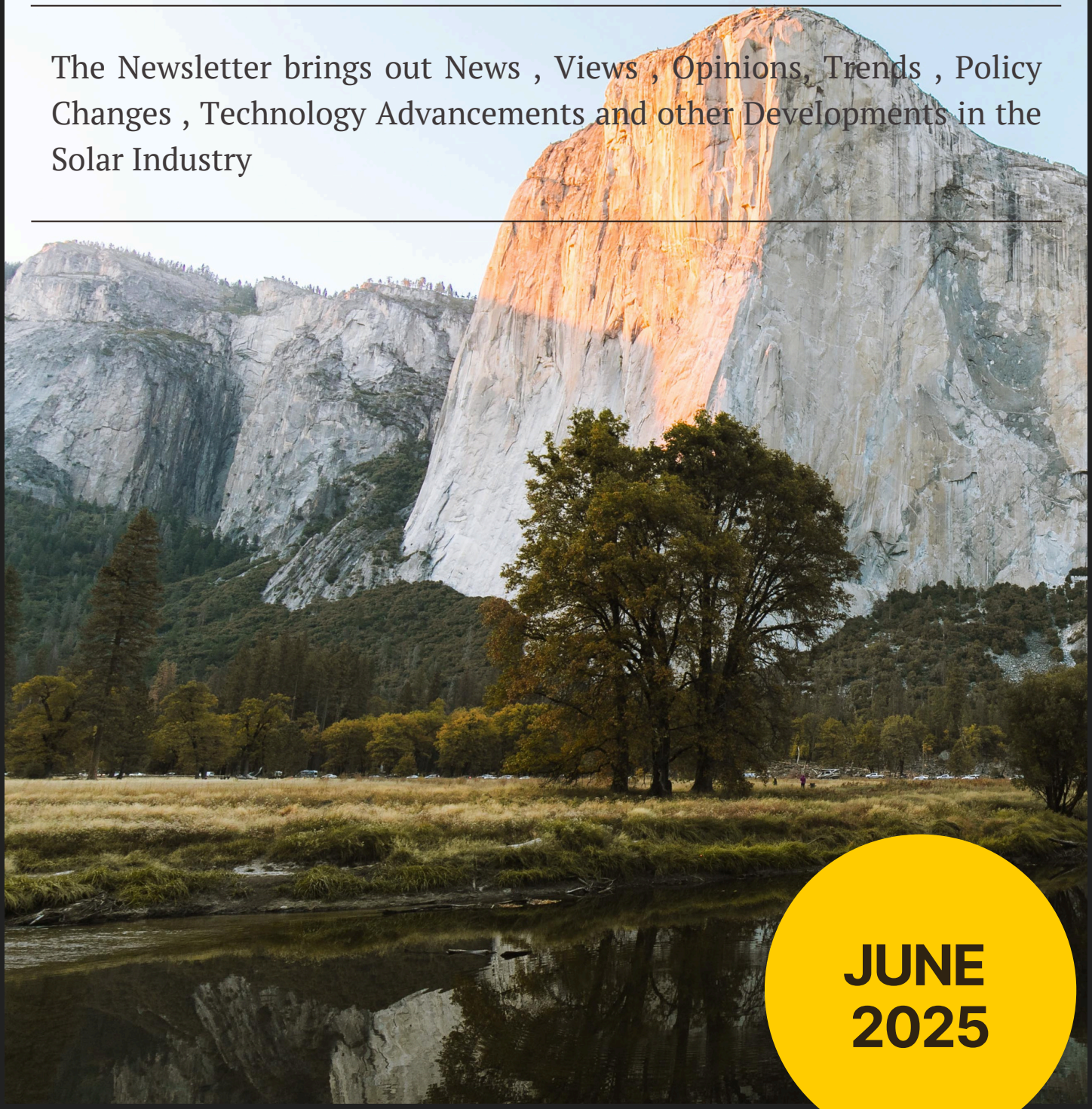
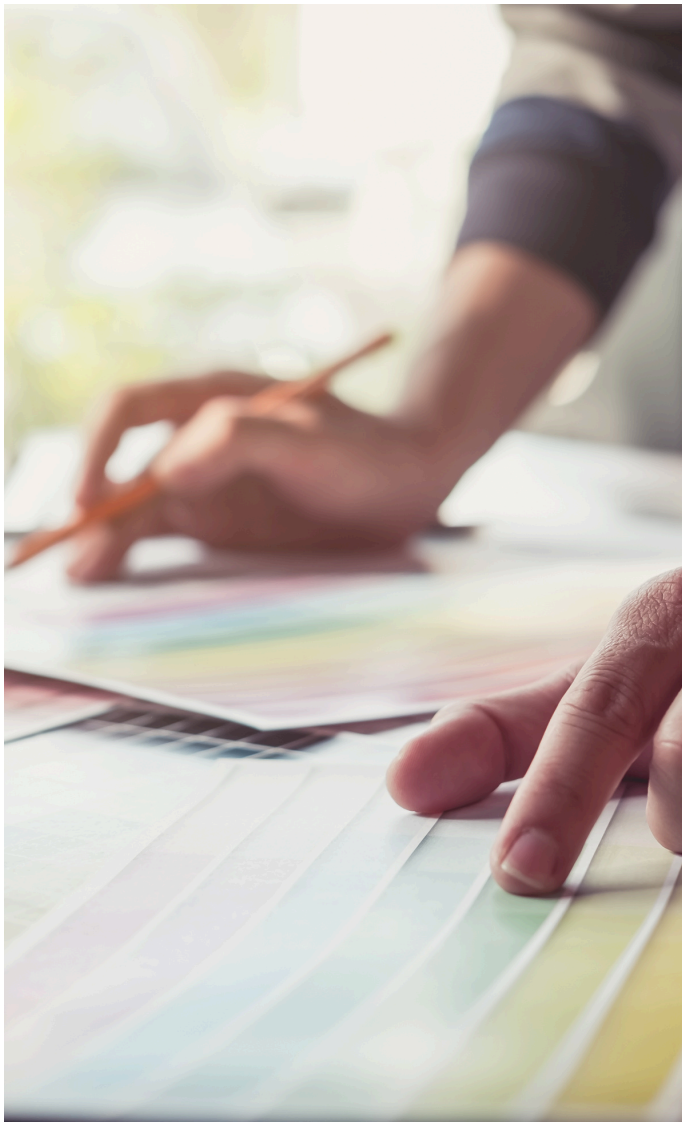
EARTH CONNECT

The Newsletter brings out News , Views , Opinions, Trends , Policy Changes , Technology Advancements and other Developments in the Solar Industry



JUNE 2025

INSIDE



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From the Editor

Powering India's Green Future from Rajasthan – Our BESS Journey Begins

It is with immense pride that I share a defining milestone in the journey of Stockwell Solar Services Pvt. Ltd.—one that not only marks a turning point for our company but also contributes meaningfully to India's clean energy transition. We are proud to have secured 225 MW / 450 MWh of Battery Energy Storage Systems (BESS) at an exceptional rate of ₹2,18,998 per MW per month for 12 years, reinforcing our position as one of the most dynamic players in India's energy ecosystem.

Founded in 2017 by a passionate group of IIT alumni, including myself and my colleague Mr. Ankit Saha, Stockwell Solar was built on a vision to deliver not just power, but purpose-driven clean energy solutions. Today, with over 500 MW of solar capacity under execution and 100+ MW operational—serving sovereign-rated government clients—we continue to push boundaries in scalability, reliability, and sustainability.

This BESS win is more than a successful bid—it is a strategic declaration. It underscores Rajasthan's readiness to lead India's renewable revolution, especially as energy storage becomes the foundation for grid stability and flexibility. In an era where intelligent and adaptive energy systems are paramount, BESS offers the resilience and responsiveness our nation needs. And Stockwell Solar is proud to be leading that charge.

I must acknowledge the unwavering commitment of our team. Mr. Ankit Saha (COO), whose operational expertise ensured technical excellence, and Mr. Jitendra Kumar (Executive Director), with over four decades of leadership in solar and public energy programs, have been pivotal in shaping our execution strategy and governance.

Every project we develop is designed not only to power infrastructure but to drive measurable environmental impact—with this initiative alone expected to offset over 3.5 lakh tons of CO_2 emissions annually, equivalent to planting more than 15 million trees. This is the true essence of our mission: going beyond megawatts to deliver lasting environmental value.

As we celebrate this milestone, we also embrace the responsibility it brings. India's renewable journey is at an inflection point. With the national goal of achieving 500 GW of non-fossil capacity by 2030, BESS will be the catalyst. At Stockwell Solar, we remain deeply committed to accelerating this transformation—rooted in Rajasthan, powered by innovation, and guided by purpose.

This isn't just Stockwell Solar's achievement—it is a win for Rajasthan, for India, and for the green future we are all working to build.

Let's power a future that shines brighter, stores smarter, and sustains longer.

—Arun Mahala
Chief Executive Officer
Stockwell Solar Services Private Limited

Virtual Power Play: India's VPPA Potential Faces Gridlock without Regulatory Backbone

A promising tool for clean energy procurement risks being reduced to a paper tiger in the absence of binding regulations

By Earth Connect News Desk

In a rapidly decarbonizing world, Virtual Power Purchase Agreements (VPPAs) are emerging as a game-changing instrument for industries to meet their renewable energy targets. But in India, this potential is being stifled—not by technology, but by the absence of a strong regulatory spine.

Recently, the Central Electricity Regulatory Commission (CERC) released a set of draft guidelines enabling designated consumers to enter long-term VPPAs with renewable energy developers. The move aims to facilitate India's ambitious target of 500 GW from non-fossil fuel sources. However, industry voices warn that the absence of a binding legal framework could lead to market confusion, risk exposure, and even greenwashing.

"It's a first step, yes—but a fragile one. Without regulatory authority, it's like constructing a solar plant without grid connectivity," said **Aditya Malpani, Senior Director, AMPIN Energy Transition.**

VPPA 101: Power Without the Wires

A VPPA is not a conventional power deal. It's a financial contract that allows energy consumers—like data centers, tech giants, and heavy industries—to buy renewable attributes (like RECs or green credits) without physically consuming the electricity. The agreement is settled financially based on the difference between the market price and the agreed VPPA rate.

The model opens a vital door for corporates unable to meet equity requirements in group captive projects, especially RE100 companies and those under stringent ESG frameworks. In India, however, the VPPA market remains in its infancy due to regulatory uncertainty, legal grey zones, and lack of institutional oversight.

"The guidelines are non-binding. That's like issuing road signs without building the road," said **Ambrish Kumar Khare, VP, Power Exchange India.**

The Cracks in the Foundation

Industry players argue that unlike global markets where central agencies mitigate risks and streamline price discovery, India's draft framework leaves critical elements undefined. From contract settlement to REC issuance and demand-supply-based price discovery—nothing is carved in regulatory stone.

"You can't build market confidence with optional rulebooks," noted **Gautam Mohanka, CEO of Gautam Solar.** "Formalized contracts, proper oversight, and transparent platforms are essential."

Further, VPPA contracts are non-tradable and non-transferable, limiting flexibility for buyers and increasing counterparty risks in long-term commitments.

Green Goals or Green Gimmicks?

The specter of greenwashing looms large. Companies eager to wear the 'green badge' may opt for VPPAs merely for branding or ESG compliance, without actual decarbonization.

"We risk turning VPPAs into carbon camouflage unless there's stringent auditing and disclosure," warned Khare. "Green credits must reflect real environmental action—not just corporate optics."

With ESG funds flowing and global sustainability norms tightening, India cannot afford a hollow green transition. Experts call for a regulatory authority to oversee risk mitigation, pricing integrity, and contractual enforcement.

India's 5 GW VPPA Pipeline: A Mirage or Momentum?

Despite these hurdles, optimism persists. Industry estimates suggest 4–5 GW of new capacity could come through the VPPA route in the next few years, provided the CERC framework evolves into a codified, enforceable mechanism.
"If properly structured, VPPAs could unlock billions in green investments and accelerate India's clean energy transition," added Malpani.

The Verdict: Reform or Relapse

India stands at a VPPA crossroads. A promising innovation now needs a policy passport. The difference between market momentum and stagnation lies in whether the government will move beyond guidelines to enact robust legislation, empower regulators, and ensure fair play.

Until then, VPPAs in India may remain more Virtual than powerful.

Sunkind Energy to Build 4 GW Solar Factories in Rajasthan & MP

India's manufacturing push gets a significant boost as Sunkind Energy partners with Confirm Ware PV Manufacturing Solutions to set up 4 GW of solar module and cell production capacity.
The MoU covers two production facilities:

- **Madhya Pradesh Unit – 2.5 GW for both modules and cells**
- **Rajasthan Unit – 1.5 GW for modules only**

Both units will manufacture advanced 610W TOPCon modules based on M10 monocrystalline silicon cells. The Rajasthan unit is expected to begin production by November 2025, while the MP unit will follow by 2027.

Confirm Ware, a global leader in solar automation solutions, will bring cutting-edge manufacturing technology, including stringers and sortation systems. The company serves clients across the U.S., Europe, Asia, and the Middle East.

Sunkind, known for its EPC work delivering over 150 MW of solar projects across India, is diversifying into storage, EV infrastructure, and single-axis trackers—making this manufacturing initiative a critical expansion move.

India's solar manufacturing landscape added 25.3 GW in module and 11.6 GW in cell capacity in 2024 alone. The ALMM mandate and strong domestic demand have catalyzed this boom, and Sunkind's entry reinforces this upward trajectory.

Green Power for Farmers: Madhya Pradesh's 1.2 GW Agri Solar Tender

In a major step toward energy self-reliance for rural India, Madhya Pradesh Urja Vikas Nigam (MPUVN) has issued a 1,200 MW solar tender aimed at solarizing agricultural feeders under the Surya Mitra Krishi Feeders program. The program is designed to reduce electricity costs for farmers while transitioning the agricultural sector toward clean energy.

This innovative tender invites participation under two distinct categories:

Self-Development Mode: Open to individual farmers, farmer groups, cooperatives, panchayats, water user associations, FPOs, and agricultural institutions. These entities face no financial eligibility barriers but must own the land on which the project is developed.

Developer Mode: Open to corporate entities registered in India, including consortiums or joint ventures of up to two entities. Bidders in this category must have a minimum net worth of ₹10 million (~$116,506)/MW.

Interested parties must submit bids by June 25, 2025, with bid openings scheduled for June 30, 2025.
Bidders must submit a processing fee of ₹5,900 ($1,164)/MW. Upon successful allocation, a performance bank guarantee of the same amount must be furnished within 60 days.

To ensure long-term commitment, equity lock-in provisions are enforced. Sole bidders and consortium partners cannot dilute their equity for at least one year post-commercial operation. Even affiliates used to meet eligibility must maintain their association through this period.
Self-development participants can authorize a representative for the entire bidding and execution process.
Developer mode participants are required to submit formal signatory documentation.
This tender builds upon MPUVN's February 2025 call for 1,500 MW under PM-KUSUM's Component C, reinforcing Madhya Pradesh's commitment to sustainable agriculture and rural empowerment.

Rajasthan Powers Ahead: 1,000 MW BESS Tender to Energize Grid Stability

Rajasthan Rajya Vidyut Utpadan Nigam (RVUNL) has issued a mega-tender to develop 1,000 MW/2,000 MWh of standalone Battery Energy Storage Systems (BESS) across six locations in Bikaner and Jodhpur districts. These facilities are expected to redefine grid resilience and flexibility in the renewable-rich state. Here's the location-wise capacity distribution:

- **Chattargarh, Bikaner** – 200 MW/400 MWh
- **Bandu, Bikaner** – 200 MW/400 MWh
- **Pugal, Bikaner** – 100 MW/400 MWh
- **Bhawad, Jodhpur** – 300 MW/600 MWh
- **Bap, Jodhpur** – 100 MW/200 MWh
- **Palli, Jodhpur** – 100 MW/200 MWh

Each bidder can secure a maximum of 250 MW/500 MWh capacity. The tender is battery-technology agnostic but demands commercially proven solutions to ensure timely commissioning. Bid submission closes on August 4, 2025, with participation costs including an earnest money deposit of ₹210,000 ($29) + 18% GST, and a tender document fee of ₹500,000 (~$5,763) + 18% GST.

Selected bidders must handle complete implementation: from EPC and commissioning to establishing the BESS transmission interconnection and future operations & maintenance. RVUNL or Rajasthan Urja Vikas and IT Services will determine the system's charge/discharge schedule.

The tender has the backing of the Ministry of Power's viability gap funding (VGF), boosting the commercial viability of large-scale storage. Recently, RERC mandated BESS integration for captive projects with contract demand exceeding 100%, affirming the strategic importance of storage.

India's Solar Surge: ALMM Capacity Soars Past 90 GW

In a remarkable stride toward clean energy self-sufficiency, the Ministry of New and Renewable Energy (MNRE) has added 2.98 GW of solar module manufacturing capacity to the Approved List of Models and Manufacturers (ALMM), elevating the national total to an impressive 90.95 GW.

Reliance Industries makes a powerful debut on the list with a manufacturing capacity of 1,716 MW, highlighting its entry into India's booming solar space. Avaada Electro, another industry leader, has increased its capacity by 1,272 MW, reaffirming its aggressive expansion. Interestingly, SASA Energy's capacity was revised from 100 MW to 98 MW, showing a rare reduction.

In addition to the capacity additions, MNRE has made notable policy clarifications. Net billing, virtual net metering, and group net metering will now be treated on par with traditional net metering under ALMM List-II. These models enable wider participation, allowing multiple consumers or service connections to benefit from shared solar infrastructure.

Another important policy shift involves the classification of solar cells: potential induced degradation (PID) and non-PID cells will now be categorized as separate product families. This move enhances quality assurance and makes solar procurement more transparent.

For off-grid applications, MNRE has relaxed the module efficiency requirement for crystalline silicon (c-Si) modules, reducing it from 19% to 18%, further enabling rural and off-grid adoption. The minimum efficiency for cadmium telluride (CdTe) thin-film modules remains unchanged.

According to Mercom India's 2025 report, India added a whopping 25.3 GW of solar module capacity and 11.6 GW of solar cell capacity in 2024. These figures underscore how domestic demand, aided by ALMM reimposition in April 2024, is catalyzing large-scale solar manufacturing.

As India races toward its renewable energy targets, the ALMM continues to be a cornerstone policy supporting domestic manufacturing, innovation, and energy independence.

RSA KNOWLEDGE ADDA

Beyond Panels: Choosing the Right Solar Structure for Performance, Safety & Profitability

In the race toward solar excellence, the solar module often takes the limelight—but the true unsung hero is the solar structure. A poorly designed or mismatched structure can degrade your plant's output, create long-term safety risks, and erode investor confidence.
So, how do you choose the right solar mounting structure—one that lasts 25+ years, withstands climatic stress, and maximizes energy generation?

Let's decode the engineering behind this critical decision.

1. MATERIAL SELECTION: STRENGTH MEETS DURABILITY

Mild Steel (MS):

Hot-Dip Galvanized (HDG) MS with minimum 80-120 microns zinc coating is standard for ground-mount utility-scale projects. Provides high tensile strength, but prone to corrosion in saline or humid areas if not treated properly.

Aluminum Alloy (AL 6063-T6):

Preferred for rooftop systems. Lightweight, corrosion-resistant, easy to handle, and maintains mechanical integrity in harsh climates. Ideal for metal sheet roofs or locations with rust-prone environments.

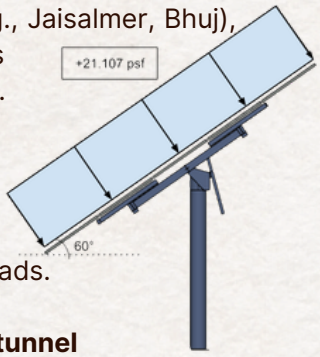
Stainless Steel (SS 304/316):

Used for nuts, bolts, and accessories—critical in ensuring no rust compromises the mounting system. 316 grade is a must for coastal installations.

2. WIND & SEISMIC LOAD COMPLIANCE

Your structure must be designed as per IS 875 Part 3, IS 800, and NBC norms.

- In high-wind zones (e.g., Jaisalmer, Bhuj), the structure must resis gusts of 180–200 km/h.
- Seismic compliance is essential in zones IV and V—look for designs tested under simulated earthquake loads.



Tip: Always request wind tunnel reports or structural simulation results during procurement.

3. MOUNTING TYPE: CHOOSE WHAT FITS YOUR TERRAIN & BUDGET

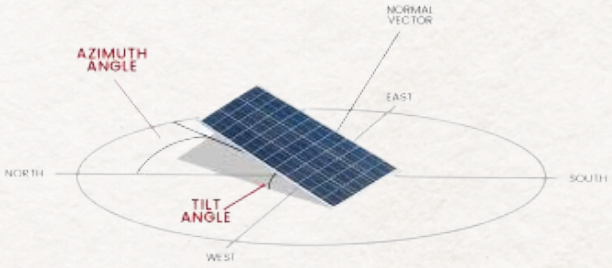
Type	Ideal For	Structure Consideration
Fixed Tilt (Ground Mount)	Utility-scale projects	Fixed 15–25° tilt; low cost
Seasonal Tilt	Semi-urban/rural rooftops	Manually adjustable frames
Tracking System (Single Axis)	High-efficiency large plants	Adds ~20% yield, but O&M intensive
Ballast-Type	RCC Roofs (non-penetrative)	Requires structural strength check
Rail-less (Metal Roof)	Industrial sheds	Lightweight AL clamps; no drilling

Caution: Never compromise tilts optimization to reduce cost. Even a 5° misalignment can reduce output by 3–5% annually.

RSA KNOWLEDGE ADDA

4. ORIENTATION & TILT OPTIMIZATION

- In India, ideal tilt = Latitude ± 5°
- South-facing structures yield max generation (for northern hemisphere).
- Adjustable tilts improve seasonal yield but may not suit OPEX-sensitive projects

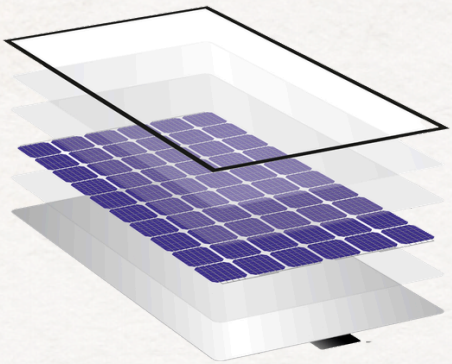


5. CORROSION PROTECTION & COATING STANDARDS

Structure failures often start with rust. Protect your plant with:

- HDG (Hot-Dip Galvanization) as per IS 4759
- Pre-galvanized GI sheets not preferred for long life
- Anodized aluminium provides excellent corrosion resistance in humid zones.

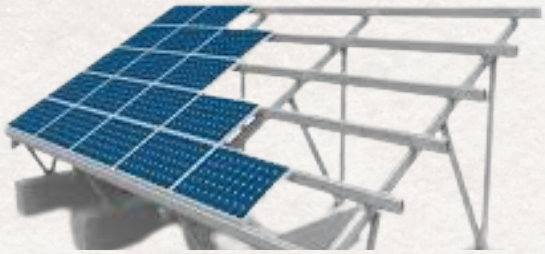
RSA Recommends: Insist on factory testing certificates for coating thickness, yield strength, and tensile properties.



6. FASTENERS, ANCHORING & ACCESSORIES: THE SILENT GUARDIANS

- **Anchor bolts:** Ensure they meet grade 8.8 or higher
- **Cable trays:** Use UV-stabilized PVC or powder-coated GI
- **Thermal Expansion Provisions:** Especially for long rails in metal rooftop setups
- **Gaskets & Rubber Pads:** EPDM rubber preferred for anti-vibration and insulation

7. STRUCTURE DESIGN VALIDATION: A NON-NEGOTIABLE



- Request structural stability certificate from licensed civil/structural engineer
- Use software such as STAAD.Pro, SolidWorks, or ANSYS for simulation-based analysis
- Factor in dead load, live load, wind uplift, and panel weight distribution

Final Checklist Before Procurement:

- Wind load & seismic compliance
- Coating thickness test reports
- Soil testing & pull-out test for ground mount
- Thermal expansion gaps
- Service life >25 years
- Compatible with future module sizes (bifacial, TOPCon, etc.)

RAJASTHAN POWERS AHEAD WITH A HISTORIC BREAKTHROUGH IN BATTERY STORAGE!

In a landmark achievement that cements Rajasthan's leadership in renewable energy innovation, NTPC Vidyut Vyapar Nigam (NVVN)'s 1 GWh standalone BESS auction has set a national record—uncovering the lowest-ever tariff of ₹216,000/MW/month for battery energy storage in India

WHO MADE IT HAPPEN? THE RAJASTHAN-BASED AUCTION ATTRACTED PARTICIPATION FROM INDIA'S MOST DYNAMIC ENERGY PLAYERS:

- Solar91 Cleantech (50 MW at ₹216,000)
- Rays Power Experts (50 MW at ₹218,700)
- Stockwell Solar Services (225 MW at ₹218,998)
- Oriana Power (125 MW at ₹218,999)
- Inox Renewable Solutions (50 MW at ₹219,000)

Together, they will deploy 500 MW / 1,000 MWh of BESS capacity—a decisive move towards integrating clean energy with grid stability.

WHY IS THIS A BIG DEAL?

- **Historic Low Tariff:** ₹216,000/MW/month—the most competitive BESS tariff ever discovered in India, beating the previous benchmark by ₹3.
- **Large-Scale Deployment:** Marks one of India's largest-ever standalone BESS projects, exclusively in Rajasthan.
- **Robust Support:** Each project is backed by Viability Gap Funding (VGF) of ₹2.7 million/MWh, reinforcing investor confidence.

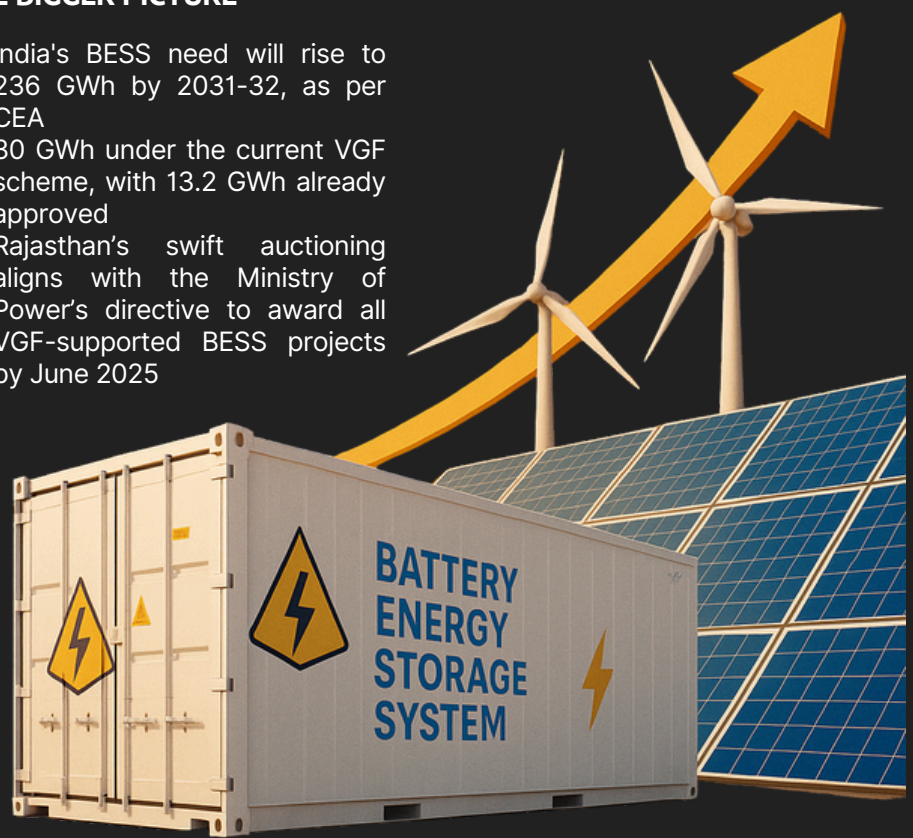
BEYOND STORAGE—A FULL INFRASTRUCTURE PUSH WINNERS MUST:

- Set up full BESS infrastructure
- Connect to the state transmission utility network
- Build dedicated substation bays
- Ensure "on-demand" energy availability to NVVN
- Secure all permits and connectivity

FACT CHECK SUCCESS: RAJASTHAN SETS BENCHMARK WITH INDIA'S LOWEST-EVER BESS TARIFF

THE BIGGER PICTURE

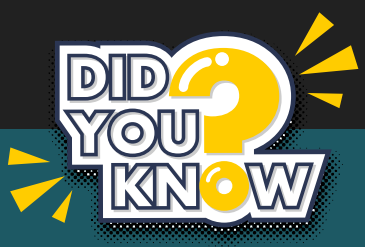
- India's BESS need will rise to 236 GWh by 2031-32, as per CEA
- 30 GWh under the current VGF scheme, with 13.2 GWh already approved
- Rajasthan's swift auctioning aligns with the Ministry of Power's directive to award all VGF-supported BESS projects by June 2025



Fact Check Conclusion:

Claim: Rajasthan leads India's BESS revolution with the most cost-effective storage solution

Fact: Verified! The NVVN auction has set a new national record, attracted major energy players, and showcased Rajasthan's bold energy vision.



Remarkably, visionary members of the Rajasthan Solar Association (RSA) spearheaded these groundbreaking BESS bids, reinforcing their pivotal role in steering India's clean energy revolution.

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