



State of India's Solar Capacity

For Prelims: Solar Photovoltaic (PV) systems, Rooftop Solar, Renewable energy, Decentralised Renewable Energy, International Renewable Energy Agency, IRENA, International Solar Alliance.

For Mains: India's achievements in renewable energy sector, India's renewables energy targets, challenges and initiatives taken to achieve it, India's Solar Capacity and Way Forward.

Why in News?

India added a **record 10 Gigawatt (GW) of solar energy** to its cumulative installed capacity in 2021.

- This has been the **highest 12-month capacity addition**, recording nearly a 200% year-on-year growth.
- India has now **surpassed 50 GW of cumulative installed solar capacity**, as on **28th February 2022**.
- Of the **50 GW installed solar capacity**, an overwhelming **42 GW comes from ground-mounted [Solar Photovoltaic \(PV\) systems](#)**, and only 6.48 GW comes from **[Roof Top Solar \(RTS\)](#)**; and 1.48 GW from off-grid solar PV.

What is the Significance of the Achievement?

- This is a milestone in **India's journey towards generating 500 GW from [renewable energy](#) by 2030**, of which 300 GW is expected to come from solar power.
- India's capacity **additions rank the country fifth in solar power deployment**, contributing nearly 6.5% to the global cumulative capacity of 709.68 GW.

Why is India falling short in Roof-top Solar Installations?

- **Fails to Exploit the Benefits of Decentralised Renewable Energy:**
 - The large-scale **solar PV focus fails to exploit the many benefits of [Decentralised Renewable Energy \(DRE\)](#) options**, including reduction in **Transmission and Distribution (T&D) losses**.
- **Limited Financing:**
 - One of the **primary benefits of solar PV technology** is that it can be installed at the point of consumption, significantly reducing the need for large capital-intensive transmission infrastructure.
 - This is not an **either/or situation**; India needs to deploy both large and smaller-scale solar PV, and particularly needs to expand RTS efforts.
 - However, there is **limited financing for residential consumers and [Small and Medium Enterprises \(SMEs\)](#)** who want to install RTS.
- **Lukewarm Responses from Electricity Distribution Companies (DISCOMS):**
 - Lukewarm responses from electricity **Distribution Companies (DISCOMS)** to supporting net metering, **RTS continues to see low uptake across the country**.

What are the Challenges to India's Solar Power Capacity Addition?

- Despite significant growth in the **installed solar capacity**, the contribution of solar energy to the country's power generation has **not grown at the same pace**.
- In 2019-20, for instance, **solar power contributed only 3.6%** (50 billion units) of India's total power generation of 1390 BU.
- The utility-scale **solar PV sector continues to face challenges** like land costs, high T&D losses and other inefficiencies, and grid integration challenges.
- There have also been **conflicts with local communities and biodiversity protection norms**. Also, while India has **achieved record low tariffs for solar power generation** in the utility-scale segment, this has not translated into cheaper power for end-consumers.
- The [International Renewable Energy Agency \(IRENA\)](#) estimates that the global value of recoverable materials from solar PV waste could exceed USD15 billion.
- Currently, **only the European Union has taken decisive steps in managing solar PV waste**.
- India could look at developing appropriate guidelines around [Extended Producer Responsibility \(EPR\)](#), which means holding manufacturers accountable for the entire life cycle of solar PV products and creating standards for waste recycling.
 - This could give **domestic manufacturers a competitive edge** and go a long way in addressing waste management and supply side constraints.

What is the state of India's Domestic Solar Module Manufacturing Capacity?

- Domestic manufacturing capacities in the solar sector do not match up to the present potential demand for solar power in the country.
 - India had **3 GW capacity for solar cell production and 8 GW for solar panel production capacity**. Moreover, **backward integration in the solar value chain is absent** as India has no capacity for manufacturing solar wafers and polysilicon.
 - In 2021-22, India **imported nearly USD 76.62 billion worth of solar cells and modules from China alone**, accounting for **78.6% of India's total imports that year**.
 - **Low manufacturing capacities, coupled with cheaper imports from China** have rendered Indian products uncompetitive in the domestic market.
- This situation can, however, be corrected if **India embraces a [circular economy](#) model for solar systems**.
 - This would **allow solar PV waste to be recycled and reused in the solar PV supply chain**. By the end of 2030, **India will likely produce nearly 34,600 metric tonnes of solar PV waste**.

Way Forward

- Governments, utilities, and banks will **need to explore innovative financial mechanisms** that bring down the cost of loans and reduce the risk of investment for lenders.
- **Increased awareness, and affordable finance for RTS projects** could potentially ensure the spread of RTS across the scores of SMEs and homes around the country.
- Aggregating roof spaces could also **help reduce overall costs of RTS installations** and enable developing economies of scale.
- In addition to an impressive domestic track record, through the [International Solar Alliance \(ISA\)](#) established by India and France at [Conference of the Parties \(COP-21\)](#) in 2015, there is a global platform to bring countries together to facilitate collaboration on issues such as mobilising investments, capacity building, program support and advocacy and analytics on solar energy.
- **Technology sharing and finance** could also become important aspects of ISA in the future, allowing for meaningful cooperation between countries in the solar energy sector.

PYQ

With reference to the Indian Renewable Energy Development Agency Limited (IREDA), which of the following statements is/are correct? (2015)

1. It is a Public Limited Government Company.

2. It is a Non-Banking Financial Company.

Select the correct answer using the code given below:

(a) 1 only

(b) 2 only

(c) Both 1 and 2

(d) Neither 1 nor 2

Ans: (c)

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