data Acquisition Systems with encrypted storage and satellite time sync. Communication requires secure 3G/4G/5G with cybersecurity measures. Powered by solar batteries, AWS data supports improved forecasting, grid reliability, and integration into national weather models for renewable energy planning.

INDIA SOLAR NEWS

Policy & Regulation >

CERC's 2025 Amendment Eases Transmission Charges For Renewable, Hydro, And Green Hydrogen Projects

The Central Electricity Regulatory Commission's June 2025 Fourth Amendment revises interstate transmission charge waivers for renewable energy, energy storage, and green hydrogen projects. It updates eligibility, including phased reductions based on commissioning dates, with waivers up to 25 years. New rules cover dual connectivity, self-declaration of renewable usage, and force majeure extensions. The amendment encourages early project commissioning and cost savings while refining billing and access provisions for diverse clean energy technologies.

KSERC Introduces New Renewable Energy Regulations For 2025 With Focus On Metering, Storage, And Decentralized Power In Kerala

Kerala's KSERC introduced new renewable energy regulations for FY 2025-26 to FY 2029-30, replacing 2020 rules. They include net metering (1-5 kW), net billing (1-500 kW), gross metering (1-3000 kW), virtual and group net metering, and provisions for virtual power plants and peer-to-peer trading. Time-of-day billing begins October 2025. Tariffs range from ₹2.09 to ₹4.78/kWh. The regulations aim to boost renewable adoption with streamlined approvals and incentives.

CERC Directs Phased Implementation Of Market Coupling In Power Exchanges Starting January 2026

CERC's July 2025 order directs phased market coupling in India's power sector, following a successful pilot integrating DAM, RTM, and SCED. DAM coupling will begin by January 2026, rotating Market Coupling Operator roles among power exchanges, with Grid-India as backup. RTM coupling and SCED integration will follow after further review. The move aims to enhance scheduling efficiency, reduce price volatility, and improve power market transparency and utilization across India.



HPERC Finalizes DSM Amendment 2025 To Align With Central Regulations In Himachal Pradesh

HPERC finalized the Second Amendment to its Deviation Settlement Mechanism Regulations on July 15, 2025, aligning with CERC's 2024 rules. After stakeholder consultations and a public hearing, key issues like the "Contract Rate" definition and deviation charges were addressed, with most CERC-aligned provisions retained. A new term, "MSW seller," was added for Municipal Solid Waste power generators. The amendments aim to enhance clarity and ensure consistent DSM implementation in Himachal Pradesh.

Uttarakhand Regulator Denies Request To Exceed 1 MW Rooftop Solar Net Metering Limit

UERC dismissed Opto Electronics Factory's petition to install 1.6 MW rooftop solar under net metering, exceeding the 1 MW limit in RE Regulations, 2023. Despite MNRE's solar expansion goals and UREDA's support, UPCL opposed, citing billing and grid impact concerns. The Commission ruled that MNRE guidelines allow various solar schemes but do not mandate net metering. Hence, the 1 MW ceiling remains, and the petition was rejected.



Chhattisgarh Drafts 2025 Regulations To Align Intra-State Deviation Settlement With National Framework

CSERC has proposed the 2025 Intra-State Deviation Settlement Mechanism regulations to align with CERC's 2024 DSM updates. The draft seeks to harmonize Chhattisgarh's framework with central rules, ensuring fair financial settlements for power buyers and sellers. Stakeholders are invited to provide feedback, and ongoing CERC amendments will be considered. These changes promote efficient, disciplined power trading and support national regulatory consistency.

INDIA SOLAR NEWS

Tender >

- Rashtriya Ispat Nigam Limited Invites Tender For Restoration Of 5 MW Solar Plant At Visakhapatnam Steel Plant
- NIT Calicut Invites Bids for 32 kWp On-Grid Solar Power Plant Installation In Kerala
- NTPC Green Energy Invites Bids For QCA Services At 296 MW Fatehgarh Solar Plant In Uttar Pradesh
- MP Jal Nigam Floats Tender For 100 MW Captive Solar Project In Madhya Pradesh
- Telecommunications Consultants India Invites Partners For 5 MW Rooftop Solar Project In Mauritius And Rodrigues
- NTPC Invites Bids For O&M Of 250 MW Solar Plant At Shimbhu Ki Bhurj In Rajasthan
- CESC Invites Bids For 40 MW/80 MWh Battery Storage Project At New Cossipore In Kolkata
- MCL invites bids for 500 kW solar tree project with 10-year CAMC
- NTPC Invites Bids For 300 MW Solar BOS Package In Rajasthan
- ITI Limited Invites Bids For 300 kWp Rooftop Solar Project In Andhra Pradesh
- NTPC Invites Bids for O&M of 92 MW Floating and 5 MW Ground-Based Solar Projects
- NHPC Invites Bids For 1200 MW Solar Project At Jalaun Solar Park In Uttar Pradesh
- NIT Calicut Invites Bids For 32 kWp On-Grid Solar Plant With ₹20 Lakh Project Value
- SJVN Floats Tender For 1000 kW Rooftop Solar Project In Itanagar Under PM Surya Ghar Scheme
- Defence Ministry Invites Bids For 2 Solar Systems Of 150 kW Near Leh Under FY 2025-26 Project
- SJVN Floats Tender For 1400 kW Rooftop Solar Projects Across Special States Under PM Surya Ghar Yojana
- CIL Invites Bids For 875 MW Solar Project In Rajasthan's Bikaner District
- GUVNL Floats Tender For 2000 MW With 4000 MWh Battery Storage Projects With VGF Support In Gujarat
- RRVUNL Floats Tender For Consultancy To Plan 32 GW Solar Parks On Government Land
- Cochin Shipyard Invites Bids For Switchboard Modification To Connect 500 kWp Solar Plant
- IISER Bhopal Invites Bids To Set Up 2 MW Captive Solar Plant With 10-Year O&M Commitment
- NTPC Green Energy Invites Bids For QCA Deployment At 250 MW Anantapur Solar Plant In Andhra Pradesh
- NTPC Green Energy Invites Bids For QCA Services At 250 MW Anantapur Solar Plant
- AAI Invites Bids For 30.52 kW Rooftop Solar Project At Diu Airport
- SECI Invites Bids For 5-Year O&M Of 10 MW Solar Project In Rajasthan
- BHEL Invites Bids For Two-Year O&M Contract Of 1.5 MWp Solar Power Plant In Hyderabad
- Visakhapatnam Steel Plant Invites Bids for 5MW Solar Plant Restoration Project
- NTPC NVVN Invites EPC Bidders For 20 MWp Solar Projects Under New Enlistment Drive
- SJVN Floats Tender For 1 MW Rooftop Solar Project In Itanagar Under PM Surya Ghar Yojana
- SJVN Green Energy Invites Bids For 951 MW Solar Projects In Maharashtra Under PM-KUSUM Scheme
- SJVN Green Energy Invites Bids For 951 MW Solar Projects In Maharashtra Under PM-KUSUM Scheme
- NHPC Invites Bids For Solar Rooftop Projects In Manipur Under RESCO Mode
- NABARD Invites Bids For 70 kW Solar Rooftop Project In Ahmedabad, Gujarat
- NCRTC Invites Bids For 110 MW Solar Power Project In Uttar Pradesh Under Captive Mode
- Coal India Limited Seeks ₹463.38 Crore Loan For 100 MW Solar Project In Gujarat
- THDC India Limited Invites Bids For 53.9 MW Solar PV Project At KPCL Thermal Plant In Karnataka
- Rajasthan Invites Bids For 500 MW/2000 MWh Battery Storage Project With VGF Support
- Damodar Valley Corporation Invites Bids For 228 MW Floating Solar Project At Konar Dam In Jharkhand
- TERI And SCGJ Sign MoU At India Energy Storage Week 2025 To Boost Training In Energy & Environment Sectors
- NTPC Green Energy Invites Bids For O&M Of 250 MW Shimbhu Ki Bhurj-1 Solar Project In Rajasthan
- L&T Wins 116 MW Solar Plus Storage Project In Bihar's Lakhisarai District
- Rashtriya Ispat Nigam Limited Invites Tender For Restoration Of 5 MW Solar Plant At Visakhapatnam Steel Plant
- SECI Invites Bids For 600 MW/1200 MWh Battery Energy Storage System In Andhra Pradesh
- NIT Calicut Invites Bids for 32 kWp On-Grid Solar Power Plant Installation In Kerala

INDIA SOLAR NEWS

Think Tank >

Batteries Take Charge: India's Power Markets Embrace Energy Storage For Profit And Stability - Report

India's power market volatility is boosting the role of battery energy storage systems (BESS), which charge during low-cost solar hours and discharge during peak demand. In 2024, merchant BESS revenue in the Day Ahead Market exceeded installation and operating costs, with IRRs up to 24%. Prices hit ₹9/kWh in one-sixth of an hour, while battery costs fell 80% since 2015. By June 2025, India had 500 MWh operational BESS and 121 GWh in development. With 236 GWh needed by 2032, BESS is vital for grid stability and renewable integration.

CEA Proposes 777 GW Optimal Power Mix For 2029-30 With 62% Non-Fossil Capacity - Report

The Central Electricity Authority's Optimal Generation Capacity Mix 2029-30 outlines a 777 GW target to meet the rising demand of 277.2 GW peak and 1,877 BU annual requirement. The plan includes 292.6 GW solar, 99.9 GW wind, 63.6 GW hydro, 94.5 GW coal, plus nuclear, biomass, and gas. Storage will feature 41.65 GW/208.25 GWh BESS and 18.2 GW PSPs. By 2029-30, 62% capacity will be non-fossil-based. Coal additions stop after 2026-27, with RE-storage hybrids gaining competitiveness. The roadmap stresses energy security, grid stability, and policy support, urging coordinated action for a reliable, low-carbon, and affordable power sector.

Navigating India's Regulatory Maze To Accelerate Green Hydrogen Projects - Report

India aims to become a global green hydrogen hub through the National Green Hydrogen Mission, launched in January 2023 with a ₹19,744 crore budget to produce 5 million tonnes annually by 2030. Projects require navigating over 73 approvals across central, state, and local levels, causing delays in 30% of cases. Central approvals include registrations and clearances from multiple ministries, while states handle land, factory, and environmental permits. The National Single Window System (NSWS) digital platform streamlines approvals but is only integrated with Gujarat, Kerala, and Rajasthan. Early due diligence, green financing, and regulatory liaison teams help developers avoid delays and risks.

India Achieves Record Renewable Energy Growth In H1 2025, Accelerates Clean Power And Energy Storage Expansion

India added a record 22 GW of renewable capacity in H1 2025, led by solar and wind, but coal still supplied 75% of electricity. Despite 234 GW of clean energy, an 80 GW coal expansion signals a focus on capacity and reliability over rapid decarbonization. Battery storage gained momentum with 7.6 GW awarded, improving grid integration. Rajasthan, Gujarat, and Tamil Nadu lead in renewables. Experts warn India's energy strategy diversifies rather than transitions, emphasizing power security. True change requires grid modernization, storage, and policy clarity to reduce long-term emissions.

India's ₹10 Lakh Crore Green Hydrogen Surge: Policy Push, Industry Momentum, and Global Ambitions - Report

India's green hydrogen sector is set for rapid growth with the National Green Hydrogen Mission targeting 5 MMTPA by 2030, up from less than 1 MTPA today. Electrolyser capacity aims to rise from under 1 GW to 20 GW. Supportive policies across states and financial incentives like SECI's tenders and Production Linked Incentives boost the sector. Green ammonia, a key hydrogen derivative, is gaining traction for fertilizer use and exports. Despite challenges like costs and infrastructure, falling renewable tariffs, strong policy support, and growing partnerships, India is a future global green hydrogen hub.

India's Evening Power Demand Still Dependent on Coal Despite Rapid Solar Growth: Report

Despite rapid solar growth, India still relies on coal for nearly 73% of electricity, especially during evening demand peaks, says an IEEFA report. Solar power dominates daytime but lacks storage to meet post-sunset needs. Rising EV electricity use adds pressure. The report urges deploying battery storage, hybrid renewable projects, and demand-side management, including Time-of-Day tariffs to shift consumption to daytime. Challenges like land acquisition and high storage costs hinder hybrid projects. Government support for storage cost reduction, energy-efficient appliances, and digital grid tools is crucial. Prioritizing storage and flexible solutions can create a cleaner, resilient, and cost-effective power system.



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FUELING THE SOLAR SURGE

Inside India's 2025 Investment Boom In The Sunrise Sector

India's solar journey has been one of the most defining stories in the global clean energy transition. In 2025, the sector will have entered a new phase, where investments are pouring in at an unprecedented pace, making it one of the most attractive markets for both domestic and international players. This surge is not only about increasing capacity but also about creating an entire ecosystem of opportunities that stretches from financing models to advanced technologies and supportive policies. Investors are showing strong confidence in India's solar sector, and this is fueling a transformation that aligns with both the country's climate commitments and its economic growth agenda.

The investment boom of 2025 comes at a time when India has already crossed several key renewable energy milestones. With ambitious targets to achieve 500 GW of non-fossil fuel capacity by 2030, solar energy remains the backbone of this plan. The government has been pushing strongly for large-scale solar parks, rooftop solar programs, hybrid projects, and solar-plus-storage solutions. These efforts have created multiple avenues for investors, ranging from utility-scale developers to financial institutions and technology providers. The policies on production-linked incentives, import duty safeguards, and renewable energy purchase obligations have created both a push and pull effect, ensuring that the market remains robust and future-oriented.

Financial innovations have also played a critical role in driving solar growth. Green bonds, infrastructure investment trusts, and blended finance mechanisms are unlocking capital at lower costs. Many international investors, including pension funds and sovereign wealth funds, are increasing their exposure to Indian solar assets because of the steady returns and long-term growth potential. Domestic banks and non-banking financial companies are also

stepping up their lending to the sector, encouraged by falling risks and rising demand. This has resulted in the emergence of new project pipelines across states, from Rajasthan's deserts to rooftops in metropolitan cities.

Another factor fueling the surge is the role of private companies and corporates that are committing to renewable power through open access and captive solar plants. The rise of corporate power purchase agreements is reshaping the investment landscape, as industries look to decarbonize their operations while ensuring affordable electricity. This trend is bringing in significant private capital and reducing dependence on government-led procurement models. The integration of storage solutions is further making solar projects more bankable, as they offer stability to the grid and reliability to consumers.

On the global front, India's solar growth is attracting attention as part of the larger shift towards sustainable finance. Institutions that once hesitated to invest in emerging markets are now looking at India as a safe bet, thanks to its strong demand base, clear policy direction, and growing domestic manufacturing ecosystem. The progress in solar module and cell production under the Atmanirbhar Bharat initiative is also reducing reliance on imports and giving confidence to investors who seek long-term stability.

The investment boom of 2025 is therefore more than just numbers. It represents a deeper structural shift where finance, technology, and policy are converging to create a sunrise sector that promises growth, jobs, and sustainability. For India, solar is not only about powering homes and industries but also about powering its future economy. With the right balance of innovation, regulation, and funding, the solar surge of 2025 is set to become a landmark chapter in the country's clean energy story.

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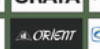
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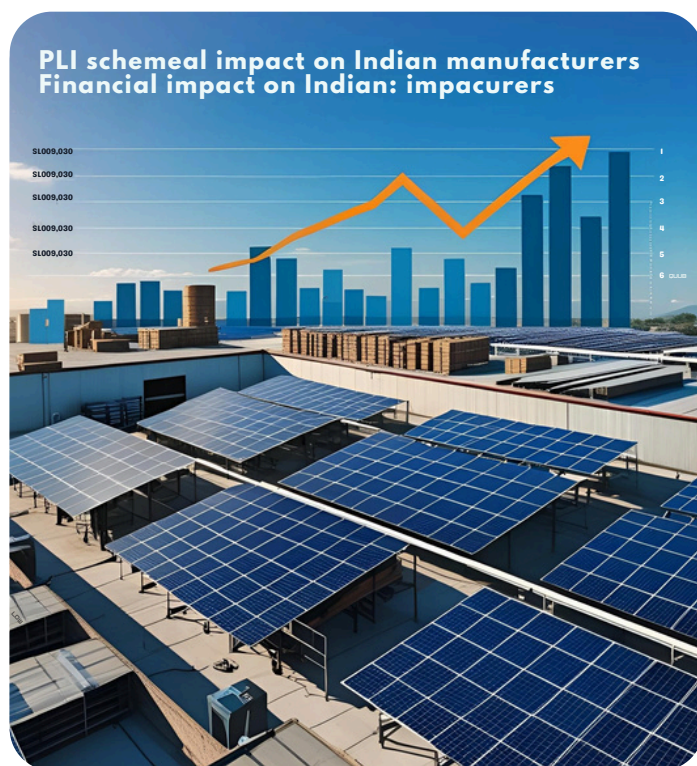
PLI Schemes And Solar: Financial Impact On Indian Manufacturers

The Production Linked Incentive (PLI) schemes launched by the Indian government have become a major talking point in the solar industry. With the goal of promoting domestic manufacturing and reducing import dependency, the PLI schemes are seen as a strong push for self-reliance. For the solar sector, this means more local production of solar modules, cells, wafers, and other key components. Financially, this scheme is creating a positive impact on Indian manufacturers who are now seeing more clarity, support, and long-term opportunities.

The government has allocated ₹24,000 crore for the PLI scheme for high-efficiency solar PV modules. This funding is being disbursed in phases and linked to performance, which ensures that only serious and eligible companies benefit. For manufacturers, this translates into better financial planning, increased capacity building, and assurance of returns over a set period of time. Many Indian companies like Reliance, Tata Power Solar, and Waaree Energies have already committed to expanding their facilities under the scheme.

This financial support reduces the burden of high initial capital investment, which is often a barrier for solar manufacturers. As a result, more companies are entering the market or expanding operations. Additionally, financial institutions are also more confident in lending to PLI-backed projects, as the government backing reduces risk. This results in increased access to credit, which was earlier a challenge for mid-sized players.

Another positive impact is the growth of the entire value chain. The PLI scheme covers integrated manufacturing, meaning companies can now



invest in not just assembling modules but also making cells, wafers, and even polysilicon in the long run. This helps in improving quality control and reduces reliance on imports, especially from countries like China. However, the scheme is not without challenges. The competition for PLI benefits is intense, and only selected applicants receive the financial support. Also, timely disbursement and clear evaluation criteria remain concerns for some stakeholders. But overall, the direction is encouraging.

For investors, the PLI scheme adds stability to the Indian solar market. It shows a long-term commitment by the government to develop domestic capabilities. As manufacturing grows, costs are expected to come down, and technology will improve. This benefits the entire ecosystem—from developers to end users—by making solar energy more affordable and reliable.

In summary, the PLI schemes have begun to change the financial landscape for Indian solar manufacturers. It is not just a short-term boost but a long-term plan to create a self-sustaining solar industry in India. With continued government support, transparent execution, and industry participation, India's solar manufacturing story is set to grow stronger and more resilient in the years to come.



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From Grid Dependency to Energy Autonomy: The Hybrid Solar Shift

Solar power has long been at the heart of the global shift to cleaner energy. But as the transition gathers momentum, it's becoming evident that solar on its own may not always offer the consistency and resilience today's energy landscape calls for.

Markets today are moving beyond the excitement of clean energy headlines and turning their attention to performance. The focus is now shifting to whether solar can offer consistent performance, especially during peak demand, unpredictable weather, or unexpected grid disruptions. When operated in siloes, the technology often struggles to keep pace with these expectations. That's exactly where hybrid solar systems are beginning to stand out.

By combining solar with battery storage or complementary sources like wind or diesel, hybrid systems are bridging the reliability gap that conventional setups may not guarantee. The numbers say it loud and clear. The global market is set to cross **\$800 million** by 2033, and it's the commercial and industrial sectors driving that shift. In addition, policy is starting to follow the momentum, too. In India, for example, every new solar project now needs to come with **two hours** of energy storage built in. It's a clear signal that the era of standalone solar is winding down. The transition to renewables is real, but what's becoming even clearer is that the systems we build now need to work in the real world, not just on paper.

Why Solar Needs a Stronger Partner

The idea that a solar panel alone can solve modern energy needs is fading fast. Peak generation doesn't always line up with peak consumption, and that mismatch often reveals itself at the most critical moments. For homes, it's the evening hours. For industries, it's during unplanned outages or surges in demand. Either way, relying on solar alone can leave you exposed.

When solar is paired with storage or a backup source, operations are better equipped to navigate uncertainty. Not just in terms of cutting costs, it also helps ensure consistency. Whether it's a hospital, a manufacturing unit, or a rural school, the value lies in knowing the power will hold steady when everything else is on edge.

In regions where the grid flickers during storms or heat waves, or where cyber risks are growing by the day, having a reliable backup is essential. The government is beginning to treat hybrid systems as strategic infrastructure. Especially in disaster-prone or remote areas, hybrid setups are proving to be lifelines by keeping critical operations running in healthcare, emergency services, and public utilities when the grid goes dark.

Technology, Flexibility, and Performance

At the heart of this shift lies technology. Innovations in inverters, solar modules, battery chemistry, and energy management systems have made modern hybrid solutions more efficient, flexible, and scalable than ever.

One of the most transformative enablers today is AI and machine learning. Intelligent energy management systems now use real-time data to forecast usage, optimize charging and discharging cycles, and respond dynamically to shifting loads. These smart systems help maximize the value of every unit of solar energy generated, reducing waste and extending battery life.

Additionally, the integration of hybrid solar with smart grids allows for remote diagnostics, real-time monitoring, and predictive maintenance, enabling system operators to take proactive action before inefficiencies turn into outages. This kind of intelligence is especially useful in large-scale commercial deployments, industrial parks, or smart city projects.

Modern hybrid systems are also modular and highly scalable, which means they can grow in step with an organization's needs. Whether it's a small community micro grid or a sprawling manufacturing facility, these systems are designed to adapt. And as AI continues to evolve, hybrid setups will increasingly be able to manage complex power flows across multiple sources and loads, turning solar power into a more dynamic, responsive, and resilient asset.

Regional Adoption

While North America and Europe continue to lead the market in hybrid solar adoption, the Asia-Pacific region is now the fastest-growing, holding **31%** of global hybrid solar revenue in 2023 and expanding at a CAGR of over 10%. Rapid industrialization, urban expansion, and increasing electricity demand are creating a strong pull for decentralized, resilient energy systems.

The Ministry of Power has mandated all new solar projects to include a two-hour, co-located energy storage system, equivalent to **10%** of the solar capacity, aimed at enhancing grid stability and peak-load support. As a result, India is expected to deploy approximately 14GW/28GWh of storage by 2030 through this requirement.

The versatility of hybrid systems also makes them a strong fit for remote, underserved, or infrastructure-deficient regions, where extending the central grid is not always viable. In such contexts, hybrid solar not only improves energy access but enhances local energy security, helping communities become more self-reliant in the face of disruptions or supply instability.

Why the Future Is Hybrid

Solar without storage is only half the success story. While it remains a crucial part of the clean energy puzzle, relying on solar alone leaves too much to chance, especially in environments where consistency and uptime matter. Hybrid systems, on the other hand, offer a well-rounded path forward that is rooted in financial sense, operational stability, and long-term energy independence.

As technology continues to evolve and costs come down, hybrid solar is quickly moving from innovation to the norm. The organizations that lean in now will build reputations for reliability, foresight, and sustainability.



Sandesh Naik

CEO
AB Energia

From Grid Dependency to Energy Autonomy: The Investment Case for Hybrid Systems

India's solar energy sector has achieved scale — now it must achieve stability.

With over 82 GW of solar capacity installed as of 2024, India has cemented its position as a global solar leader. But while generation capacity has grown exponentially, power reliability, dispatchability, and investor confidence have not kept pace. The underlying reason? Solar in India still largely operates in isolation — without storage.

At Solidus Techno Power Pvt. Ltd., where we are executing over 400 MWp of industrial and utility-scale solar projects, it is abundantly clear: solar without storage is a half measure. For investors, regulators, and developers alike, hybrid systems must now take center stage.

The Real Problem: Generation Without Control

Solar generation follows the sun — not the demand curve. Most plants peak at midday, while India's power demand peaks between 6 PM and 10 PM. This mismatch results in:

- Midday oversupply and curtailment
- Evening deficits and thermal fallback
- Unpredictable revenues for developers
- Price crashes in open access and merchant markets

Battery Energy Storage Systems (BESS) are the answer. They time-shift excess generation to match peak demand, stabilize the grid, and allow renewable developers to sell "power on demand" rather than "power when available."

According to the Central Electricity Authority (CEA), India will require 74 GW / 411 GWh of storage by 2032 — a 40x increase from current levels — to support its non-fossil targets.

Why Hybrid Systems Make Financial Sense

In hybrid systems, the economics are evolving fast. The Levelized Cost of Storage (LCOS) has declined to ₹6-7/kWh and is expected to fall further as India's PLI schemes and domestic battery manufacturing scale up.

- Time-of-Day (ToD) revenue optimization
- Participation in firm power and RTC tenders
- Grid services income (frequency response, peak shaving)
- Reduced risk of power curtailment and cashflow volatility

At Solidus, we are seeing strong demand from industrial clients for reliable, RTC-like solar. Storage-backed captive systems — especially in open access — provide cost predictability and grid independence, which are becoming competitive differentiators in energy-intensive industries.

Addressing Barriers: The Policy Mandate

Adoption, however, faces four persistent roadblocks:

1. High upfront storage costs
2. Absence of mandated ToD tariffs
3. Limited financing for hybrid models
4. Lack of monetizable grid-service markets

To unlock this potential, India needs:

- Time-of-Day tariff enforcement at state level
- Accelerated depreciation and VGF for storage
- Priority sector lending recognition for hybrid assets
- Hybrid-specific tenders with clear storage guidelines

India can learn from global benchmarks — the U.S. added 8.7 GW of storage in 2023, largely attached to renewables. Australia's storage assets now regularly participate in energy and frequency markets. India must move in the same direction.

Why the Future Is Hybrid

India's solar sector has moved from ambition to implementation. The next phase must focus on integration, intelligence, and investment viability. Hybrid solar+storage systems are not just environmentally sound they are financially resilient, technologically scalable, and grid-essential.

As CTO of Solidus, I believe the companies and investors who embrace storage today will lead the clean energy market tomorrow. The conversation must now shift from "megawatts installed" to "megawatts available when needed."

Because in the world of modern energy, timing isn't just everything, it's the investment case.

About the Author

Jaspal Singh is the Chief Technology Officer at Solidus Techno Power Pvt. Ltd. With over 200 MWp of experience in delivering grid-connected and hybrid solar systems, he leads Solidus' innovation in performance-driven, storage-ready EPC execution across India.



Jaspal Singh

Chief Technology Officer
Solidus Techno Power

Financing Innovation: How Solar-Plus-Storage Is Attracting New Capital



In India, solar energy is growing quickly. But now, something even more exciting is happening—solar is being paired with energy storage. This combination, called “solar-plus-storage,” is attracting more attention from investors. It allows solar power to be used even when the sun is not shining, making clean energy more reliable. Because of this, new types of financing are coming into the market to support these projects.

Earlier, most solar projects in India were based on simple models—generate power in the day and sell it to the grid. However, this model had its limits. Power could not be stored, so it had to be used immediately. With the falling prices of batteries and other storage systems, it is now possible to store solar power for later use. This is especially helpful for areas with unstable electricity supply or high evening demand. For investors, this means higher returns and more flexibility in how the electricity is used or sold.

Private equity firms, green energy funds, and international banks are now more interested in Indian solar projects with storage. This is because these projects offer long-term contracts, better technology, and lower risks. One of the key trends is the rise of hybrid tenders, where the government invites bids for solar and storage together. These projects often get fixed tariffs for 25 years, which gives confidence to lenders and investors.

Another new financial innovation is the use of green bonds. These are special loans used only for clean energy projects. Indian companies are issuing green bonds to raise money for solar-plus-storage, and global investors are buying them. Some firms are also using build-own-operate-transfer (BOOT) models. In this model, a company sets up the solar-plus-

storage plant, runs it for a few years, and then transfers ownership to a government or utility. This helps bring in upfront capital without long-term burden.

New digital platforms are also helping finance reach smaller solar-plus-storage projects. For example, some fintech companies are offering loans to households or small businesses to set up rooftop solar with batteries. These platforms use data to decide who qualifies for a loan, making the process faster and less risky.

Government support is playing a big role. India’s Production Linked Incentive (PLI) scheme for battery manufacturing and the Solar Energy Corporation of India’s (SECI) tenders for round-the-clock power supply are creating more opportunities. These efforts are reducing costs, improving returns, and attracting capital from different sources. States like Gujarat, Maharashtra, and Karnataka are also starting pilot projects that combine solar with storage for local energy needs.

As technology keeps improving, the cost of batteries will fall further. This will make solar-plus-storage even more competitive. For investors, this means more projects, lower risks, and steady returns. For India, it means a cleaner, more stable power supply and progress toward energy security and climate goals.

In the coming years, financing innovation will be the key to unlocking the full potential of solar-plus-storage. With the right mix of policy support, technology upgrades, and financial models, India is well-placed to lead the global shift towards smarter, cleaner energy systems.

Why India's Solar Sector Needs a Financing Overhaul: Policy Support Isn't Enough

India's solar sector has received consistent policy support over the last decade, ranging from accelerated depreciation and SECI-backed auctions to the establishment of solar parks and open access rules. National missions, subsidies, and regulatory reforms have signalled the government's intent to scale up solar capacity. Yet, the sector continues to face a critical gap, i.e., financing. Despite strong policy momentum, the structure, flow, and risk-adjusted pricing of capital have not kept pace with solar targets. Without targeted financial solutions, the sector's long-term growth remains vulnerable.

Often, the volume of policy measures does not translate into financial viability on the ground. Developers, particularly in the utility-scale segment, win bids at aggressive tariffs but find themselves unable to achieve financial closure. Project bankability remains a persistent concern, undermining the momentum created by regulatory reforms.

The regulatory environment for project finance has become more stringent. The Reserve Bank of India has introduced tighter norms for banks and NBFCs, with heightened focus on capital adequacy and risk assessment. While intended to safeguard systemic stability, this has inadvertently delayed approvals even for well-structured solar projects. Meanwhile, auction dynamics have encouraged ultra-low tariffs, leaving developers with wafer-thin margins and increasing the likelihood of delays or cancellations. These disruptions heighten lender concerns and impact expected cash flows. Solar developers in India also face a comparatively high cost of capital, as lenders continue to apply a significant risk premium to the sector.

Although renewable energy falls under the priority sector lending framework, the pricing of such loans rarely reflects any real concessional treatment. Lenders continue to apply conservative risk assessments, shaped by concerns around project viability and repayment timelines. These apprehensions are further compounded by payment security issues and counterparty risks. Delays in payments by state distribution companies (DISCOMs) constrain working capital and elevate credit risk, making financial institutions more reluctant to fund new projects.

Newer business models and decentralised solar solutions are also finding it difficult to attract capital. The regulatory and financial frameworks have not kept pace with emerging approaches such as peer-to-peer trading, asset leasing, or pay-as-you-go systems. These models require revised appraisal frameworks and custom financial products that are largely missing from the current lending environment.

Exposure to currency fluctuations and import dependence introduces further complications. Projects relying on imported equipment face foreign exchange volatility and supply chain disruptions. These factors add uncertainty and raise capital costs, particularly in an increasingly risk-sensitive credit market.

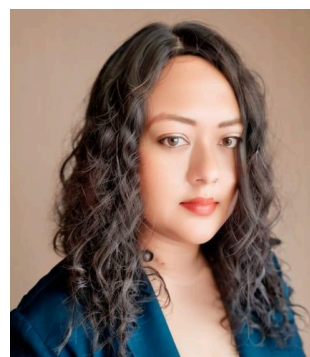
Green bonds and other capital market instruments remain underutilised in the solar sector. Concerns around greenwashing, regulatory compliance, and tax treatment continue to deter smaller developers from tapping into these financing tools. Despite their potential to unlock long-term institutional capital, uptake has been limited due to a lack of clear guidance and accessible structuring mechanisms.

What India's solar sector needs is a purpose-built financing system. This includes blending concessional capital with mainstream lending, strengthening legal measures such as payment security structures, widening access to green bonds for smaller developers, and encouraging banks and financial institutions to adopt more nuanced, sector-specific risk models tailored to renewable energy.



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India's Solar Bond Market: Is The Time Right?



India's solar sector has grown rapidly in recent years, driven by the government's clean energy goals and rising energy demand. Among the many ways to fund solar energy projects, green bonds—especially solar bonds—have started to gain attention. These are debt instruments used to raise money specifically for solar energy projects. Investors in India and abroad are now taking a serious look at the potential of India's solar bond market.

India needs huge investments to meet its target of 500 GW of non-fossil fuel capacity by 2030. A large part of this will come from solar power. However, raising funds at the right cost remains a challenge. Traditional financing methods like loans from banks have limitations due to high interest rates and limited availability. This is where solar bonds can play a big role. They can provide long-term, stable, and low-cost capital to developers.

In recent years, some large Indian companies like ReNew Power and Greenko have issued green bonds in the international markets to raise funds. These bonds were well received by global investors, indicating growing trust in India's renewable sector. At the same time, Indian financial institutions such as IREDA (Indian Renewable Energy Development Agency) are also trying to tap into this market. In January 2023, IREDA issued a green bond on the London Stock Exchange to raise \$300 million for renewable energy projects in India.

Despite such success stories, the domestic solar bond market is still at a very early stage. One of the challenges is the lack of clear guidelines and a dedicated green bond framework in India. Although SEBI (Securities and Exchange Board of India) has issued basic norms for green bonds, investors often look for more detailed standards, especially in terms of how the proceeds will be used and what kind of reporting will be done.

Another concern is the credit rating of the issuing companies. Many solar developers in India are smaller firms with limited credit history, which makes it hard for them to raise money through bonds. To address this, the government can explore credit guarantee mechanisms or allow blended finance options where public and private funds are mixed to reduce the risk.

Investor confidence also depends on currency stability, project timelines, and policy certainty. While India has made strong progress in solar power generation, concerns over delays in land acquisition, power evacuation, and policy changes in some states still remain. Clearer policies and stable power purchase agreements (PPAs) will help increase investor confidence in solar bond issuances.

Going forward, there is a clear opportunity for the Indian solar bond market to grow. As ESG (Environmental, Social, and Governance) investing becomes popular, Indian bonds could attract global climate-focused funds. A stronger push from the government, including tax benefits or interest subsidies on green bonds, can further support the market.

While India's solar bond market is still developing, the time seems right to strengthen its foundation. With proper regulations, support mechanisms, and investor awareness, it can become a key tool in financing the country's solar future. Investors who believe in clean energy and long-term gains may find this an attractive space in the coming years.



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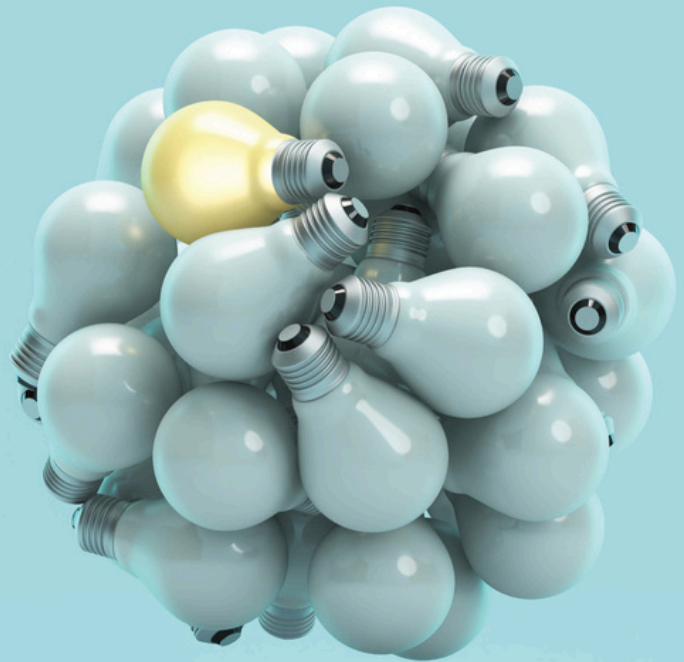
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Financing The Last Mile: Making Solar Affordable For Rural India

In rural India, access to reliable electricity is still a big challenge. Many villages either do not have power or face long hours of power cuts. Solar energy can help solve this problem. It is clean, renewable, and can be installed even in remote areas. But for many rural families, the main problem is not the availability of solar power—it is the cost. Buying and installing a solar system is still too expensive for most of them. That is why financing the last mile is so important.

Making solar affordable for rural India means finding ways to help families pay for it in small amounts. Most rural households do not have access to formal bank loans or credit cards. They also worry about how to maintain the system if something breaks. This is where innovative financing models come in. These models help people buy solar products without needing to pay everything upfront.

One such model is the pay-as-you-go system. In this, a family pays a small amount each day or week using mobile money or prepaid cards. Once the full cost is paid over time, the system becomes theirs. This method is already working well in parts of Africa and is now being tried in India. Some companies also offer solar systems on rent, where users pay a fixed monthly fee and the company handles maintenance and repairs.

Another approach is through self-help groups and microfinance institutions. These groups already help rural women with small loans for income-generating activities. Now, they are also helping people get loans for solar lanterns, home lighting systems, and even solar-powered

water pumps. These loans are small, easy to repay, and are often combined with training on how to use and take care of the equipment. Government schemes are also making a difference. The PM-KUSUM scheme is helping farmers get solar pumps at a lower cost. It offers a large subsidy, and the remaining amount can be financed through banks or local cooperatives. The government also supports mini-grids in areas where grid power has not reached. These mini-grids use solar panels to power entire villages. People can pay for the electricity they use each month, just like in cities.

Digital tools are helping too. Some startups are using mobile apps to track payments, system performance, and customer service. This gives confidence to lenders, as they can see that the system is working and the customer is paying on time. In return, more people get access to loans and solar power.

Bringing solar to rural India is not just about energy—it also brings better health, education, and job opportunities. Children can study at night, health centers can store vaccines in solar-powered fridges, and small businesses can run machines and lights. But all this depends on how well the last mile is financed.

By working together—governments, companies, banks, and communities—India can make solar energy truly affordable and available to every village. With the right financial tools and local support, rural India can lead the way in clean, reliable energy.





Accelerating Solar Plus Storage Adoption to Power India's Clean Energy Transition

Ratul Puri

Chairman
Hindustan Power

KEY HIGHLIGHTS ▼

- Storage integration boosts peak-hour reliability and supports grid flexibility.
- Investor confidence rises with supportive policies like VGF and storage tenders.
- Hybrid solar-storage projects gain momentum across key Indian states.

How are you integrating storage into solar projects to meet India's peak power needs?

Storage is integral to the way we design and scale solar infrastructure in India. With demand curves shifting and the grid requiring more flexibility, integrating storage allows us to better manage both generation and consumption patterns. We welcome the recent advisory by the Central Electricity Authority that advised a minimum two-hour co-located storage system for new solar projects, equivalent to 10% of the installed solar project capacity, in future solar tenders.. This push for co-optimised planning ensures that excess generation is not wasted and peak-hour reliability is strengthened. New projects are being aligned with this directive and storage models designed to support both load shifting and peak shaving are being explored. As policy and technology mature together, storage will evolve from a support function to a strategic asset in India's clean energy future.

What investment trends do you see in the Indian solar-plus-storage segment?

The solar-plus-storage segment in India is gaining significant investor interest, supported by strong policy commitments and global momentum around energy transition. PLI schemes for both solar PV modules and advanced chemistry cell batteries are laying the groundwork for domestic manufacturing at scale. India has also emerged as one of the fastest-growing clean energy investment

destinations globally. According to the Government data, FDI in the non-conventional energy segment has crossed USD 21 Bn from Oct 2019 to Dec 2024. The continued growth of the clean energy sector is also expected to generate more employment opportunities across the value chain.

How are solar-plus-storage projects being financed in today's market scenario?

Financing for solar-plus-storage projects in India is becoming increasingly diverse as the market matures. According to the International Energy Agency's World Energy Investment 2025 report, global investments in the energy sector are expected to reach a record 3.3 trillion US dollars in 2025,[1] reflecting strong momentum across the sector. Domestically, large corporates are also stepping up their participation through joint ventures and direct investments. States such as Gujarat, Uttar Pradesh, and Maharashtra are setting benchmarks in execution and well-structured incentives. We are seeing a shift toward blended finance models and structured instruments that help reduce the risks of early-stage investments while supporting growth. Together, these changes signal that solar-plus-storage is steadily moving from pilot projects to mainstream adoption, backed by global investor confidence and supportive domestic policy.

What are the key challenges in scaling hybrid solar-storage projects across Indian states?

Hybrid solar-storage systems are the next step in building a more reliable and future-ready renewable energy ecosystem for India. They offer the flexibility and consistency our growing power demand requires. But like any ambitious solution, there are early-stage challenges. These include delays in land allocation, grid connectivity issues, and the need for quicker closure on power purchase agreements. We also need a balanced regulatory environment that supports firm and dispatchable renewable energy without placing excessive risk on developers. Creating a predictable structure for

risk sharing, especially as battery storage matures, will be key to building long-term investor confidence. We see these challenges as a collective opportunity and believe that stronger collaboration between states, regulators, and developers, and technology stakeholders will help us achieve India's 2030 renewable energy vision.

How are policy moves like VGF and storage tenders impacting investment strategies?

The Viability Gap Funding (VGF) scheme for battery energy storage is helping address financial gaps in early-stage projects, which improves the bankability of large-scale storage systems needed for round-the-clock renewable energy. As solar and wind capacity grow, storage is becoming essential to ensure power availability during peak hours. Without it, surplus generation during solar hours can go underutilised. Measures like VGF and upcoming storage tenders reinforce storage as a national infrastructure priority. Together with supportive regulation, these policy signals are creating greater confidence for investors and helping accelerate project pipelines that contribute to grid reliability and clean energy scale-up.

Can you highlight one solar-plus-storage project by Hindustan Power and investor interest around it?

Hindustan Power is strengthening India's solar-plus-storage ecosystem through key projects across states, including a **100 MW ISTS solar project with 200 MWh BESS awarded by SJVN. The company has also secured a 120 MWh standalone BESS project in Bihar and signed a ₹620 crore agreement for a solar-plus-storage plant in Assam.**

These projects reflect rising investor interest in India's hybrid energy landscape. By pairing solar power with advanced storage, they support national goals around sustainability, energy security, and 24x7 clean power delivery.

Why India's Solar Sector Needs A Financing Overhaul, Not Just Policy Support



India's solar sector has achieved remarkable growth over the last decade, with ambitious targets driving both capacity additions and policy reforms. The government has played a crucial role by introducing schemes, subsidies, and regulatory frameworks to attract developers and investors. However, despite this progress, the financing landscape for solar remains riddled with structural challenges that threaten the sector's long-term sustainability. While policy support has laid a strong foundation, the sector's next phase of growth will depend less on government directives and more on an overhaul of financing mechanisms that can unlock affordable, large-scale, and reliable capital.

One of the biggest hurdles lies in the high cost of capital. Solar projects in India continue to depend heavily on debt, with nearly 70 to 75 percent of project funding structured through loans. Domestic lenders often perceive renewable energy projects as high risk, primarily due to concerns around payment security from distribution companies, project execution delays, and regulatory uncertainties. This has translated into higher interest rates compared to global standards, with Indian developers typically paying around 9 to 12 percent, whereas their counterparts in developed markets access capital at nearly half the cost. Such disparities put Indian projects at a disadvantage in terms of competitiveness and financial viability.

Another persistent challenge is the lack of long-term financing options. Most banks and financial institutions offer debt with a tenure of 10 to 12 years, while the operational life of a solar asset extends to 25 years or more. This mismatch forces developers to refinance midway, creating uncertainty in cash flows and adding to the overall cost of the project. International investors with longer investment horizons have shown interest in India, but currency risks and hedging costs significantly erode returns, reducing their appetite for large-scale commitments.

The issue of payment delays by state distribution companies further compounds financing difficulties. Even when projects are operational and generating power, developers often wait months to receive payments, disrupting debt servicing schedules. This weakens investor confidence and makes lenders cautious. Credit enhancement

mechanisms, payment security funds, and risk-sharing instruments have been discussed, but their implementation has been slow and uneven across states. Without robust financial guarantees, developers continue to bear the brunt of systemic inefficiencies.

At the same time, equity financing also needs to be deepened. While large foreign players and infrastructure funds have been active in acquiring operational assets, early-stage project financing remains constrained. Domestic institutional investors such as pension funds and insurance companies, which could provide long-term stable capital, have yet to significantly participate in solar investments due to regulatory and risk perception barriers. A more diversified investor base is essential to ensure that solar financing does not rely excessively on a handful of international funds or debt-heavy structures.

The sector also requires innovative financing instruments tailored to renewable energy needs. Green bonds, infrastructure investment trusts (InvITs), and securitization of renewable assets have emerged as potential tools, but they have not reached the scale needed to transform the market. Scaling up such instruments will not only provide liquidity but also bring in retail investors and broaden capital access. Additionally, blended finance models, where public funds are used to de-risk private investments, can play a critical role in making projects bankable and attracting foreign capital.

India's solar sector stands at a critical juncture where policy ambitions must be matched with financing innovation. Without cheaper and longer-tenure capital, the targets of achieving 500 GW of renewables by 2030 could face significant roadblocks. Beyond government policies, the solution lies in building financial ecosystems that address risks, improve payment security, and encourage diverse sources of capital. The transition from subsidy-driven growth to investment-driven sustainability demands nothing short of a financing overhaul. If India can reimagine its financial framework for solar, it will not only accelerate capacity additions but also establish itself as a global leader in clean energy investment.

Beyond Tariffs: How Indian Developers Are Navigating Financial Risk In Solar Projects

In the Indian solar sector, the focus has traditionally been on securing projects through competitive tariff-based bidding. However, as the market matures, developers are facing a new challenge—managing financial risks that go beyond just offering the lowest tariff. From unpredictable module prices and currency fluctuations to delays in payments and land acquisition issues, developers are now required to have a more strategic financial plan to ensure project viability.

One of the biggest risks Indian developers face today is the volatility in global solar module prices. Since a large portion of modules is imported, fluctuations in international markets, shipping costs, and import duties can affect project costs significantly. Developers are now hedging against this risk by locking in prices early through long-term supply agreements or by sourcing from local manufacturers to reduce uncertainty and dependency on global markets.

Another key area of concern is the delay in payments from state distribution companies (DISCOMs). These delays can impact a developer's cash flow and ability to repay loans on time. To address this, some developers are opting for projects under central government schemes or selling power to commercial and industrial (C&I) consumers who offer better payment security. This shift in strategy reduces exposure to financial stress caused by delayed DISCOM payments.

Currency fluctuation is another factor that adds to financial risk, especially when developers rely on foreign loans or equipment imports. Many are now choosing rupee-denominated loans or working with Indian financial institutions to avoid currency mismatch and interest rate volatility.

Land acquisition and evacuation infrastructure remain uncertain in several states. Developers are mitigating this by conducting more thorough due diligence before bidding and by preferring sites with clear land titles and existing grid connectivity. Some companies also choose to co-develop with land aggregators to speed up the process.

Access to finance itself is evolving. Indian developers are no longer relying only on traditional debt and equity. They are exploring green bonds, infrastructure investment trusts (InvITs), and securitization of future cash flows to diversify their funding base. This allows them to manage risk better and attract long-term capital.



Risk-sharing partnerships are also becoming common. Developers are forming joint ventures with global investors or technology providers to share financial and execution risks. These collaborations not only bring in capital but also technical expertise and project management experience.

Policy uncertainty is another layer of risk. Developers have faced challenges due to sudden changes in import duties, GST rates, or execution timelines. To navigate this, many are building contingency buffers into their project costs and timelines, ensuring they are better prepared for regulatory changes.

The financial risk management in India's solar sector is no longer limited to securing the lowest tariffs. Developers are becoming smarter and more strategic, focusing on diversified financing, better risk sharing, and operational resilience. This shift is helping ensure that projects remain viable and attractive to investors, even in a highly competitive and dynamic market.

Policy To Profits: How Government Reforms Are Shaping Solar Investments In India

India's solar energy sector is growing fast, and a big reason behind this is the strong push from government policies and reforms. Over the past decade, the Indian government has introduced several measures that have encouraged investors to look at solar as a profitable and reliable sector. These reforms have not only made solar projects more attractive but also helped reduce costs and risks for companies entering this space.

One of the key reforms has been the creation of clear national targets. The government set a goal of installing 100 GW of solar capacity by 2022 and is now aiming for 280 GW by 2030. These targets give a strong signal to investors that the government is serious about solar power. When policies support long-term plans, investors feel confident to put their money into new projects.

Another important reform has been the introduction of transparent and competitive bidding processes. Agencies like SECI (Solar Energy Corporation of India) conduct auctions where developers compete to

offer the lowest tariffs. This has brought down the cost of solar power, making it cheaper than coal in many cases. At the same time, it has ensured fair competition and attracted both Indian and global investors.

The government has also improved the ease of doing business in the renewable sector. Earlier, getting approvals for land, grid connection, and financing was difficult. Now, single-window clearances, digital platforms, and standard contracts are being used to make the process smoother. Reforms in transmission infrastructure, like the Green Energy Corridor, have helped developers evacuate power from remote locations to high-demand areas.

Financial incentives are also a major driver. The government offers viability gap funding, interest subvention, and production-linked incentives (PLI) to boost local manufacturing of solar panels and components. These measures reduce dependence on imports and promote self-reliance, while also opening up new investment opportunities in domestic manufacturing.

Foreign Direct Investment (FDI) policies have been liberalized, allowing 100% FDI under the automatic route in renewable energy. This has resulted in billions of dollars flowing into Indian solar projects from international firms, funds, and banks. Tax benefits such as accelerated depreciation and GST reductions on solar equipment have further supported investor interest.

States have also played a big role. Many state governments offer additional subsidies, land on lease, and attractive net metering policies for rooftop solar. While some challenges remain in terms of policy clarity and payment security from state utilities, recent reforms like the Late Payment Surcharge Rules and the push for smart metering are helping resolve these issues.

The government reforms have changed the face of solar investments in India. From ambitious targets to financial support, from bidding transparency to policy stability, these changes have made the sector more attractive and profitable. As the country moves toward its clean energy goals, continued support and new reforms will be key to drawing in more capital and making India a global leader in solar power.





IoT PV SCADA Powering PM-KUSUM Projects

We at EnerMAN are proud to be a major technology partner of the Ministry of New and Renewable Energy's (MNRE) PM-KUSUM program, which was introduced by the Government of India. In order to promote sustainable renewable energy use, reduce the reliance on fossil fuel energy, improve the stability of grid power through distributed generation, and give farmers more economic power, this forward-thinking program aims to integrate solar photovoltaic (PV) systems into agricultural power infrastructure throughout rural India.

Three main areas are the focus of the plan.

First, in order to produce clean electricity that can be fed into the grid, makes it easier to install decentralised, grid-connected solar PV plants with capacities of up to 2 MW on agricultural or barren land. In addition to encouraging the production of clean energy, this gives farmers another way to make money from their land.

Second, the program encourages the installation of independent solar-powered agricultural pumps (component - C), which increase farm productivity and lower operating costs by enabling irrigation in off-grid areas and enabling farmers to use less diesel and steer clear of unstable electricity supplies.

Third, PM-KUSUM promotes the solarisation of current grid-connected pump sets, which allows farmers to use solar energy for irrigation and export excess power to the grid via net metering, thus increasing energy efficiency and income potential.

For farmers and other stakeholders, the financial framework supporting PM-KUSUM makes the adoption of solar energy feasible and affordable. It comprises a 60 percent capital subsidy that is split between the federal and state governments, a 10 percent beneficiary contribution, and an optional institutional loan that can cover up to 30 percent of the project's cost. This funding model increases rural energy access while reducing upfront costs and guaranteeing long-term operational savings.

We at EnerMAN, support the goals of the program by offering cutting-edge data management and monitoring solutions that are crucial for maximising the performance of solar assets. Rapid fault detection and operational optimisation are made possible by our ETi-EDGE Local Monitoring System, which provides on-site, real-time tracking of solar PV plant performance.

In addition, our ETi-SOL cloud-based IoT SCADA platform facilitates data-driven decision-making by offering safe, scalable remote access to performance analytics, live and historical data. ETi-SOL has the features of - Centralized Monitoring System (CMS) / Remote Monitoring System (RMS) which allows the plant owner to view multiple plants data in single platform efficiently.

Transforming Agri-Energy with Intelligence
EnerMAN'S IoT SCADA Powering PM-KUSUM Scheme Nationwide.

- Real-Time Remote Monitoring**
anytime, anywhere — via a secure web/mobile interface.
- Advanced Data Analytics**
Identify performance gaps, generations losses and downtime tracking dashboards.
- Instant Alerts & Notifications**
Receive real-time alerts / notifications for breakdowns, faults, low generation, abnormal system behavior.
- Predictive Maintenance & Diagnostics**
Leverage intelligent analytics to predict faults before they happen, improving asset life and reducing O&M costs.
- Seamless IoT Integration**
Works with various communication protocols (Modbus RTU/TCP, MQTT, etc.) and integrates easily with your existing field devices and sensors.
- Centralized Control for Multiple Sites**
Monitor and manage multiple locations from one unified SCADA dashboard — perfect for developers and DISCOMs managing distributed assets.
- Data Security & Cloud Backup**
End-to-end encryption, secure user authentication, and periodic cloud backups ensure your data is always safe and accessible.
- Customizable & Scalable**
Tailored to suit rooftop, ground-mounted, hybrid, and off-grid solar applications — scales from small plants to utility-size projects.
- SEDMS Portal Integration & Telemetry Sharing**
Ensure Compliance and seamless reporting to Government portals & Agencies

Call us : +91 70229 49911 | +91 99806 98001 | +91 74117 70381 | Email: sales@enerman.in | www.enerman.in

EnerMAN facilitates the exchange of energy data with the State Solar Energy Data Management (SEDMS) Platform, which also makes regulatory compliance easier and allows for smooth integration with DISCOMs and government portals. MQTT protocols are used to securely transfer the data in compliance with government regulations.

Presently, EnerMAN's integrated technology suite supports more than 100MW of PM-KUSUM solar projects, enabling developers, DISCOMs, and farmers to optimise operational efficiency, guarantee asset reliability, and enhance return on investment. We are dedicated to speeding up India's shift to decentralised renewable energy and sustainable agricultural development with our technology-driven approach.

MNRE pushing for adopting advance technology like IoT based SCADA for live data collection from Solar PV plants and Sub-station grid metering point using mobile internet / Cellular network (3G/4G/5G) and MQTT / API / FTP through secured interfaces to safeguard against Cyber security threat / attacks. This helps in effective management and maximum utilization of renewable energy generated from distributed system across India by State Level and National Level SEDMS CMS platforms. This will also ensure no misuse of capital subsidy and future automation of JMR and bill settlement reduce unnecessary manual and time-consuming effort.

By Sabarish, Rekha and Ravi of EnerMAN Technologies

Eastman: Powering the Solar Ecosystem with Backward Integration in Power Electronics



Shekhar Singal

Managing Director
Eastman Auto & Power Limited

KEY HIGHLIGHTS ▼

- Eastman's backward integration and R&D deliver reliable, cost-effective solar inverters for India and global markets.
- Eight manufacturing facilities reduce import dependency and strengthen "Make in India."
- Indigenous tech and digitization power high-performance, IoT-enabled solutions with strong service support

How does Eastman's backward integration improve the quality and reliability of your grid-tied inverters?

The Grid Tie Inverters is a result of Eastman's unwavering commitment to 'Make in India' and our vision of becoming a globally respected solar energy products manufacturer. Through backward integration, we manufacture critical components of the Grid Tie Inverter in-house at our advanced power electronics facility, ensuring superior quality and consistent performance.

Our strength lies in robust in-house R&D capabilities. From firmware development to system architecture, the Grid Tie Inverter is designed to meet the unique challenges of Indian C&I consumers—such as load variability, extreme weather conditions, and the demand for smart grid compatibility. This level of control enables us to maintain high-quality standards across every stage of production.

We operate four dedicated manufacturing facilities for power electronics components, maintaining the highest levels of quality and control. With technologies such as Injection Moulding, Surface Mount Technology, and Manual Insertion, we ensure customer needs are met for consistent supply of Solar Energy.

This seamless synergy between R&D and manufacturing empowers us to deliver reliable, feature-rich, and cost-effective solutions. We're not just making inverters—we're building solutions made for India and ready for the world.

In what ways is Eastman reducing import dependency and supporting "Make in India"?

Eastman today operates eight state-of-the-art manufacturing facilities across India, each designed with a focus on innovation, quality, and self-reliance. Out of these, one facility is dedicated exclusively to lithium battery production, where we manufacture batteries for E-Rickshaw, Residential Backup & Solar Storage applications.

Four of our facilities specialize in power electronics—covering home inverters, off-grid inverters, grid-tie inverters & E-Rickshaw Chargers. Here, backward integration plays a critical role, as we produce essential components like Cabinets, fans, and transformers in-house. Our Backward Integration facilities include Injection Moulding, Heat Sink Machining, Press Shop, Laser Cutting Machines for Cabinets, Inductor Manufacturing, and BOPET Sheet Manufacturing. This not only ensures consistency and quality but also reduces dependency on imports.

The remaining three facilities are focused on lead-acid battery manufacturing. Together, these eight facilities reflect our commitment to 'Make in India', creating resilient, integrated supply chains that support India's clean energy transition



Innovation, integration, indigenization, reliability, and sustainability—Eastman's pillars for delivering next-gen solar energy solutions."

How is indigenous technology helping you deliver cost-efficient and high-performance inverters?

Indigenous technology is at the heart of how we design and deliver cost-efficient, high-performance inverters. By developing core technologies in-house—whether it is advanced MPPT algorithms, IoT-enabled monitoring systems, or robust safety features—we are able to customize solutions for Indian and global grid conditions without relying on costly imports.

This not only reduces costs but also gives us the flexibility to innovate faster and address specific consumer needs in diverse markets. Indigenous R&D, combined with our backward integration in power electronics, allows us to achieve the right balance of performance, reliability, and affordability. Ultimately, it enables Eastman to offer world-class inverters that are 'Made in India, for the World'—delivering long-term value to customers while supporting the country's self-reliance in clean energy

What Differentiates Eastman's Power Electronics in the Industry

Eastman stands apart in the renewable energy sector with its comprehensive portfolio and advanced product engineering. Unlike many players, Eastman provides solutions across all three types of solar setups – On-Grid, Off-Grid, and Hybrid, making it a one-stop partner for end-to-end solar energy needs.

Key Differentiators & Unique Features

- **Complete Solar Solutions-** From panels and inverters to batteries and energy storage, Eastman delivers fully integrated solar energy systems.
- **Extended Product Assurance-** Up to 10 years warranty on Solar Grid-Tie Inverters and Hybrid Inverters, offering unmatched reliability and customer confidence.
- **Zero Export Function-** Ensures compliance with utility regulations by preventing excess energy export.
- **Superior Thermal Management-** Advanced design ensures efficient cooling, longer lifespan, and higher performance stability.
- **High PV Installation Capacity-** Supports up to 1.5x overload, enabling maximum energy harvest even in challenging conditions.
- **Low Startup Voltage-** Quick system activation ensures early morning and low-light energy generation.
- **Smart Grid Integration-** Seamless compatibility with modern grid requirements, ensuring future-readiness.
- **Durable IP65 Enclosure-** Protects against dust, water, and extreme weather, making it ideal for global installations.
- **IoT-Enabled Monitoring-** Wi-Fi & GSM data logging sticks provide real-time remote monitoring, system diagnostics, and energy management via the Eastman One app.

How does the company ensure service for the products?

At Eastman, customer satisfaction doesn't end with product delivery, it continues throughout the entire lifecycle of our solutions. Powered by a robust pan-India service network, we ensure reliable, on-demand support wherever our customers operate—be it in urban, semi-urban, or rural regions.

Our expansive service infrastructure guarantees:

1. Fast response times
2. Expert on-site assistance
3. A strong maintenance ecosystem

Every service technician is factory-trained and fully equipped to handle everything from product installation to complex technical troubleshooting ensuring uninterrupted performance, especially for our Commercial & Industrial (C&I) clients, where uptime is mission-critical.

We have introduced several customer-centric service initiatives to enhance user experience and deliver service excellence:

- **24x7 Call Centre:** Easy complaint logging through a dedicated helpline.
- **AI-Powered Voicebot:** Intelligent voice support that ensures your complaint is registered seamlessly.
- **Complaint Management CRM:** Tracks the complete customer journey and ensures timely resolution.
- **Eastman Assure:** A dedicated customer service portal offering a one-stop solution for service needs.
- **Technical Self-Help Videos:** Step-by-step product installation and troubleshooting guides available online.

At Eastman, our commitment goes beyond power—it's about powering trust and ensuring peace of mind.



Eastman's inverters are more than just products—they embody India's vision of clean energy, blending innovation, reliability, and self-reliance to create solutions that power today while shaping a sustainable tomorrow."

Our expansive service infrastructure guarantees:

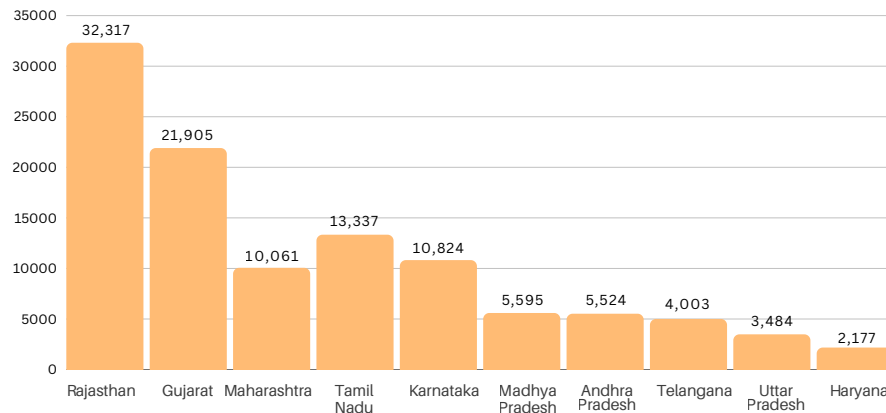
Key initiatives include:

- **IoT-Enabled Applications:** Eastman One – Our advanced IoT platform enables real-time system monitoring, remote diagnostics, and intelligent energy management for Solar Inverters. A key differentiator of Eastman One is that all data is securely stored on Indian servers, ensuring robust data protection and compliance with local regulations.
- **AI-Powered Chatbot:** A 24/7 virtual assistant offering instant support, troubleshooting, and guidance to users.
- **Power ONE:** Integrated platform for our Salesforce & Distributors ensuring seamless flow of information and faster execution of transactions
- **Centralized Technical Knowledge Base:** A comprehensive digital repository for partners and technicians, enabling quick access to manuals, FAQs, and best practices.

Together, these digital and automation capabilities empower Eastman to deliver efficient, connected, and customer-centric energy solutions on scale.

Solar Installations by State

TOTAL SOLAR PV INSTALLATIONS AS OF JULY, 2025 (MW)



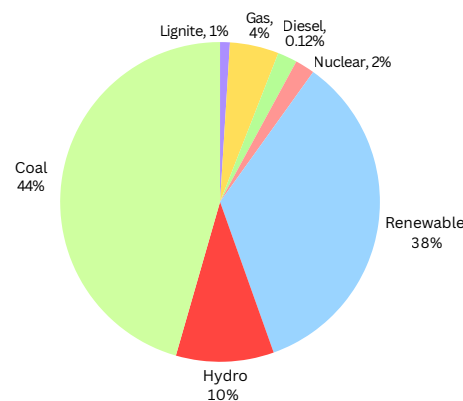
SOURCE: MNRE

SOLARQUARTER RESEARCH

India achieved a remarkable milestone by installing an unprecedented 21,151.82 MW of Solar PV capacity in the calendar year 2025 till July. By the end of July 2025, the country's total Solar PV installations surpassed 119 GW. During this period, rooftop Solar PV installations reached approximately 19.87 GW. Rajasthan led the way, with 32,317.19 MW installed, accounting for 27.15% of the nation's total Solar PV capacity. The county also added around 21 GW in the first seven months of the calendar year 2025. Rajasthan, Gujarat, Maharashtra, Tamil Nadu, and Karnataka together contributed over 74.31% of the total installed Solar PV capacities across the country. While Rajasthan and Gujarat maintained their leading positions, Maharashtra stepped up two spots to its position, pushing Tamil Nadu and Karnataka down to fourth and fifth place compared to installed solar PV capacity by July 2024. The overall Solar PV installations saw a growth of over 36.47% compared to the 87.207 GW recorded by the end of July 2024.

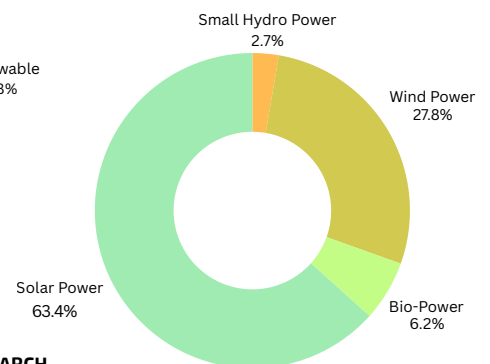
In the pie chart, Renewable capacity additions continue to increase at a rapid pace in India, accounting for approximately 38.3% of India's total power capacity at the end of July 2025. India's total installed power capacity stood at over 490 GW at the end of July 2025 from all the sources, with renewables accounting for 187.86 GW, making up 38.3%, compared to cumulative renewable energy installations of 150 GW at the end of July 2024, which represented a growth of around 25% year-over-year. Solar power accounted for approximately 119 GW of installations, which represents 24.3% of the total installed power capacity. Among the renewable, Wind and Solar constitute over 91% of the total renewable (excluding large hydro), Wind Power installed capacity at the end of July 2025 was over 52.14 GW, which represents 10.6% of the total power capacity installed.

INDIA POWER MIX

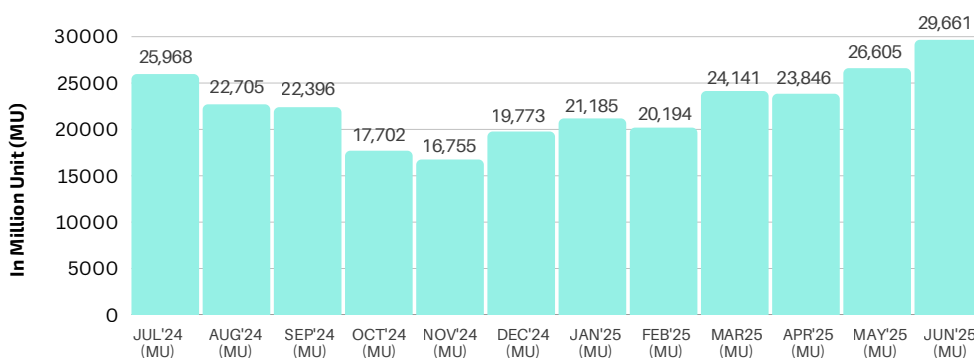


SOURCE: CEA JULY 2025 | SOLARQUARTER RESEARCH

INDIA RENEWABLE MIX



Monthly RE Generation in India

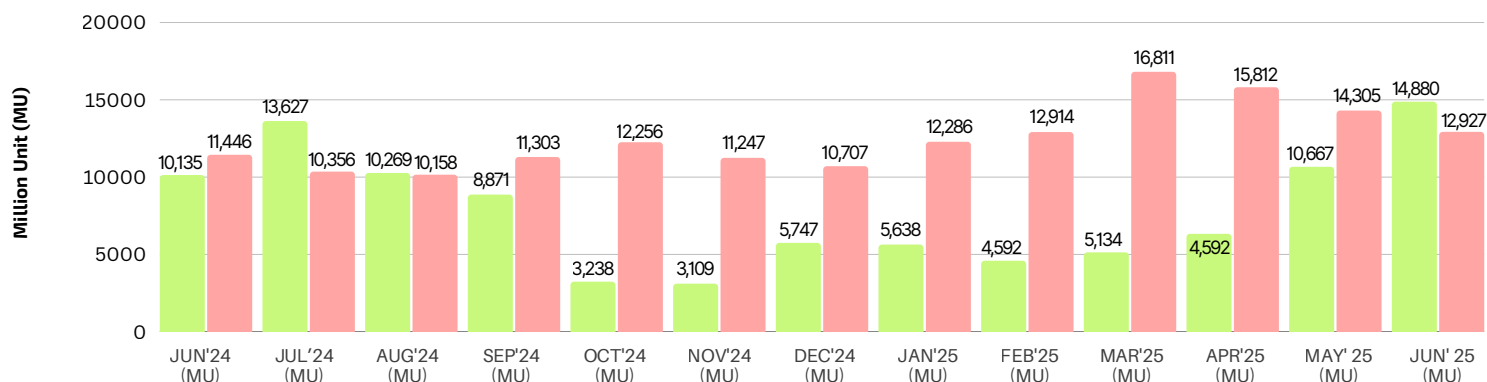


SOURCE: CEA

SOLARQUARTER RESEARCH

Total renewable energy generation in June 2025 reached 29,660.94 million units, which is an increase of RE generation by around 28.67% year-over-year from June 2024, when the RE generations were 23,052.28 million units. Solar Power generation has also increased by around 12.95% year-over-year from June 2024 (11,445.66 million units) to June 2025 (12,927.48 million units). Wind Power generation has increased by almost 46.81% in the same period and reached 14,879.54 million units in June 2025.

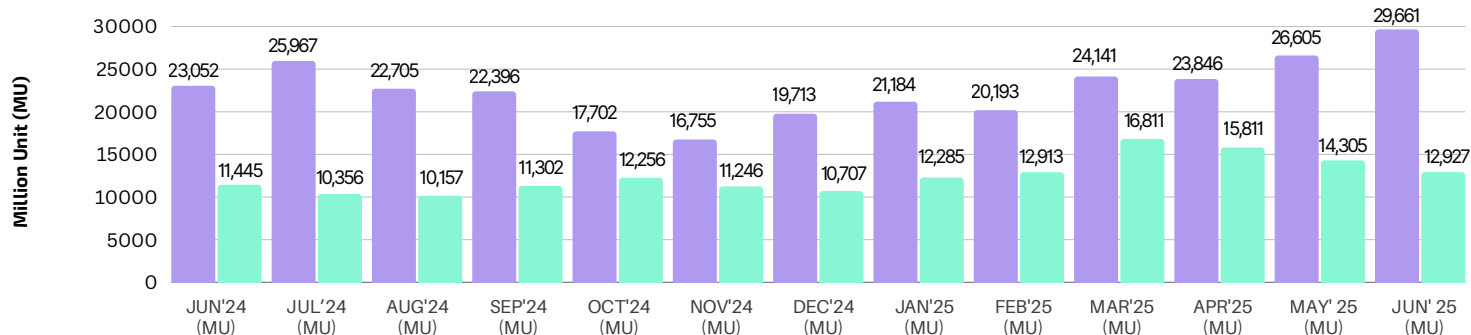
Solar Vs Wind Generation In India In 2024-25



SOURCE: CEA

SOLARQUARTER RESEARCH

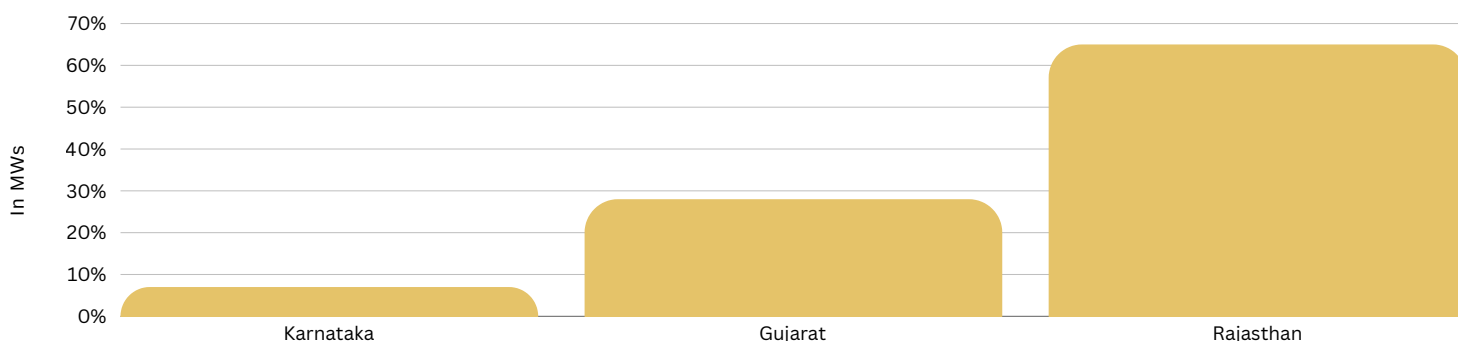
Renewable Energy Vs Solar Generation



SOURCE: CEA

SOLARQUARTER RESEARCH

Hybrid Projects (Solar Component)



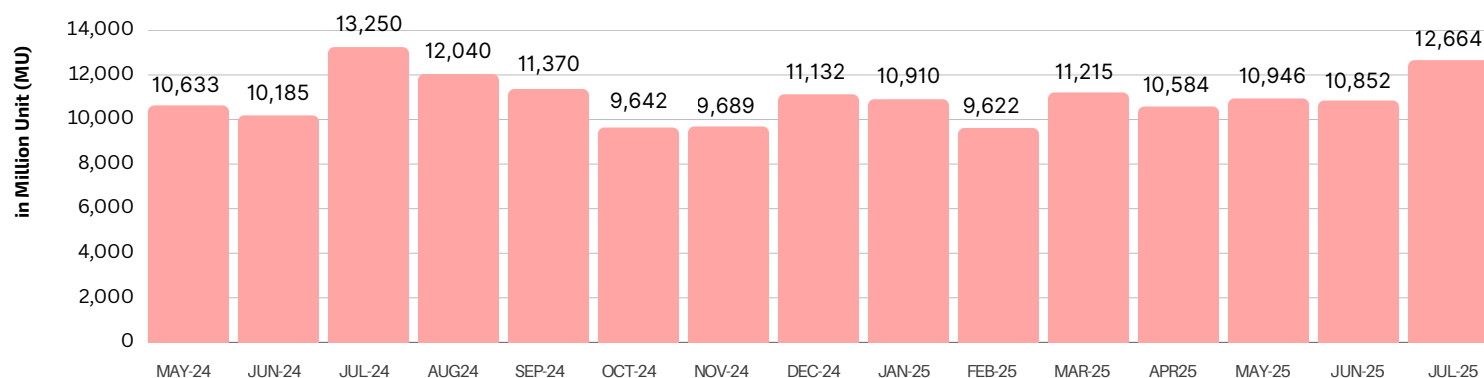
SOURCE: MNRE (JULY 2025)

SOLARQUARTER RESEARCH

As of July 2025, India's installed hybrid projects capacity reached 3,063.36 MW, contributing around 2.57% to the country's total solar PV capacity. This is part of the overall renewable energy capacity of 187.86 GW, excluding large hydro. Hybrid projects, which combine solar and wind power, are currently limited to just three states: Rajasthan, Gujarat, and Karnataka. Among these, Rajasthan leads with the highest installed capacity of 1,980 MW. This is mainly because the state has strong potential for both solar and wind energy. Rajasthan receives high solar irradiation and also experiences strong wind speeds, making it ideal for hybrid energy generation. The installed capacity of hybrid projects has shown a year-on-year growth of about 19.15% compared to July 2024, when it stood at 2,570.96 MW. This steady growth highlights the increasing focus on hybrid projects as a solution to improve grid stability and renewable energy utilization.

Electricity Market

IEX ELECTRICITY MONTHLY TRADED VOLUME IN 2024-2025

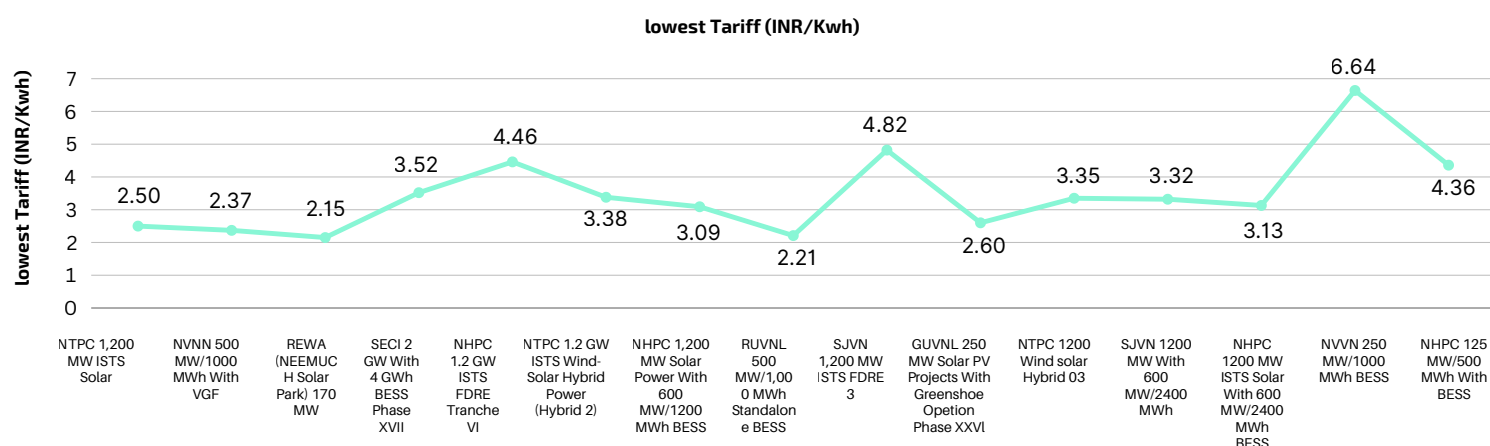


SOURCE: IEX

SOLARQUARTER RESEARCH

In July 2025, the Indian Energy Exchange (IEX) reached a total volume of 12,664 million units (MU), a 4.42% year-over-year decline. According to government data published in July '25, the country's energy consumption reached 153.6 BUs, an increase of 2.6% compared to the previous year. Despite the increase in demand, prices on power exchanges were lower compared to the previous year, owing to higher supply-side liquidity on the exchange platform. The market-clearing Price in the Day Ahead Market at ₹4.18/unit during July 2025 declined 16% YoY. Similarly, the price in the Real Time Market at ₹3.83/unit during July 2025, declined 23% YoY.

Lowest Solar Tariff (₹/kWh) in 2024 - 2025



SOURCE: SOLARQUARTER RESEARCH

BIDDING DETAILS

The introduction of ALMM List-I for Solar PV modules and the upcoming ALMM List-II for PV cells, set to take effect in June 2026, has added new compliance challenges for developers in India's solar auctions, contributing to tariff fluctuations. These hurdles are further intensified by ongoing global supply chain disruptions caused by geopolitical tensions such as the Russia-Ukraine war, the US tariff conflict, and unstable currency exchange rates.

Although the Indian government has offered some relief by extending project commissioning deadlines, developers continue to face significant cost pressures. The recent imposition of anti-dumping duties on solar PV glass imports from China and Vietnam has escalated input costs, leading domestic manufacturers to raise prices. This has added to the financial burden on solar project developers.

Moreover, the latest tariff hikes by the U.S. on solar imports have tightened global module supply and driven up prices, indirectly affecting Indian projects. In 2024, solar tariffs in India remain volatile, shaped by increasing module and installation costs, project scale, and grid connectivity issues.

**SOLAR
QUARTER**
PRESENTS



**SOLAR
CONTRACTORS
MEET 2025
NAGPUR**

AWARDS



**Most Preferred Module in
Maharashtra**

**Best Bifacial Mono-PERC
Solar Module**

Novasys Greenergy Pvt. Ltd.



Best Utility-Scale Inverter

Solis



**Best N-Type TOPCon Solar
Module**

Saatvik Green Energy Limited



**Best Made in India Single-
Phase Residential Grid-Tied
Inverter (3-5 kW)**

Selec Controls Pvt. Ltd.



**Best Grid-Tied Inverter for
Residential & Commercial
Projects (1 & 25 kw)**

Feston SEV Pvt Ltd



**Best High-Power HJT Solar
Module**

Loom Solar



My Solar Plant



**Essens Renewable India
Pvt. Ltd. (Formerly known
as Belectric India & RWE)**



Surya Urja Nirmitee



**Reinitiatives Energy and Infra
Pvt. Ltd. (REI-INFRA)**

India Crosses 119 GW Solar Mark: Unlocking New Investment Horizons In Clean Energy

India has achieved a significant milestone in its renewable energy journey by crossing the 119 GW mark in solar energy, reflecting the nation's accelerating focus on clean energy adoption and investment. In 2025, India has recorded a cumulative monthly installed solar PV capacity of approximately 21,151.82 MW, underscoring the robust expansion of solar infrastructure across both utility-scale and distributed generation segments. This growth signals not only India's commitment to reducing carbon emissions but also its emergence as a key global hub for renewable energy investments.

The solar installation trend in 2025 shows notable monthly variations, with June leading as the month with the highest addition of 5.4 GW, followed by March, which saw 3.08 GW of new installations. These figures indicate a steady momentum in project commissioning, reflecting improved project execution timelines, policy support, and increasing investor confidence. The concentrated growth in specific months suggests a combination of regulatory approvals, grid connectivity readiness, and financial closures aligning to accelerate capacity additions.

Rajasthan continues to dominate the solar landscape with the highest installed capacity, registering a total of 32,317.19 MW. The state's vast desert areas, abundant solar irradiation, and proactive policy framework have positioned it as the leader in solar deployment. Other states are following suit, gradually building capacity through both large-scale utility projects and decentralized rooftop installations, thus contributing to a balanced and diversified solar growth across the country.

The breakdown of India's solar capacity highlights a strong preference for ground-mounted solar PV systems, which account for 90,990.61 MW of the total installed capacity. This underscores the focus on

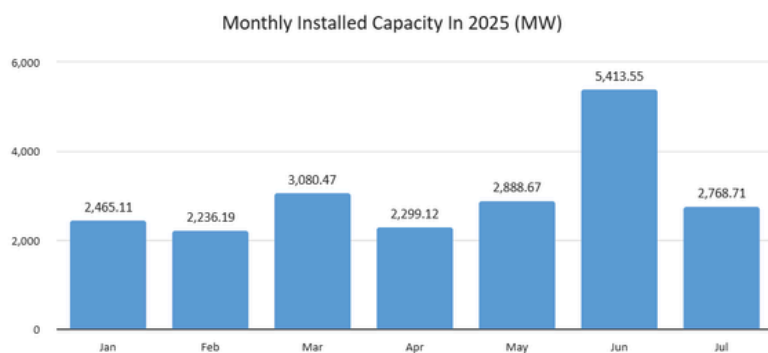
utility-scale projects capable of generating significant power and feeding into the national grid. Rooftop solar installations have also gained momentum, reaching a cumulative capacity of 19,876.49 MW. This growth reflects increasing adoption by commercial, industrial, and residential consumers seeking energy self-sufficiency and cost savings, alongside government schemes promoting distributed solar generation. Hybrid solar systems, integrating multiple generation and storage technologies, have achieved an installed capacity of 3,063.36 MW, indicating early adoption of innovative solutions that offer grid flexibility and enhanced energy reliability.

India's solar milestone presents fresh opportunities for investors, project developers, and technology providers. With continuous policy support, streamlined tendering processes, and ambitious targets under the National Solar Mission, the sector is set to attract further capital inflows and technological innovation. International investors are increasingly viewing India as a stable and high-growth market for renewable energy, driven by long-term demand projections, declining technology costs, and supportive regulatory frameworks.

The nation's progress also demonstrates the potential of solar energy in addressing energy security challenges and contributing to sustainable development goals. By integrating large-scale solar projects, rooftop installations, and hybrid systems, India is creating a resilient and diversified energy mix. This achievement not only enhances the nation's clean energy credentials but also reinforces the broader narrative of India emerging as a global leader in renewable energy adoption, investment, and technological advancement.



Each new megawatt installed is not just capacity added, but a step closer to energy security and a sustainable future. It demonstrates how clean power can drive development while cutting emissions. India's journey is setting a benchmark for the world.



SOURCE: CEA

SOLARQUARTER RESEARCH

**SOLAR
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SOUTH ASIA

PRESENTS



Ms. Amangi Perera

Deputy General Manager - Business Development

Hayleys Solar

Mrs. Nadika Herath

Director & CEO

Solar Booze (Pvt) Ltd.

Mrs. Farhima Amana

Managing Director & CEO

InvoTech Holdings (Pvt) Ltd.

Ms. Udani Jayasinghe

Manager - Business Development

GAIA Greenenergy Holdings (Private) Limited



Solar Company of the Year: Developer

Solar Company of the Year: EPC

Hayleys Solar



Wind Company of the Year: Developer

Haywind



Solar Manufacturer of the Year: Best Inverter

Solar Manufacturer of the Year: Best Battery Energy Storage System (BESS)

Huawei Technologies Lanka Co., (Pvt) Ltd.



Solar Company of the Year: Module

JA Solar



Company of the Year: Diversified Renewable Energy Solutions

Company of the Year: Pioneer in Clean Energy

Panasian Power PLC



Solar Company of the Year: System Integrator

Solar Company of the Year: Excellence in Project Delivery

Abans Electricals PLC



Company of the Year: Rooftop & Distributed Solar

GAIA Greenenergy Holdings (Private) Limited



Solar Company of the Year: Structure

Alumex



Solar Company of the Year: Distributor

Hayleys Electronics



Solar Company of the Year: Monitoring Solutions

Fentons Information Technology



Company of the Year: Innovative RE Initiative

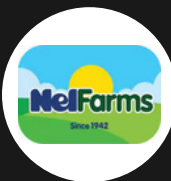
Project of the Year: Renewable Energy

Hayleys Solar



Company of the Year: Green Manufacturing

Crystal Martin



Company of the Year: Excellence in Corporate RE Adoption

Nel Farms



Company of the Year: Achieving Carbon Neutrality through RE

Emjay Panvila Plant



Company of the Year: RE Transportation Initiative

Hayleys Mobility



Sustainability Excellence in Integrating HSE with Renewable Projects

GAIA Greenenergy Holdings (Private) Limited



Sustainability Excellence in Emerging Solar Integration

InvoTech Holdings (Pvt) Ltd.



Project of the Year: Energy Efficiency

National Water Supply and Drainage Board



Project of the Year: Green Building

DPL



Project of the Year: Carbon Reduction

Toyota Lanka



Project of the Year: Green Technology Deployment

Cargills Group



Sustainability Team of the Year: Green Technology Innovation

BYD Energy Storage



Sustainability Team of the Year: Green Manufacturing Excellence

Ocean Lanka



Outstanding Services Innovation of the Year

Hayleys Solar



Service Excellence in Safe Solar Operations

GAIA Greenenergy Holdings (Private) Limited



Service Excellence Award: Customer-Centric Renewable Solutions

Solar Booze (Pvt) Ltd.



Best Solar Project of the Year

Pussalla Meat Producers (Pvt) Ltd.



Smart Innovative Project of the Year

Solar Island (Pvt) Ltd.



Best Hybrid Solar Project of the Year

S.L.A.M Power Solutions (Pvt) Ltd.



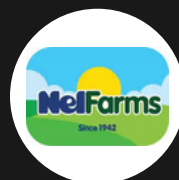
Best Solar OffGrid Project of the Year

Eastern University



Best Rural Electrification Project of the Year

Uchchimunai Housing



Best Solar Project Deal of the Year

Nel Farms



Best Solar Overseas Project of the Year

Hayleys Solar



**Technology Excellence
Award: High-Performance PV
& Inverter Systems**

Solax Power



**Best Solar Technology of the
Year
Smart Technology Innovation
of the Year**

Hayleys Solar



**Best Wind Technology of the
Year**

Ryse Energy Projects (Pvt) Ltd.



**Company of the Year – Rising
Star in Energy Storage**

BYD Energy Storage



**Excellence in Research &
Development Leadership**

Mr. Chathura Vidana Gamage

Chief Technical Officer

**GAIA Greenenergy Holdings
(Private) Limited**

**Excellence in Techno Commercial
Leadership**

Mr. Shelan Fernando

Head of Engineering - Maldives

**Excellence in Financial Thought
Leadership**

Mr. Lasantha Somaratne

Head - Strategic Business Development
Unit

Excellence in Legal Leadership

Ms. Sylvia Tiserra

General Manager - Group Legal

**Excellence in Investor Relation
Leadership**

Mr. Pamudith Gunawardana

Chief Financial Officer

Excellence in ESG Leadership

Mr. Nisal Liyanage

Deputy General Manager
Group Compliance & ESG

Excellence in CSR Leadership

Ms. Lalani Weeraarachchi

General Manager - Human Resources

Excellence in Human Resource Leadership

Mr. Chanaka Indrajith

Manager - HRBP

Excellence in Asset Management Leadership

Mr. Panduka Rathnayake

General Manager - Finance

Excellence in Operations & Maintenance Leadership

Mr. Dilshan Nanayakkara

General Manager - Operations

Excellence in Design & Engineering Leadership

Mr. Heshan Kathriarachchi

Deputy General Manager - Engineering Sales

Excellence in Technology Leadership

Mr. Chathurka Dewapriya

Deputy General Manager - Utility Projects

Excellence in Procurement & Construction Leadership

Mr. Ruwan Kumara

General Manager - Supply Chain

Excellence in Business Management Leadership

Mr. Romesh De Silva

Deputy General Manager - Projects



Best Marketing Team of the Year

GoodWe



Best Construction Team for PV Integration into Building Architecture

Eleven Engineering & Constructions (Pvt) Ltd



Best Legal Team of the Year

Hayleys PLC



Best Engineering Team of the Year

Best O&M Team of the Year

Best Sales Team of the Year

Best Consulting Team of the Year

Hayleys Solar



Best Procurement Team of the Year

Best Brand Building Team of the Year

Best Finance Team of the Year

Hayleys Fentons

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AWARDS

ENERGY
EXCELLENCE
AWARDS 2025



State Market Leader Award -
Inverters

**SolaX Power Network
Technology (Zhejiang) Co., Ltd.**



State Market Leader Award -
Modules (Platinum)

Saatvik Green Energy Limited



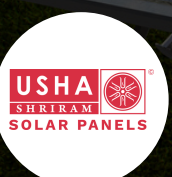
State Market Leader Award -
Modules (Diamond)

Credence Solar Panels Pvt. Ltd.



State Technology Leadership
Award - SCADA & Solar
Monitoring

TrackSo



Emerging Solar Module
Company of the Year

Usha Shriram Solar



Best Ground Mount Project of
the Year

Best Business Development
Team of The Year

Best Marketing Team of The Year

InSolare Energy Limited



Best Hybrid Project of the
Year

Kleio Solar Power Pvt Ltd



Company of the Year – Smart
Energy Solutions

iPLON India Pvt Ltd.



Company of the Year -
Customer Service & After-
Sales Support

S Technologies

Women in Clean Energy – Leadership
Award

Nalini S

Senior Sales Manager – South India

SOLIS

Solar Acumen of the Year

Pratik Bhatt

Vice President – Sales & Marketing

InSolare Energy Ltd



Company of the Year - Solar EPC (Utility)

InSolare Energy Limited



Company of the Year - Solar EPC (Solar Pump Sets)

Megha Green Energy Solutions



Company of the Year - Solar EPC (C&I)

NeoGreen Power Pvt. Ltd.



Company of the Year - Solar EPC (Institutional)

Manipal Energy and Infotech Limited



Company of the Year - Solar EPC (Residential)

Re-invigorate Ventures Pvt Ltd

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AWARDS



Company of the Year - Solar System Integrator (Industrial)

Kumble Solar Energy Solutions Pvt Ltd



Company of the Year - Solar System Integrator (Residential)

Greenzone Energy Solutions



Company of the Year : Green Energy Initiative

Nexus Select Trust



Company of the Year: Green Manufacturing - Modules

Novasys Greenergy Limited



Company of the Year: Sustainable Technology Integration

Loom Solar Private Limited

Congratulations to all the winners!!!



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AWARDS



State Market Leader Award
(Inverter) - Platinum

10-Year Milestone of Inverter
Excellence in India Award

Smart Technology Innovation
of the Year - Inverter

Sungrow India Pvt. Ltd.



State Market Leader Award
(Inverter) - Diamond

**SolaX Power Network
Technology (Zhejiang) Co., Ltd.**



State Market Leader Award
(Inverter) - Gold

**Ningbo Deye Inverter
Technology Co., Ltd**



State Market Leader Award
(Modules) - Platinum

Saatvik Green Energy Limited



State Market Leader Award
(Modules) - Diamond

Atmanirbhar India State
Business Leader -
Encapsulant & Backsheet

KNACK ENERGY PVT. LTD.



State Market Leader Award
(Mounting Structures) -
Platinum

Sunchaser Structures



State Market Leader Award
(Mounting Structures) -
Diamond

MTE STRUCTURES LIMITED



Smart Technology Innovation
of the Year - Modules

Loom Solar Private Limited



State Technology Leadership
Award - Modules

Credence Solar Panels Pvt. Ltd.



Best Sales & Marketing Team
of the Year

Adani Solar



Best Made in India Inverter in
PM Surya Ghar Yojana

Selec Controls Pvt. Ltd.



Best Solar Remote Monitoring
for PM KUSUM Scheme

TrackSo



State Distributor of the Year

State Channel Partner Award

Yuvaan Energy Limited



Emerging Distributor of the
Year

**Greenox Renewable Energy
India Private Limited**



State Design Consulting
Company of the Year

FIRST FRONT SOLAR ENERGY



Solar Developer of the Year

Zodiac Energy Limited



Company of the Year – Smart
Energy Solutions

Solar Ace Energy LLP



Company of the Year –
Battery Energy Storage
Systems (BESS)

Zenwatt Clean Energy



Company of the Year –
Integrated Clean Energy
Solutions

UPVOLTAGE SOLUTIONS LLP



Company of the Year -
Customer Service & After-
Sales Support (OEM)

Scorp Energy Private Limited



Best Marketing Team of the
Year

Best Project of the Year -
Carport

Mecpower Solutions Ltd.



Best Sales Team of the Year

Pahal Solar

Women in Clean Energy – Leadership
Award

Khushbu Joshi

Head – Accounts and Taxation

Stride Climate Investments

Supply Chain Innovator of
the Year

Zafar Mirza

General Manager - Supply Chain
Management

Sustaina Power Ventures Pvt. Ltd.

Smart Energy Innovator of the Year

Parth Jhaveri

Owner

Paras Enterprise

Young Leader of the Year

Chintan Mahida

Director

JALARK SOLAR SOLUTIONS OPC PVT LTD

Emerging Leader of the Year

Vishant Panchal

Business Development Manager - Utility
Shenzhen Hopewind Electric Co., Ltd.

Entrepreneur of the Year

Setul Shah

Director

Mecpower Solutions Ltd.

CEO of the Year

Mohammed Rinas Chenangadan

CEO & Director

Solaire - A Lagnuvo Initiative



Solar EPC Company of the Year (Utility) - Platinum

Company of the Year - Excellence in Utility Project Delivery

Company of the Year - Women Empowerment in Solar Workforce

Zodiac Energy Limited



Solar EPC Company of the Year (Utility) - Diamond

Mecpower Solutions Ltd.



Company of the Year - Customer Service & After-Sales Support

Paras Enterprise



Company of the Year - Excellence in Rooftop Project Delivery

Efforts Solar Pvt. Ltd.



Company of the Year: Green Manufacturing - Inverter

FESTON S.E.V. PVT. LTD.



Company of the Year: Green Manufacturing - Modules

SASA ENERGY LLP



Sustainability Team of the Year: CSR Excellence

Stride Climate Investments

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Congratulations to all the winners!!!



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AWARDS



State Market Leader Award -
Inverter (Platinum)

SUNGROW
Clean power for all

10-Year Milestone of Inverter
Excellence in India Award

Smart Technology Innovation
of the Year - Inverter

Sungrow India Pvt. Ltd.

Deye

State Market Leader Award -
Inverter (Diamond)

**Ningbo Deye Inverter
Technology Co., Ltd**

NOVA
Every day is a SUN day

State Market Leader Award -
Modules

Novasys Greenergy Limited

PAHAL
SOLAR
Solar PV Modules Manufacturer

Smart Technology Innovation
of the Year - Modules

Pahal Solar

Feston
Always on
SOLAR INVERTERS

Rising Star Inverter Company
of the Year

Feston SEV Pvt. Ltd.



Smart Technology Innovation
of the Year - Battery Energy
Storage Systems

Loom Solar Private Limited



Fastest Emerging Solar
Module Manufacturer of the
Year

Future Solar

Entrepreneur of the Year

CA Ritu Jain

Co-Founder & Managing Director
SRVs Solars Limited

Solar Acumen of the Year

Rishi Kumar Gupta

Founder & CEO
Solarise Semicon Energy

Visionary of the Year

Vipul Jain

Director
SRVs Solars Limited



Company of the Year: Green
Manufacturing (Modules)

Saatvik Green Energy Ltd.



INDUSTRY
INSIGHTS



KNOWLEDGE
SHARING



NETWORKING
OPPORTUNITY



BRANDING
OPPORTUNITY



SOLAR
QUARTER
INDIA

UPCOMING EVENTS

State Event



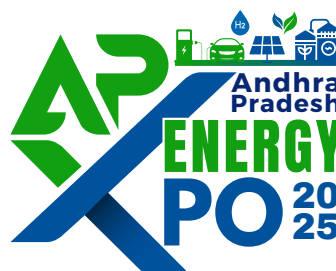
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CONTRACTORS
MEET 2025
SURAT

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19 SEPTEMBER, 2025

India Expo City, Visakhapatnam
Andhra Pradesh



Check out
the website



19 SEPTEMBER, 2025

India Expo City, Visakhapatnam,
Andhra Pradesh



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SOLAR &
STORAGE
CONFEX 2025
MADHYA PRADESH

Check out
the website



25 SEPTEMBER, 2025

Sheraton Grand Palace
Indore



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CONFEX 2025
UTTAR PRADESH

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the website



10 OCTOBER, 2025

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Lucknow

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