

Solar Intelligence — de-risking the China chain

Value-chain self-sufficiency, ALMM/duty stack, rare-earth mining push, solar & battery recycling economics, and LFP vs sodium-ion.

~190 / 31 GW India module vs cell capacity Assembly-rich, cell-poor — the DCR premium engine	18.7% Anti-dumping duty (Apr-2026) On Chinese TOPCon/HJT modules, + 40% BCD	■7,280 cr Rare-earth magnet scheme 6,000 MTPA sintered REPM; 20 bids incl. L&T, Coal India	70% by 2030 Battery EPR mandate Collection & recycling; 58 recyclers under ■1,500 cr NCMM
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01 · China reliance — where the value chain actually sits

India self-sufficiency by solar value-chain stage (% of domestic demand): Polysilicon 2% · Ingot / Wafer 5% · Cells 16% · Modules 100%

India's ~190 GW of module assembly sits on top of only ~31 GW of cell capacity and near-zero wafer/polysilicon — so every ALMM-compliant module still carries an imported Chinese core. That's why ALMM List-II (cells, effective Jun-2026) instantly created a 70–100% DCR premium: the mandate outran domestic cell supply.

The duty stack on Chinese modules is now 40% BCD + 18.7% anti-dumping (TOPCon/HJT, Apr-2026) + full-chain origin traceability — cargoes without polysilicon-to-module documentation face rejection.

02 · How India is overcoming it

The counter-offensive

- PLI (24 GW integrated): Adani ramping ingot-wafer; Reliance building HJT with backward integration
- ALMM List-I gates modules (2021), List-II gates cells (Jun-2026) — demand-side forcing of localisation
- Cell capacity headed to ~64.6 GW by mid-2026 against ~44 GW annual demand — cells localise first, wafers next
- DCR programmes (PM Surya Ghar, PM-KUSUM) guarantee a protected offtake pool for domestic cells
- MNRE monitors module prices monthly via NISE to police profiteering during the transition

Realistic sequencing: modules (done) → cells (2026–28) → wafers/ingots (2028–30) → polysilicon (the hardest, energy-intensive step). Until wafers localise, 'Made in India' remains 'Assembled on Chinese silicon' — which is precisely what the traceability regime now forces everyone to document.

03 · Rare earths — the new mining focus

China supplies 85–90% of India's rare-earth magnets. The response: a ■7,280 crore scheme for 6,000 MTPA of integrated sintered NdFeB magnet capacity (NdPr oxide → finished magnet), drawing 20 bids including L&T, Coal India, ReNew and Attero Recycling — plus dedicated rare-earth corridors in Odisha, Kerala, Andhra Pradesh and Tamil Nadu for mining, processing and R&D under the National Critical Mineral Mission.

The gap to watch is midstream processing — mined monazite to battery/magnet-grade material — where a dedicated policy is expected next. Ore without processing is just geology.

India rare-earth magnet import dependence on China: Magnets from China today 88% · Target domestic share by 2030 (scheme ambition) 40%

04 · Recycling — solar panels & lithium batteries

Batteries: EPR effective Apr-2025 mandates 70% collection & recycling by 2030; 58 recyclers approved under the ■1,500 cr NCMM incentive to recover lithium, cobalt, nickel and graphite. Critique: credits are weight-based, so high-value rare-earth/critical-material recovery is under-incentivised — expect rule amendments to add strategic-material categories.

Solar: PV waste falls under the E-Waste/BWM framework, but India's first big decommissioning wave (2005–2015 vintage plants) arrives 2030+. Building recycling capacity now — glass, aluminium, silver, silicon recovery — is the difference between a resource and a landfill problem.

India cumulative PV waste projection (million tonnes): 2025 0.1Mt · 2028 0.34Mt · 2030 0.6Mt · 2033 1.7Mt · 2035 3.4Mt

05 · Economics — LFP vs sodium-ion

Indicative cost at scale (\$/kWh, cell level, India landed): LFP (imported, landed) 75\$/kWh · Sodium-ion (projected at scale) 45\$/kWh

Sodium-ion's India case: \$40–50/kWh projected at scale (vs \$70–80 landed LFP), domestic sodium-carbonate feedstock, no Chinese LFP licence required, and better high-temperature behaviour — a real fit for stationary storage and 2-wheelers. LFP keeps 4-wheelers and energy-dense use-cases through ~2028.

Watch the dual-chemistry strategies: Reliance's sodium-ion pivot is not a consolation prize — it's the only chemistry where India can plausibly own the full stack this decade. The risk is the same scaling valley China crossed for LFP: sodium-ion economics only appear at GWh volumes.

Latest headlines

- India's ALMM-II adds G12R TOPCon cells in ninth revision (PV Tech)
- Solar Cell Capacity in ALMM Surpasses 35 GW in August 2026 (Energetica India Magazine)
- India's solar PV manufacturing capacity hits 100 GW, but upstream import dependence remains high: NITI Aayog (Down To Earth)
- Has India Moved Too Fast on Solar Cell Localisation? (TimesTech)
- Domestic solar cell supply shortage short term, market set to realign soon: Experts (ET EnergyWorld)
- MNRE revises ALMM List-II with new solar cell models, efficiency ranges (Power Peak Digest)
- TOPCon Accounts for 33% of India's Solar Cell Capacity, While Mono PERC Retains Lead (Saur Energy)
- Domestic Solar Cell Supply Under Strain as Demand for TOPCon Modules Surges (Mercomindia.com)
- India To Mandate DCR Solar Panels From June 2026 Amid Supply And Cost Concerns—Industry Leaders View (SolarQuarter)
- Solex Sees Upward Pressure On Solar Module Prices, Cites Multiple Factors (Saur Energy)

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