



Achintya Securities Limited

India's Solar Boom at a Crossroad

Record Additions, Regional Concentration,
and the Manufacturing Glut Paradox



July 18, 2026

Introduction

India's clean energy narrative has fundamentally transcended its early days of being a niche environmental initiative. Today, solar power is the indisputable backbone of the nation's industrial policy, grid infrastructure upgrade, and overarching manufacturing strategy. Evolving from a mere 2.8 GW of installed capacity in 2014 to a staggering 157 GW in 2026, the sector has demonstrated unprecedented scale. In FY26 alone, the country shattered its own records by adding 44.61 GW, completely eclipsing the 34 GW target and nearly doubling the FY25 milestone of 23.83 GW.

However, beneath this veneer of hyper-growth lies a complex paradox. The sector is currently grappling with severe regional imbalances, a massive manufacturing supply glut, and the hidden costs of pushing for absolute self-reliance. Let us deeply explore the mechanics of India's solar power boom, the technological shifts underway, and how investors can strategically navigate this maturing landscape.



The Mathematics of the Solar Boom

To truly appreciate the scale of India's solar expansion, we must look at the mathematical trajectory of its growth over the last twelve years. The compound annual growth rate (CAGR) from 2014 to 2026 showcases one of the fastest energy transitions in modern history.

This remarkable 39.6% annualized growth rate positions India firmly on the trajectory to become the world's second largest solar market by annual installations in 2026. Yet, growth at this velocity brings structural growing pains that policymakers and capital allocators must urgently address.



Solar Remains Concentrated in a Handful of States

The 85% Concentration Problem

As the provided article notes, 85% of India’s installed solar capacity is concentrated in just seven states: Rajasthan, Gujarat, Maharashtra, Karnataka, Tamil Nadu, Andhra Pradesh and Madhya Pradesh. This concentration has deepened over FY25–FY26 rather than diversified.

State	Solar Capacity (June 2026)	% of National Total	Key Advantage
Rajasthan	49.5 GW	31.5%	High irradiation (5.7 kWh/m ² /day), abundant low-cost desert land
Gujarat	51.5 GW	32.8%	Hybrid solar-wind zones, strong DISCOM, coastal evacuation infrastructure
Karnataka	33.1 GW	21.1%	Proactive RE policy, best renewable evacuation corridor
Maharashtra	29.8 GW	19.0%	Large industrial load centres, open access demand
Tamil Nadu	21.2 GW	13.5%	Hybrid wind-solar clusters, strong transmission
Andhra Pradesh	12.8 GW	8.1%	Good irradiation but policy volatility
Madhya Pradesh	11.4 GW	7.3%	Land availability, strategic location

Why Some States Are Falling Behind

- **Andhra Pradesh:** Hit by regulatory flip-flops (three PPAs renegotiated in 2024–25, leading to investor hesitancy). Despite good solar resource, new additions fell 40% in FY26 vs. FY24.
- **Madhya Pradesh:** Has ample land but transmission capacity bottlenecks the RE evacuation corridor from Rewa and Neemuch remains incomplete, with 4 GW of completed projects waiting for connectivity.
- **Uttar Pradesh:** Fast improving – added 1.7 GW in Q1 FY27 (up from 0.8 GW in Q4 FY26). Driven by KUSUM scheme (solar pumps) and PM Surya Ghar. However, utility-scale faces hurdles: fragmented land parcels and high stamp duty on leasehold land.
- **West Bengal and Bihar:** Remain laggards due to low irradiation (4.5 kWh/m²/day), weaker DISCOM financial health, and lack of state-level solar parks.



Manufacturing Paradox: Tech Evolution & the Cost of Autonomy

Perhaps the most fascinating dynamic in India's current solar ecosystem is the massive disconnect between manufacturing capacity and domestic deployment. Driven by Production-Linked Incentives (PLI) and protective trade barriers, domestic manufacturing has exploded.

By 2025, module manufacturing capacity ballooned to 210 GW, while cell capacity reached 27 GW. Yet, annual domestic demand hovers around 40-45 GW.

Here is how this overhang impacts the industry:

- **Plummeting Utilization:** Due to this severe mismatch, module assembly plants are currently operating at a sluggish ~40% utilization rate, a sharp drop from the >70% seen in FY23.
- **The Technology Trap:** A significant chunk of India's domestic capacity (~30 GW) is locked into legacy Mono PERC technology. Meanwhile, the global standard has rapidly shifted to n-type TOPCon (Tunnel Oxide Passivated Contact) and HJT (Heterojunction) cells, which offer significantly higher efficiency and lower degradation rates. Manufacturers failing to upgrade face severe obsolescence risks.
- **The Premium for Self-Reliance:** To protect local manufacturers from Chinese dumping, the government enforces the ALMM (Approved List of Models and Manufacturers) and high Basic Customs Duties (BCD). While this secures supply chains, it artificially inflates domestic panel prices. This push for self-reliance is estimated to add a hefty ₹30,000 crore to the cost of solar installations this year alone.

Taming the Grid: The Urgency of Storage and Transmission

As solar energy floods the grid, it introduces the infamous "Duck Curve" problem an oversupply of energy during sunny afternoons and a sudden, steep drop off in generation right as evening peak demand hits.

India's peak power demand has already touched 271 GW and is projected to breach the 300 GW mark next year, driven by extreme summer heat, rising EV adoption, and the explosive energy needs of AI data centres. Simply adding more solar panels is no longer sufficient; the grid requires dispatchable, round-the-clock (RTC) clean energy.

Consequently, massive capital is now flowing into Battery Energy Storage Systems (BESS) and Pumped Hydro Storage (PHS), which act as massive sponges to soak up afternoon solar and release it during the night.



What Does This Mean for Investors?

For institutional and retail investors, the solar narrative has completely morphed. It is no longer a rudimentary "buy the panel maker" story. The value chain has deepened, requiring a highly nuanced investment strategy.

Investors must pivot their focus toward:

1. **Grid Upgrades & Transmission:** Companies manufacturing high-voltage cables, transformers, and smart grid infrastructure are entering a multi-decade Supercycle. Power cannot be sold if it cannot be transmitted.
2. **Vertically Integrated Manufacturers:** Module assemblers without captive cell or wafer production will suffer margin compression. Integrated players who can seamlessly upgrade to TOPCon technology will command a premium.
3. **Energy Storage Innovators:** Battery manufacturers, critical mineral refiners, and engineering firms specializing in Pumped Hydro projects represent the next massive growth frontier in the RE ecosystem.

While the pipeline is robust with 145 GW of projects having secured Power Purchase Agreements (PPAs) and a further 70 GW in development profitability will strictly Favor companies with deep technological moats and flawless execution.



The 2030 Horizon: What's Next?

Looking forward, India is hurtling toward an annual solar installation trajectory of 50 GW. The ultimate goal is to achieve 500 GW of non-fossil fuel capacity by 2030, of which solar is projected to contribute roughly 280-300 GW.

The low-hanging fruit of utility-scale solar has largely been picked. The next phase of India's green revolution will be heavily qualitative rather than purely quantitative. Success will be defined by the commercialization of Green Hydrogen, the seamless integration of energy storage, deep electricity market reforms, and the aggressive expansion of the C&I (Commercial and Industrial) open-access market.

India's solar boom undeniably remains a generational wealth creation opportunity, provided stakeholders can skilfully navigate the emerging complexities of manufacturing gluts and grid stabilization.





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