

India's Solar Rise

Mains: *GS III – Infrastructure & Renewable energy*

Why in News?

India's solar capacity has increased significantly making solar the largest contributor to the country's renewable energy mix.

What are the solar energy achievements by India?

- **Capacity Growth** - From an installed capacity of approximately **3 GW in 2014**, the sector has expanded more than fiftyfold, reaching **162.15 GW till 30 June 2026**.



Source: Ministry of Power and Ministry of New and Renewable Energy

The country has added 37 GW of solar capacity in 2025, surpassing the United States in annual additions.

*India has also emerged as the **world's second-largest solar growth market**, underlining its growing role in the global clean energy transition.*

- **Record Growth in FY (2025-26)** - India added 44.61 GW solar capacity, nearly double FY 2024-25; solar module manufacturing rose to 172 GW (from 2.3 GW in 2014).
- **Non-fossil fuel capacity** - It reached 283.46 GW with record annual addition of 55.29 GW, on 29 July 2025, Renewable Eenergy met 51.5% of electricity demand, the highest monthly share.
- **Major contributing states** - Solar deployment spans diverse geographies and climatic zones, with Rajasthan, Gujarat, Karnataka, Tamil Nadu, Andhra Pradesh, and Maharashtra accounting for a major share of installed capacity.
- Some of the large solar projects include the
 - Bhadla Solar Park (Rajasthan),
 - Pavagada Solar Park (Karnataka), and
 - Rewa Ultra Mega Solar Park (Madhya Pradesh).

India's Solar Journey

Chronology



Source: Ministry of New and Renewable Energy and Ministry of Power

What is the policy architecture behind the solar expansion?

- **Climate Commitments and Long-Term Targets**
- **COP26 in Glasgow** - India announced the Panchamrit goals, which include 500 GW of non-fossil fuel capacity by 2030 and net-zero emissions by 2070.
- These targets were integrated into India's updated Nationally Determined

Contributions under the Paris Agreement.

- **Mission LiFE** - It promotes sustainable consumption and eco-friendly citizen practices.
- **Creation of Demand**
- **National Solar Mission** - It established long-term capacity targets and provided an early impetus to solar deployment.
- **Renewable Purchase Obligations (RPOs)** - It require electricity distribution companies and other obligated entities to procure a specified share of their electricity from renewable sources.
- It provides long-term market certainty for developers and investors while encouraging greater renewable energy adoption.
- **Supporting schemes** - PM Surya Ghar drives household rooftop solar adoption, while PM-KUSUM supports solar pumps and feeder solarisation in agriculture.
- Together, they broaden the solar market and boost participation across consumers, farmers, businesses, and utilities.
- **Lowering Costs: Competitive Bidding and Tariff Discovery**
- **Auction Mechanism** - e-Reverse Auction mechanism, which encourages developers to compete to supply electricity at the lowest possible rate.
- **Tariffs Trend** - It declined from around Rs.18 per unit in 2010 to a record-low of Rs.2.44 per unit, attained at the Bhadla Solar Park auction in 2017.

Falling tariffs have made solar power highly affordable, placing India among the world's lowest-cost solar markets.

- **Enabling Infrastructure**
- **Solar Parks Scheme** - Initially launched with a target of 20 GW and later expanded to 40 GW in 2017.
- **Supported by** - Green Energy Corridor (GEC) Programme aims to facilitate the transfer of power from RE-rich areas to demand centres across the country.

- It enhanced transmission networks enabled evacuation of 24,567.8 MW RE by Feb 2026.
- Green Energy Corridor projects in 10 states target 44 GW evacuation, strengthening national grid integration.
- As of February 2026, 54 solar parks with a combined sanctioned capacity of 39,188 MW have been approved across the country.


**SHANKAR
IAS PARLIAMENT**



NATIONAL PARKS IN INDIA – RANKED BY NUMBER OF PARKS



RANK	STATES / UNION TERRITORIES	NO. OF PARKS	CAPACITY SANCTIONED (MW)
1	Rajasthan	11	10,726
2	Madhya Pradesh	9	4,208
3	Uttar Pradesh	8	3,740
4	Gujarat	7	12,150
5	Andhra Pradesh	5	4,200
6	Maharashtra	4	1,105
7	Kerala	3	255
8	Jharkhand	2	334
9	Chhattisgarh	1	100
10	Jharkhand and West Bengal ^{1A}	1	310
11	Karnataka	1	2,000
12	Odisha	1	40
13	Mizoram	1	20
TOTAL		54	39,188 MW

1A – Joint Park across Jharkhand and West Bengal

- **Supporting Manufacturing** - To strengthen domestic solar manufacturing and reduce import dependence.
- **PLI Scheme for High-Efficiency Solar PV Modules** - Launched in 2021, with Rs.4,500 crore and expanded in 2022 with Rs.19,500 crore, promotes domestic manufacturing and reduces import dependence.
- By October 2024, it attracted Rs.35,000 crore investment and created about 10,000 direct jobs.
- **Approved List of Models and Manufacturers (ALMM)** - Introduced in 2019, it ensures only approved solar PV modules and cells meeting quality standards are eligible for government-supported and competitively bid projects.

- It promotes domestic manufacturing by mandating approved products, thereby strengthening India's solar ecosystem alongside the PLI Scheme.

PM Surya Ghar: Muft Bijli Yojana

- It is the world's largest domestic rooftop solar programme.
- Launched in - 2024 with an outlay of Rs.75,021 crore,
- Eligible households receive subsidies for rooftop solar installations, while collateral-free loans facilitate adoption.
- It empowers households to adopt rooftop solar, lowering electricity bills, while World Bank financing supports scaling up residential solar adoption in India.

Pradhan Mantri-Kisan Urja Suraksha Evam Utthaan Mahabhiyan (PM-KUSUM)

- Launched in 2019, to expand the use of solar energy in agriculture.
- It supports the installation of
 - Decentralised solar power plants,
 - Standalone solar agriculture pumps, and
 - Solarisation of grid-connected agricultural pumps.
- **Aim & Mechanism** - To provides reliable daytime irrigation power, reduces diesel use, and enables farmers to generate and sell surplus solar electricity.
- **Capacity Target** - Seeks to add ~34,800 MW solar capacity by 2026-27 with Rs.34,422 crore Central support.
- **Significance** - In FY 2025-26, distributed solar solutions contributed **16.3 GW**, or **36%**, of the **44.61 GW** of solar capacity added during the year. Of this, **7.6 GW** came from PM-KUSUM and **8.7 GW** from rooftop solar.

Pradhan Mantri Surya Sarovar Yojana (PM-SSY)

- **Approval & Outlay** - July 2026; Rs.5,070 crore; implementation FY 2026-27 to FY 2030-31; applicable to all States/UTs.
- **Objective** - Support 5,000 MW Floating Solar PV (FSPV) projects with co-located Energy Storage Systems (ESS).
- **Features** - Minimum 2-hour storage (10,000 MWh) to manage peak demand; use of reservoirs/ponds reduces land pressure; improves grid reliability.
- **Assessment** - NISE estimates floating solar potential of ~102.18 GWp across reservoirs and inland water bodies.
- **Expected Outcomes:**
 - Cut ~10 million tonnes CO₂ annually.
 - Generate 16,000-17,000 full-time equivalent jobs.
 - Promote domestic manufacturing of floatation systems, PV cells/modules, and ESS

What is India's Leadership in Global Solar Cooperation?

- **International Solar Alliance (ISA)** - Co-founded by **India and France** at COP21 in Paris in 2015, the ISA has emerged as a key platform for global solar cooperation.
- It brings together countries including the Maldives, Greece, Germany, Italy, Bhutan, Luxembourg, and Argentina to accelerate solar deployment, share knowledge and technology.
- It has evolved into an important platform for cooperation among member countries.
- **One Sun One World One Grid (OSOWOG)** - Proposed by India in 2018, **OSOWOG** is a vision for an interconnected global renewable energy network.
- To advance this vision, India and the United Kingdom launched the *Green Grids Initiative-One Sun One World One Grid (GGI-OSOWOG) at COP26 in 2021.*
- The initiative is supported by Australia, France, the United States, and the International Solar Alliance.
- It promotes cross-border Renewable Energy trade through interconnected electricity grids, strengthening energy security and accelerating the clean energy transition.

- India has strengthened renewable energy cooperation across the Global South through the ISA and, during its G20 Presidency, built consensus on tripling global RE capacity by 2030.

What lies ahead?

- As India progresses towards its Panchamrit commitments and net-zero target by 2070, solar power will remain a key pillar.
- It will continue to drive the clean energy transition.

Reference

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