

# EARTH C NNECT

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

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# SOLAR

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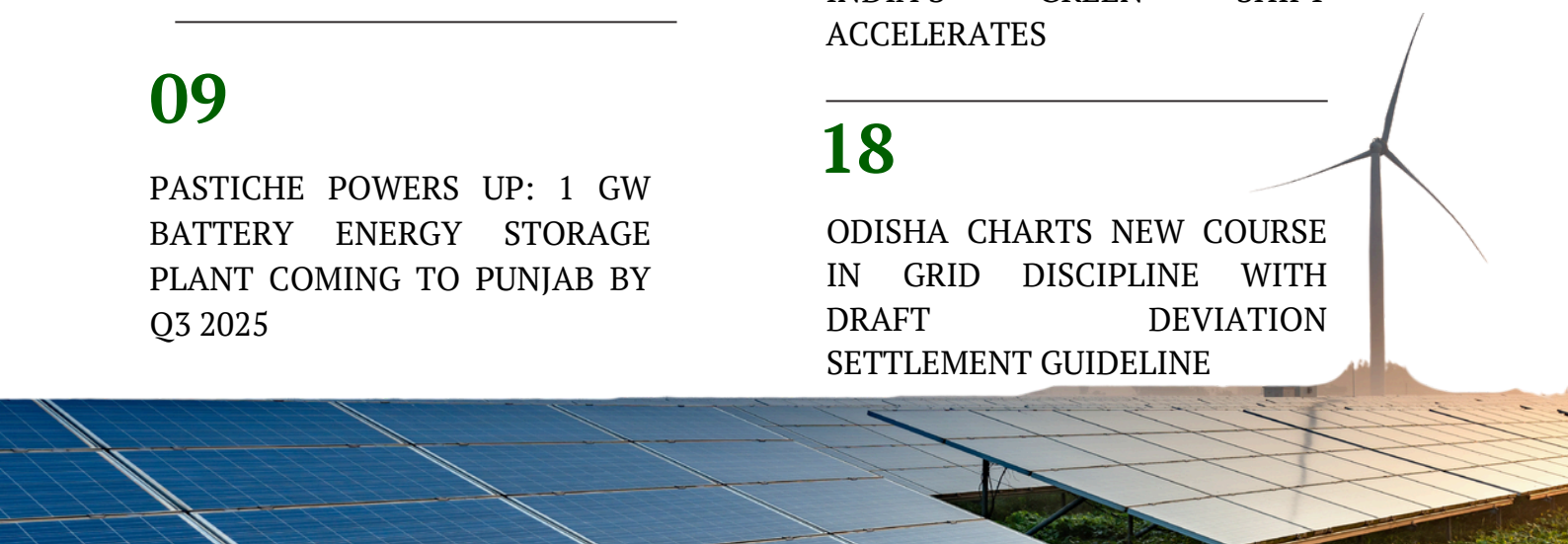
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# EDITORIAL

## INSIGHT ON SUSTAINABILITY & GREEN ENERGY



The world today stands at a crucial juncture where sustainability is no longer a choice, but an imperative. Green energy has emerged as the cornerstone of this global transformation, redefining how we power economies, preserve ecosystems, and ensure a better future for generations to come.

Rajasthan, with its vast solar potential and forward-looking policies, has taken the lead in shaping India's renewable energy landscape. The state is not only tapping into its abundant natural resources but also setting an example of how innovation, investment, and intent can come together to drive sustainable growth. As the nation transitions towards clean energy, Rajasthan's leadership in creating a robust solar and green energy ecosystem is both inspiring and transformative.

At ultra**VIBRANT** Solar Energy Pvt. Ltd. , we believe sustainability extends beyond clean energy production—it encompasses responsible project execution, community engagement, and long-term value creation. Green energy is about empowering people, enabling industries, and ensuring that development does not come at the cost of environmental balance. Our expertise in turnkey EPC solutions for Solar & Battery Energy Storage System (BESS) and delivering reliable and future-ready energy solutions reflects our commitment towards sustainability by producing clean energy as a Contributor to the Nation Ecosystem positioning Rajasthan as a pioneer in green energy, ensuring long-term benefits for communities and businesses alike.

The way forward lies in developing a strong ecosystem—innovative technologies, skilled manpower, robust policy frameworks, and collaboration across stakeholders. Together, through collective vision and action, we can transform this immense potential into lasting impact—ensuring a greener, cleaner, and more prosperous tomorrow for generations to come.

**Rajeshwer Singh**

Managing Director  
ultra**VIBRANT** Solar Energy Pvt. Ltd.

## EARTH C NNECT

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### RSA Members Brain storming on on Rating system





# L&T SECURES LANDMARK EPC ORDER FOR 116 MW SOLAR + 241 MWH BESS PROJECT IN BIHAR

## Powering Bihar's Green Future with 4-Hour Energy Storage and Liquid Cooling Innovation

In a major stride toward India's renewable energy transition, Larsen & Toubro (L&T) Renewables has clinched a prestigious Engineering, Procurement, and Construction (EPC) contract from the Bihar State Power Generation Company Limited (BSPGCL) for a 116 MW solar power project co-located with a 241 MWh battery energy storage system (BESS) at Kajra, Lakhisarai district, Bihar.

The project, floated through a competitive tender in April 2025, carries an estimated cost of ₹10.64 billion (~\$123.39 million) and is slated for completion within 18 months—cementing L&T's reputation as a front-runner in India's solar-plus-storage domain.

### 4-Hour Battery Backup for Grid Resilience

As part of the contract, L&T will deliver a BESS capable of supplying up to 50.5 MWh of electricity over a continuous four-hour window, enabling efficient energy time-shifting. This ensures surplus solar energy generated during daylight hours can be stored and dispatched during peak demand periods—boosting grid reliability and enhancing power availability for end-users.

At the heart of this storage system is advanced liquid cooling technology, offering:

- Higher power density
- Enhanced safety features
- Longer system life and durability

### Supporting Bihar's Jal-Jeevan-Hariyali Mission

This cutting-edge solar-plus-storage project is more than just a technical marvel. It is strategically aligned with the Jal-Jeevan-Hariyali Abhiyan, Bihar's flagship initiative focused on water conservation, afforestation, and sustainable development. By integrating clean energy with long-duration storage, this initiative supports both climate action and socioeconomic upliftment in the region.

### Expanding Capacity at Lakhisarai Clean Energy Hub

This new project marks an extension of L&T's earlier phase at the same location, where it had already been awarded a 185 MW solar + 254 MWh BESS EPC order by BSPGCL in June 2024. With the latest win, the total storage capacity of the Lakhisarai renewable energy cluster will now rise to a robust 495 MWh, making it one of India's largest co-located renewable-plus-storage sites.

### National Push: Viability Gap Funding for BESS

Recognizing the growing importance of energy storage, the Ministry of Power announced in June 2024 the second tranche of Viability Gap Funding (VGF) for BESS projects. Under this scheme:

- A VGF of ₹1.8 million (~\$21,043)/MWh is being provided.
- 30 GWh of BESS capacity is targeted for development.
- The initiative is backed by the Power System Development Fund, with a total outlay of ₹54 billion (~\$631.3 million).

This financial support is expected to catalyze widespread deployment of energy storage systems—critical for enabling 24x7 clean energy and achieving net-zero goals.

### L&T: Leading the Charge in Renewable EPC

With this landmark win, L&T continues to solidify its position as a national leader in EPC solutions for utility-scale renewable energy. By combining engineering excellence, advanced technology, and a commitment to sustainability, L&T is not only helping Bihar leap forward in clean energy adoption—but is also contributing to India's broader climate and development agenda.



India is preparing for its biggest leap yet in rooftop solar adoption. Under the **PM Surya Ghar: Muft Bijli Yojana**, the government has approved a bold utility-led model that could take rooftop solar coverage from two million to five million households in just weeks.

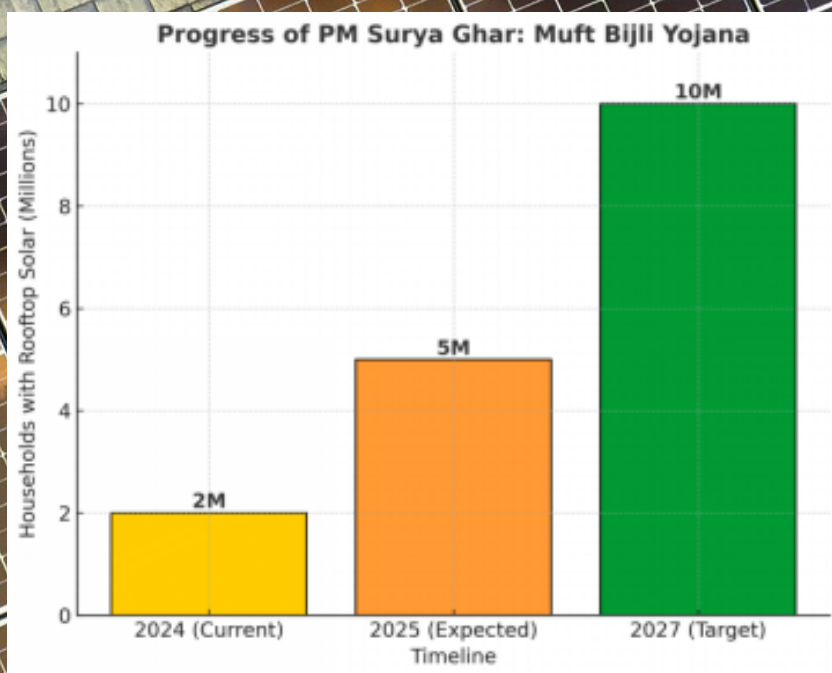
“Rooftops are fast turning into power plants,” said Union Minister for New and Renewable Energy Pralhad Joshi, noting that nearly half of current adopters already enjoy zero electricity bills, while others earn by selling excess power back to the grid. With utilities now at the helm, the government expects installations to triple in record time.

Progress so far has been uneven—some states racing ahead while others lag. To accelerate adoption, approvals must now be cleared within 15 days. Financing, too, remains a stumbling block, as many banks resist lending for rooftop projects. Officials are pushing state-level bankers’ committees to step in, while also emphasizing the urgent need to expand domestic manufacturing of solar modules, wafers, and polysilicon to meet India’s colossal renewable targets: 1,800 GW by 2047 and 5,000 GW by 2070.

The government’s latest review also spotlighted allied clean energy programs, from PM-KUSUM for farmers to green hydrogen and advanced renewable integration strategies.

The road ahead is ambitious. But with the new utility-led model, India’s rooftop revolution could shift from a fragmented experiment to a mass movement—delivering cheaper electricity to millions, reducing dependence on imports, and powering the country toward true energy independence.

## INDIA’S ROOFTOP SOLAR PUSH: PM SURYA GHAR TO POWER 5 MILLION HOMES WITH NEW UTILITY-LED MODEL





Rajasthan, India's renewable energy hub, is facing a major setback. Since March 2025, nearly **4 GW of solar and wind power has been curtailed**, with losses crossing 50% during peak solar hours. The twin culprits: delayed transmission projects and unusually low demand triggered by extended rainfall in northern India.

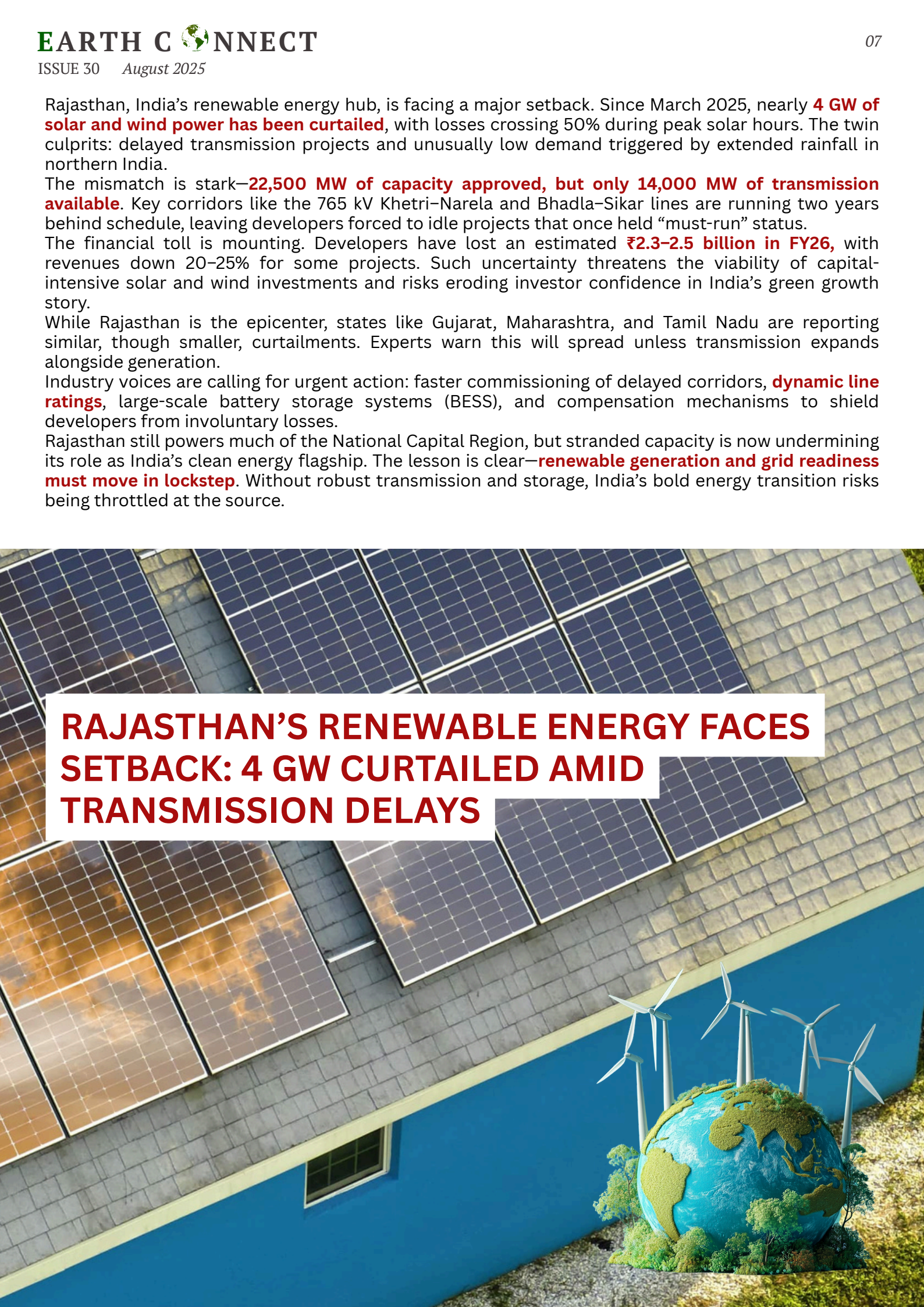
The mismatch is stark—**22,500 MW of capacity approved, but only 14,000 MW of transmission available**. Key corridors like the 765 kV Khetri–Narela and Bhadla–Sikar lines are running two years behind schedule, leaving developers forced to idle projects that once held “must-run” status.

The financial toll is mounting. Developers have lost an estimated **₹2.3–2.5 billion in FY26**, with revenues down 20–25% for some projects. Such uncertainty threatens the viability of capital-intensive solar and wind investments and risks eroding investor confidence in India's green growth story.

While Rajasthan is the epicenter, states like Gujarat, Maharashtra, and Tamil Nadu are reporting similar, though smaller, curtailments. Experts warn this will spread unless transmission expands alongside generation.

Industry voices are calling for urgent action: faster commissioning of delayed corridors, **dynamic line ratings**, large-scale battery storage systems (BESS), and compensation mechanisms to shield developers from involuntary losses.

Rajasthan still powers much of the National Capital Region, but stranded capacity is now undermining its role as India's clean energy flagship. The lesson is clear—**renewable generation and grid readiness must move in lockstep**. Without robust transmission and storage, India's bold energy transition risks being throttled at the source.



## RAJASTHAN'S RENEWABLE ENERGY FACES SETBACK: 4 GW CURTAILED AMID TRANSMISSION DELAYS





## INDIA POWERS PAST 100 GW –

## A NEW DAWN IN SOLAR MANUFACTURING EXCELLENCE

**From 2.3 GW in 2014 to a Record-Breaking 100 GW in 2025 – The ALMM Triumph**

India has illuminated the global renewable energy map by achieving a historic milestone of 100 GW Solar PV Module Manufacturing Capacity under the Approved List of Models and Manufacturers (ALMM). This quantum leap, from a modest 2.3 GW in 2014, marks an extraordinary transformation in the nation's solar manufacturing journey.

Union Minister for New and Renewable Energy, Shri Pralhad Joshi, hailed this achievement as a testament to Prime Minister Shri Narendra Modi's visionary leadership and the game-changing Production Linked Incentive (PLI) Scheme for High-Efficiency Solar Modules.

**“This landmark is more than a number—it's proof that India's solar manufacturing ecosystem is now robust, self-reliant, and future-ready,”**

**Joshi stated.**

**The growth story is as inspiring as it is rapid:**

**Capacity Surge:** From 2.3 GW (2014) ➔ 8.2 GW (2021) ➔ 100 GW (2025)

**Manufacturer Expansion: From just 21 manufacturers in 2021 ➔ 100 manufacturers operating 123 state-of-the-art units today.**

**Global Competitiveness:** Adoption of high-efficiency technologies and vertically integrated operations have positioned India as a strong player in the global solar value chain.

This milestone fuels India's march towards its 500 GW non-fossil fuel capacity target by 2030, reinforcing the Atmanirbhar Bharat vision and strengthening the nation's contribution to global decarbonization efforts.

The MNRE's ALMM Order, first rolled out in January 2019, has acted as the cornerstone policy for quality assurance and capacity building. In just over four years, capacity has multiplied more than twelvefold—a rare feat in global energy transitions.

From established industry giants to innovative new entrants, the entire solar manufacturing spectrum has contributed to this moment. It's a shining example of how industry, State governments, and the Central Government can align for national and global impact.

With continued policy support, infrastructure development, and innovation, India's solar manufacturing future has never looked brighter.

**RSA Insight:** This isn't just about crossing 100 GW—it's about setting the stage for India to be the world's solar manufacturing powerhouse.





## PASTICHE POWERS UP: 1 GW BATTERY ENERGY STORAGE PLANT COMING TO PUNJAB BY Q3 2025

In a decisive move to energize India's clean energy landscape, Pastiche Energy Solutions, a leading battery manufacturer from Haryana, has announced the establishment of a 1 GW lithium iron phosphate (LFP) Battery Energy Storage System (BESS) manufacturing plant near Chandigarh, Punjab. This transformative project is poised to become a game-changer for India's growing energy storage ecosystem.

With an initial investment of ₹10 million (~\$114,588) in its first phase, the facility is set to be commissioned by Q3 2025, marking a major milestone in the nation's journey toward energy independence and sustainability. The plant will produce advanced BESS units as well as battery packs for electric vehicles (EVs)—serving a wide spectrum of mobility and grid applications.

But this is just the beginning.

### Scaling Ambitions: 5 GW Expansion & In-House Cell Manufacturing

Pastiche plans to scale up the manufacturing capacity to a staggering 5 GW, along with backward integration to produce lithium-ion cells under the same roof. This vertical integration strategy will enhance cost-efficiency, technology control, and market responsiveness.

To further power its green ambitions, the company also aims to install a 100–150 kW solar power plant on-site to run the facility on clean, renewable energy.

### From Local Innovation to National Impact

Founded in 2015, Pastiche Energy Solutions has emerged as a pivotal player in India's energy storage space, catering to a wide array of sectors—from residential and commercial to utility-scale, telecom, aerospace, railways, medical, and marine industries.

Pastiche's expertise extends to manufacturing battery packs for:

- 2W/3W/4W EVs
- Electric buses, trucks, and tractors
- Automated Guided Vehicles (AGVs) & robotics

### India's BESS Boom: Storage Gaining Ground

India's installed BESS capacity surged to over 341 MWh in 2024, a sixfold increase from the 51 MWh in 2023—a clear sign of the rising demand for energy storage in the renewable energy sector.

As of December 2024, the country's cumulative battery energy storage capacity stood at approximately 442 MWh, with:

- 60% from solar + storage hybrids
- 36% from renewable RTC (Round-The-Clock) systems
- 4% standalone BESS
- 0.05% from floating solar + storage

To further fuel this momentum, the Ministry of Power in June 2025 announced the second tranche of Viability Gap Funding (VGF), offering ₹1.8 million (~\$21,043)/MWh to support the development of 30 GWh of BESS capacity across the nation.

### Pastiche: Energizing the Future, One Cell at a Time

With this ambitious project, Pastiche is not just building batteries—it is building the future of energy. The upcoming Punjab facility is expected to become a cornerstone for India's clean energy transition, while generating employment, fostering innovation, and strengthening domestic manufacturing under the 'Make in India' mission.

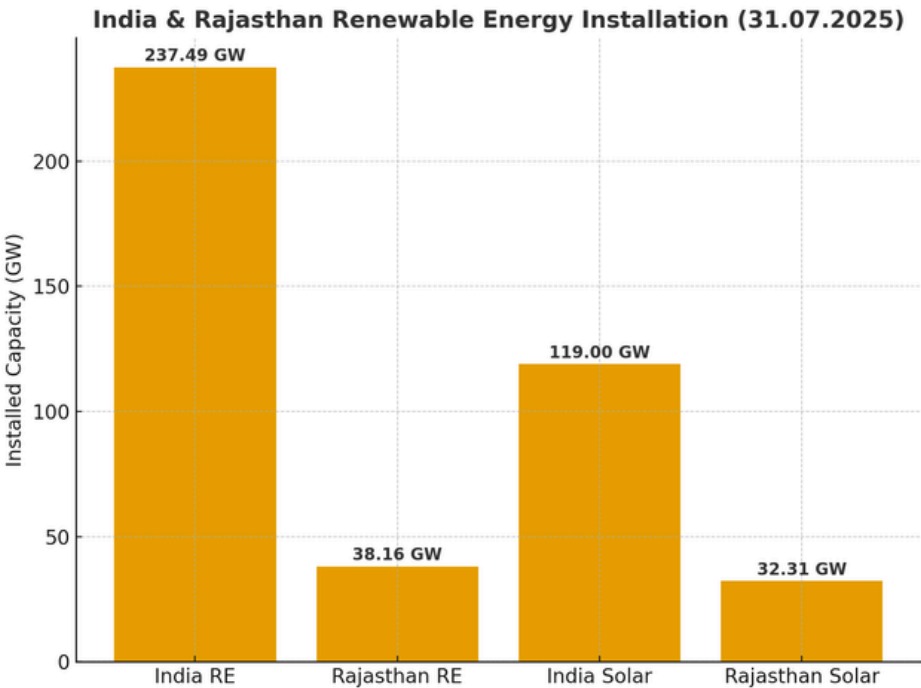


# INDIA’S RENEWABLE ENERGY GROWTH AT A GLANCE

India continues to shine as a global leader in renewable energy, setting remarkable benchmarks in sustainable development.

|                                           |
|-------------------------------------------|
| Total Installed Renewable Energy in India |
| 237.49 GW                                 |

|                                                |
|------------------------------------------------|
| Total Installed Renewable Energy in Rajasthan: |
| 38.16 GW                                       |



## Solar Power Leading the Transition

Rajasthan proudly contributes over 27% of India’s total solar energy, reinforcing its position as the Solar Capital of India.

|                         |
|-------------------------|
| India’s Solar Capacity: |
| 119 GW                  |

|                             |
|-----------------------------|
| Rajasthan’s Solar Capacity: |
| 32.31 GW                    |



# GAIL-RVUNL JOIN FORCES TO POWER RAJASTHAN'S RENEWABLE FUTURE

## A Strategic 1 GW Alliance Combining Solar, Wind, and Gas-Based Energy for Sustainable Growth

In a major push to accelerate India's clean energy transition, GAIL (India) Limited, a central public sector enterprise, has inked a strategic Joint Venture Agreement (JVA) with Rajasthan Rajya Vidyut Utpadan Nigam Limited (RVUNL) to develop 1 GW of renewable energy capacity across Rajasthan.

The joint venture aims to deploy 750 MW of solar power and 250 MW of wind energy, integrating these with existing gas-based power plants to create a robust and hybrid energy ecosystem that balances reliability and sustainability.

## Gas + Renewables: A Smart Blend for Round-the-Clock Power

This pioneering collaboration sets the stage for "bundled generation", where clean and dispatchable gas-based power complements the intermittency of solar and wind energy. It's a forward-looking model designed to ensure seamless grid operations, greater energy security, and improved renewable energy adoption at scale.

Notably, RVUNL's existing Ramgarh gas-based power station will be transferred to the joint venture, forming the backbone of this integrated energy model.

## Corporate Structure and Financial Details

The joint venture company will initially be a wholly owned subsidiary of RVUNL, with GAIL acquiring an equal equity stake through direct subscription or share purchase upon meeting agreed-upon conditions.

- **Initial Authorized & Paid-up Capital:** ₹1 million (~\$11,416)
- **Equity Share Price:** ₹10 (~\$0.11) per share
- **Board Composition:** 6 Directors (3 each from GAIL and RVUNL)
- **Lock-in Period:** 5 years
- **Right of First Refusal:** Granted to both parties in case of third-party share transfer

The collaboration is designed with clear governance, mutual rights, and long-term stability in mind—ensuring a strong foundation for what could become a national model for public-sector-led energy transformation.

## Beyond the JV: GAIL's Bold Renewable Vision

GAIL is steadily expanding its renewable energy footprint. Earlier this year, it floated an EPC tender for a 17.5 MW floating solar project at its Pata facility in Uttar Pradesh—showcasing its commitment to innovative clean energy deployment.

In February 2025, GAIL also scaled up its startup investment fund from ₹1 billion (\$57.6 million)\*\*. The enhanced corpus will fuel the growth of next-gen startups in clean energy, energy storage, electric mobility, and digital tech.

## A Glimpse into India's Green Future

With India targeting 500 GW of non-fossil fuel capacity by 2030, collaborations like this between central and state-level entities mark a pivotal shift toward unified, large-scale implementation.

The GAIL-RVUNL joint venture is more than just a business alliance—it's a blueprint for India's energy convergence strategy, combining traditional and renewable sources to achieve net-zero ambitions without compromising energy reliability.

As Rajasthan emerges as a frontrunner in India's solar and wind journey, this JV reinforces its position as the renewable powerhouse of the nation.

RSA KNOWLEDGE ADDA

FAULTY INSTALLATION OF TOPCON BIFACIAL MODULES  
RAISES FIRE RISK ON METAL ROOFS

The rapid adoption of TOPCon (Tunnel Oxide Passivated Contact) bifacial solar modules has sparked safety concerns in India’s booming rooftop solar market. While these modules promise 8–12% higher energy yield compared to monofacial panels, their misapplication on metal sheet roofs has resulted in alarming fire incidents.

WHY THE RISK IS HIGHER?

- Glass-to-Glass Structure:** TOPCon bifacial modules are heavier (32–38 kg vs. 22–25 kg for monofacial) and require stronger, ventilated mounting systems.
- Rear-Side Blockage:** Metal roofs block reflected sunlight and trap heat. Studies show that when bifacial modules are installed without rear exposure, rear-side gain drops by 90–95%, while module temperature rises by 15–20°C above standard conditions.
- Heat Build-Up:** Each 10°C rise in temperature can reduce module lifespan by 5–7 years (Fraunhofer ISE data). On metal roofs without clearance, hotspot temperatures have exceeded 95°C, increasing fire risk.

Technical Data Highlights

| Parameter                                 | Monofacial Module | Bifacial TOPCon (ideal setup) | Bifacial TOPCon (on metal roof)                  |
|-------------------------------------------|-------------------|-------------------------------|--------------------------------------------------|
| Efficiency                                | 21–22%            | 22.5–24%                      | Drops to 21% (rear side blocked)                 |
| Temperature Coefficient                   | –0.36%/°C         | –0.30%/°C                     | –0.30%/°C (but +15°C rise adds ~4.5% extra loss) |
| Operating Temperature (STC: 25°C)         | 45–55°C           | 45–55°C                       | 60–75°C                                          |
| Rear-Side Gain                            | N/A               | 45–55°C                       | <1–2%                                            |
| Fire Incidents Reported (2023–24, India)* | <0.1%             | N/A                           | 3+ confirmed cases due to overheating            |

*Based on field reports collected from EPC players & safety audits in Gujarat, Rajasthan, and Tamil Nadu.*





RSA KNOWLEDGE ADDA

## Common Installation Mistakes

1. Using monofacial mounting structures with purlins that cast shadows.
2. No clearance ( $\leq 50$  mm) between panels and sheet roofs, blocking airflow.
3. Underrated cables/connectors that fail under higher TOPCon currents (12–18 A per string vs. 9–11 A for mono PERC).
4. Untrained manpower – installations by local electricians with no solar safety training.



## Best Practices for Safe Installation

1. **Minimum Clearance:**  $\geq 1$  meter for RCC roofs; 200–300 mm for sheet metal roofs with ventilated structures.
2. **Reflective Base:** White paint or albedo sheets under bifacial modules to optimize rear-side gain.
3. **Correct BoS Components:** Use cables rated at 90°C (XLPE insulated) and MC4-compatible connectors tested for  $\geq 30$ A currents.
4. **Structure Design:** Tilted mounting with wind tunnel-tested structures to prevent hotspots and ensure ventilation.
5. **Periodic Testing:** IR thermography for hotspot detection, insulation resistance checks, and torque verification for connectors.

## RSA Takeaway

As India pushes towards 1 million rooftop installations under PM Surya Ghar: Muft Bijli Yojana, the industry must prioritize safety, awareness, and standardization. TOPCon bifacial modules can deliver long-term benefits, but only if installed with the right structures, ventilation, and trained manpower.

### RSA strongly recommends:

- BIS-certified BoS components,
- Training programs for rooftop installers,
- Standardized guidelines for bifacial rooftop deployment.

**Remember: A few percentage points of efficiency are not worth risking fire safety, system integrity, and customer trust.**

# FIRM NOTE ON GST REFORMS IN RENEWABLE ENERGY

## A LANDMARK BOOST FOR INDIA’S SOLAR TRANSITION

### 1. FINAL GST ON SOLAR COMPONENTS (EFFECTIVE FROM 22ND SEPTEMBER 2025)

As per the resolution of the GST Council, the Government of India has taken a landmark step to accelerate the renewable energy transition by reducing GST rates across all major solar components. This reform will significantly lower project costs, ease the financial burden on developers, and bring down tariffs for end consumers—making solar energy more accessible and competitive.

| Solar Items                          | Earlier GST Rate | Revised GST Rate |
|--------------------------------------|------------------|------------------|
| Solar Modules / PV Cells             | 12%              | 5%               |
| Solar Inverters                      | 12%              | 5%               |
| Solar DC Cables                      | 18%              | 5%               |
| Solar Transformers / PCUs            | 18%              | 5%               |
| Solar Pumps (Irrigation)             | 12%              | 5%               |
| Solar Water Heaters & Cookers        | 12%              | 5%               |
| Batteries (Li-ion, Lead Acid, etc.)  | 18%              | 5%               |
| Solar Power Generating Systems (EPC) | 12%/ Mixed       | 5%               |



## 2. WHY THIS REFORM MATTERS ?

- 1.This GST rationalisation marks a historic milestone for India’s clean energy sector.
- 2.By lowering the tax incidence on core solar equipment, the reform will:
  - Reduce overall project cost.
  - Enhance financial viability for developers.
  - Drive higher adoption of solar energy by industries, institutions, and households.
  - Accelerate India’s path toward achieving net-zero goals and fulfilling national renewable energy targets.

## 3. VERIFICATION & SOURCE

This GST cut from 12% to 5% was officially notified by the GST Council & CBIC (effective 22nd September 2025). The decision has been reported and verified through multiple government and leading industry sources

| 6. RENEWABLE ENERGY |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
|---------------------|-----------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| (12% to 5%)         |                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| No.                 | Chapter / Heading / Sub-heading / Tariff item | Description of Goods                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 1.                  | 7321 or 8516                                  | Solar cookers                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 2.                  | 8419 12                                       | Solar water heater and system                                                                                                                                                                                                                                                                                                                                                                                                                       |
| 3.                  | 84, 85 or 94                                  | Following renewable energy devices and parts for their manufacture:-<br>(a) Bio-gas plant;<br>(b) Solar power-based devices;<br>(c) Solar power generator;<br>(d) Wind mills, Wind Operated Electricity Generator (WOEG);<br>(e) Waste to energy plants / devices;<br>(f) Solar lantern / solar lamp;<br>(g) Ocean waves/tidal waves energy devices/plants;<br>(h) Photo voltaic cells, whether or not assembled in modules or made up into panels. |
| 4                   | 87                                            | Fuel Cell Motor Vehicles including hydrogen vehicles based on fuel cell technology and of length not exceeding 4000mm.                                                                                                                                                                                                                                                                                                                              |



## 4.THE BIGGER PICTURE

This reduction to 5% GST across solar modules, inverters, batteries, and EPC systems is more than a reform—it is a renewable revolution enabler.

It ensures:

- **Sustainability** – By reducing costs and promoting adoption.
- **Energy Security** – By boosting domestic demand and solar growth.
- **Consumer Benefits** – By lowering tariffs and making solar energy accessible for all.

# INDIA'S GREEN SHIFT ACCELERATES — RENEWABLES NOW POWER NEARLY HALF THE NATION

## RSA Quarterly Fact Check | Q2 2025

India's energy transition is no longer a distant vision — it's happening now, and at a record pace. By the end of June 2025, renewable energy, including large hydro, accounted for 48.3% of the country's total installed power capacity, equivalent to 234.2 GW. The data, compiled from the Central Electricity Authority (CEA) and the Ministry of New & Renewable Energy (MNRE), underscores a turning point in India's journey toward a low-carbon power sector.

### Solar Energy: The Growth Engine

Solar energy continues to lead India's renewable growth story.

- **Share in Total Capacity:** 24%
- **Share in Renewable Capacity:** 49.7%
- **Quarterly Growth:** 11.8% increase in capacity compared to Q1 2025
- **Yearly Growth:** Massive 33.5% jump compared to Q2 2024
- **Generation:** 43 billion units (BU) in Q2 2025, a 19.2% YoY increase and a 2.5% QoQ rise.

With nearly half of India's renewable capacity coming from solar, it is clear that the sector is now the backbone of India's clean energy ambitions.

### Hydro, Wind & Biomass — The Balancing Forces

While solar steals the spotlight, other renewable technologies continue to play critical roles:

- **Large Hydropower:** 49.4 GW installed, representing 10.2% of total power capacity. Significant pumped storage capacity was added this quarter, including THDC's Tehri PSP Unit-1 (250 MW) and Greenko's Pinnapuram HPS Units 1–5 (5 × 240 MW), totaling 1,200 MW.
- **Wind Energy:** 51.7 GW capacity (10.7% share), with a 3.3% increase from Q1 2025.
- **Biomass & Small Hydro:** Contributing 2.2% and 1.1% respectively to total installed capacity, these sectors provide valuable grid stability and rural energy access.

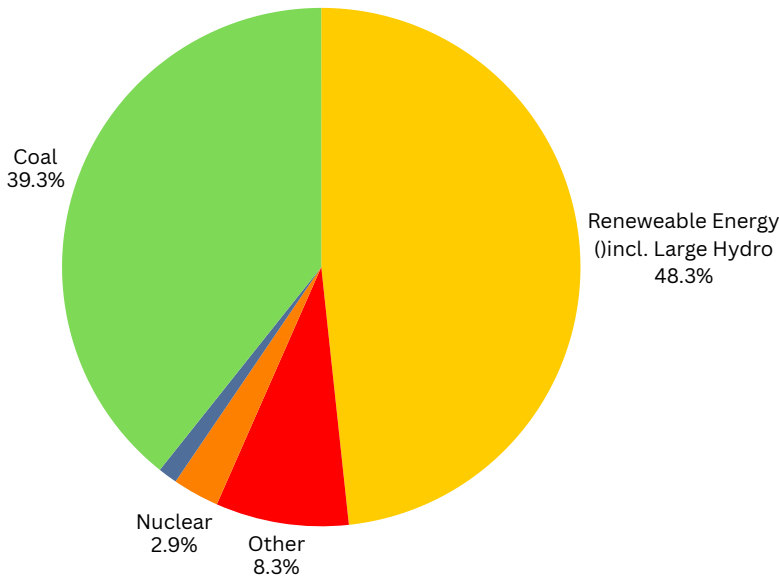
### Conventional Power — Losing Ground

Despite still accounting for a majority share (51.7%) of total installed capacity, conventional energy sources are on a downward trajectory:

- **Coal:** Capacity fell slightly due to the decommissioning of ~2 GW, despite the commissioning of NTPC's Barh I Unit-3 (660 MW) and UPRVUNL's Obra C Unit-2 (660 MW).
- **Gas:** Capacity dropped by a steep 17.9% in Q2 2025 due to unit closures.
- **Nuclear:** Bucked the trend with a 7.3% increase from Q1 2025.



THIS DECLINE IN CONVENTIONAL CAPACITY, COUPLED WITH RENEWABLE GROWTH, REFLECTS INDIA’S STRUCTURAL SHIFT TOWARD CLEAN ENERGY.



INDIA’S INSTALLED POWER CAPACITY MIX - Q2 2025

RSA Perspective

Speaking on the Q2 2025 report, the Rajasthan Solar Association (RSA) said: “India’s renewable journey is accelerating at an unprecedented rate. Solar’s rapid expansion is not just adding capacity — it’s reshaping the very foundations of our power sector. We are approaching the historic milestone of renewables surpassing 50% of total installed capacity, and we believe this will be achieved within the next year.”

Key Takeaways

— Q2 2025

- 48.3% of installed power capacity is renewable (including large hydro).
- 234.2 GW renewable capacity as of June 2025.
- Solar: 24% of total capacity; 49.7% of renewable capacity.
- YoY Renewable Growth: 19%
- YoY Solar Growth: 33.5%
- Conventional Capacity: Down from 53.9% in Q1 to 51.7% in Q2.

Outlook

With solar and wind projects in the pipeline and pumped storage capacity rising, India is on the brink of a clean energy majority. Policy clarity, grid upgrades, and storage integration will be key to sustaining this momentum. The next 12 months could witness a historic reversal — renewables overtaking conventional sources for the first time in India’s history.

# ODISHA CHARTS NEW COURSE IN GRID DISCIPLINE WITH DRAFT DEVIATION SETTLEMENT GUIDELINE

## OERC RELEASES COMPREHENSIVE MECHANISM TO BALANCE GRID OPERATIONS AND CLEAN ENERGY INTEGRATION

In a pivotal move toward strengthening power system discipline, the Odisha Electricity Regulatory Commission (OERC) has released the Draft Intrastate Deviation Settlement Mechanism and Related Matters Regulations, 2025. The draft framework aims to usher in a transparent and commercially binding structure for grid users—ensuring scheduled power drawal and injection while safeguarding grid security and reliability across the state.

**Stakeholders have until August 30, 2025, to submit their comments and suggestions on the proposed guidelines.**

## Who Will BE AFFECTED?

The regulations will apply to:

- Electricity sellers and buyers utilizing intrastate transmission or distribution networks through open access
- Distribution licensees and deemed licensees
- Consumers connected to the state transmission system, with scheduled drawal monitored by the State Load Dispatch Center (SLDC)

## DEVIATION ACCOUNTING AT ITS CORE

**The new mechanism clearly defines how deviations will be calculated:**

### For General Sellers:

Deviation (MWh) = Actual Injection - Scheduled Generation

% Deviation =  $100 \times (\text{Deviation} / \text{Scheduled Generation})$

**For Wind & Solar Generators:** Follows the same formula, but categorized separately for variability handling

### For Buyers:

Deviation (MWh) = Actual Drawal - Scheduled Drawal

% Deviation =  $100 \times (\text{Deviation} / \text{Scheduled Drawal})$



**Dynamic Charges: Linking to Real-Time Market Signals**

The normal rate (NR) for deviation charges will be determined by the highest of the following three market-linked parameters:

**(A) The Area Clearing Price (ACP) of Day-Ahead Markets**

**(B) Weighted average ACP of Real-Time Market segments**

**(C) A composite rate involving ACPs from integrated DAM, RTM, and Ancillary Service Charges**

In scenarios where ACP is unavailable for a specific time block, data from the last available corresponding day will be used.

No deviation charges will apply to the injection of infirm power, but once scheduled post-trial run, charges will apply as per normal seller categories.

**Special Provisions for Grid Operations**

- Startup or Auxiliary Power Drawal before Commercial Operation Date will be charged at the reference or contract rate.
- In the case of forced outages, charges are based on reference rates for up to eight time blocks.
- Deviation from High-Price Day-Ahead Market (HP-DAM) transactions will be penalized using ACPs specific to HP-DAM segments

**Settlement and Pool Account Management**

The SLDC will prepare deviation charge statements weekly, backed by separate accounts for:

- Principal and interest components
- State deviation pool
- Interstate deviation charges (as per ERPC reports)
- All deviation charges, late payment surcharges, and recoveries will flow into a State Deviation Pool Account, from which:
- Sellers (over-injecting) and buyers (under-drawing) will be compensated
- Funds will be used for grid enhancement, capacity building, and approved reliability initiatives Any year-end surplus in the pool will be redirected to projects improving grid safety and operational excellence, subject to annual Commission approval.

# CONCLUSION

Odisha's draft regulation marks a critical step toward building a more accountable and future-ready power system by aligning with national regulatory trends, strengthening grid discipline, and enhancing transparency. Through clear implementation timelines, mock settlement exercises, and penalties for delays, the framework ensures procedural readiness and operational accountability. As the state scales up renewable capacity and modern grid technologies, this regulation lays the foundation for integrating clean energy more effectively while preparing Odisha's energy ecosystem for a disciplined, transparent, and market-aligned future.

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