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India's Rooftop Solar Hits 20.8 GW: PM Surya Ghar Drives 123% YoY Growth

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WHY IN NEWS:

India's installed **rooftop solar capacity touched 20.8 GW by end-December 2025**, with **7.1 GW added during 2025** — a **122–123% year-on-year jump** from 3.2 GW in 2024. **Residential consumers accounted for 76% of the growth**, driven by the **PM Surya Ghar Muft Bijli Yojana**. The Mercom India Research Q4 & Annual 2025 Rooftop Solar Market Report data resurfaced in current-affairs discussion on May 22, alongside **International Day for Biological Diversity** linkages to clean energy.

ABOUT PM SURYA GHAR MUFT BIJLI YOJANA

A flagship rooftop-solar scheme aimed at making **one crore households "energy positive"** with free or near-free electricity.

- **Launched:** February 15, 2024 by Prime Minister Narendra Modi.
- **Target:** 1 crore (10 million) households by **2026–27**.
- **Outlay:** ₹75,021 crore.
- **Benefit:** Up to **300 units of free electricity per month** for participating households.
- **Subsidy structure (Central Financial Assistance):**

SYSTEM SIZE	SUBSIDY
1 kW	₹30,000
2 kW	₹60,000
3 kW and above	₹78,000 (cap)

- **Implementing agency: Solar Energy Corporation of India (SECI).**
- **Nodal ministry: Ministry of New and Renewable Energy (MNRE).**

2025 ROOFTOP SOLAR PERFORMANCE

INDICATOR	2025 VALUE
Rooftop solar added in 2025	**7.1 GW**
Rooftop solar added in 2024	3.2 GW
YoY growth	**~122–123%**
Residential share of additions	**76%**
Total installed rooftop solar (Dec 2025)	**20.8 GW**

Metering regime

- **Net metering** for residential systems (typically <10 kW).
- **Gross metering** generally applied to larger commercial / industrial installations, subject to state DERC regulations.

INDIA'S RENEWABLE ENERGY TARGETS

- **2030 target: 500 GW of non-fossil installed capacity** — pledged under the **Panchamrit commitments at COP-26 (Glasgow, November 2021).**
- **National Solar Mission** (revised): **280 GW of solar by 2030**.
- **Total installed RE capacity (as of March 31, 2026):** ~274.68 GW, including ~150.26 GW of solar.
- **India's global rank in renewable energy capacity: 3rd (IRENA 2026)** — after China and the United States.

SOLAR MANUFACTURING ECOSYSTEM

- **PLI Scheme for High Efficiency Solar Modules** — total outlay ~₹24,000 crore:
  - **Phase I:** ₹4,500 crore (2021).
  - **Phase II:** ₹19,500 crore (2023).
- **ALMM (Approved List of Models and Manufacturers):** Restricts use of non-Indian modules (and progressively cells) in government-supported projects — pushing domestic manufacturing.
- **Domestic capacity (2025 estimate):**

STAGE	CAPACITY
Modules	~75 GW
Cells	~25 GW
Wafer / Ingot	<2 GW

The wafer–ingot stage remains the weak link in India's solar manufacturing value chain.

KEY CHALLENGES

- **DISCOM finances:** Rooftop net-metering shifts revenue away from utilities to consumers — straining already stressed distribution companies.
- **Anti-dumping vs. self-sufficiency:** Trade remedies on Chinese cells/modules must be balanced against the timeline for genuine cell-level self-reliance.
- **Rural penetration:** Most rooftop adoption is concentrated in urban, middle- and upper-middle-class households.
- **Aggregator / RESCO models:** Third-party-ownership (Renewable Energy Service Company) penetration is still limited.
- **Land-use trade-offs:** Utility-scale solar competes with agricultural land use in arid and semi-arid regions.

WAY FORWARD

- **Solar + storage co-deployment:** Battery integration is essential for managing the rising share of variable RE.
- **Community-scale solar and agri-PV** (agrivoltaics — solar over farmland) pilots.
- **Smart meters and time-of-day (ToD) tariffs** to align consumption with solar generation.
- **PM-KUSUM expansion** — solarisation of agricultural pumps (Components A, B and C).
- Strengthening **discom-rooftop financial frameworks** (e.g. utility-led aggregation models).

UPSC RELEVANCE

- **GS Paper 3 — Economy:** Infrastructure (energy); inclusive growth; industrial policy.
- **GS Paper 3 — Environment:** Climate change mitigation; India's NDCs; energy transition.
- **GS Paper 3 — Science & Technology:** Indigenisation; PLI; solar manufacturing technology.

- Mains themes: Energy transition and just transition; rooftop solar and DISCOM viability; manufacturing self-reliance; meeting Panchamrit commitments.
- Prelims angle: PM Surya Ghar specifics, SECI, MNRE, ALMM, Panchamrit pledges, IRENA rankings, India's NDCs.

FACTS CORNER

PM Surya Ghar Muft Bijli Yojana: Launched February 15, 2024.

Outlay: ₹75,021 crore.

Subsidy: Up to ₹78,000 per household; 300 free units/month.

Target: 1 crore households by 2026-27.

Total rooftop solar (Dec 2025): 20.8 GW.

2025 additions: 7.1 GW (122–123% YoY).

Residential share of growth: 76%.

India's total installed RE (Mar 2026): ~274.68 GW; solar: ~150.26 GW.

India's global RE rank: 3rd (IRENA 2026, after China and USA).

2030 non-fossil target: 500 GW — Panchamrit, COP-26.

2030 solar target: 280 GW.

PLI Solar outlay: ₹24,000 crore (Phase I + Phase II).

Nodal ministry: Ministry of New and Renewable Energy (MNRE).

Implementing agency: Solar Energy Corporation of India (SECI).

ALMM: Approved List of Models and Manufacturers.

Sources: MNRE, PIB, PM Surya Ghar

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