



## ROOF TOP SOLAR SYSTEM – ENVIRONMENT AND GS III MAINS

Q. Examine the potential of solar energy in India. Highlight the government's initiatives in the field of solar energy. (10 marks, 150 words)

**News:** *How well is India tapping its rooftop solar potential? | Explained*

### What's in the news?

- Rooftop solar (RTS) has the potential to revolutionise India's energy landscape, offering a sustainable, decentralised, and affordable solution to meet the country's growing electricity needs and making consumers self-reliant.

### Key takeaways:

- The country's installed **RTS capacity increased by 2.99 GW in 2023-2024**, the highest growth reported in a year.
- As of March-31 this year, the total installed RTS capacity in India was 11.87 GW, per the Ministry of New and Renewable Energy.
- To meet rising energy demand, India needs to double down on its efforts to expand its RTS potential.

### Rooftop Solar Potential and Growth Capacity:

#### Growth in Capacity:

- In 2023-2024, India's Rooftop Solar capacity increased by 2.99 GW, reaching a total of 11.87 GW as of March 31, 2024.

### Potential and Targets:

#### Overall Potential:

- India's RTS potential is approximately **796 GW**.

### Future Goals:

- To meet the 500 GW renewable energy target by 2030, with 280 GW from solar, **RTS needs to contribute 100 GW by 2030**.

### Rooftop Solar (RTS):

- Rooftop solar refers to photovoltaic (PV) systems with electricity-generating solar panels installed on the rooftops of residential or commercial buildings.
- Rooftop-mounted systems are smaller compared to ground-mounted photovoltaic power stations.

### Advantages of Rooftop Solar System;

#### 1. Electricity Bills:

- Use of the RTS system reduces electricity bills and expenses.



## 2. Optimum Use of Land:

- RTS system uses vacant roof space, thereby reducing additional requirements of land.

## 3. Energy and Ecological Security:

- Reduction in carbon emission leads to energy and ecological security.
- It also enhances tail -end grid voltages and alleviates system congestion.

## 4. Decrease in T&D Losses:

- This system reduces transmission and distribution losses as power consumption and generation are co – located.

## 5. Low Gestation Period:

- The installation and commissioning requires less time.

## 6. Better Management of Daytime Peak Loads:

- RTS system helps DISCOM/utility in managing daytime peak loads.

## Ways to Ensure Rooftop Solar Growth:

### 1. Awareness Campaigns:

- Distribution companies and local bodies should lead grassroots-level campaigns, with door-to-door promotion for comprehensive coverage.

### 2. Economic Viability:

- Enhance low-cost financing options for households, making RTS loans easily accessible.

### 3. Research and Development:

- Invest in solar technology, energy storage solutions, and smart-grid infrastructure to reduce costs and improve reliability.

### 4. Training and Skill Development:

- Accelerate training programs like ‘Suryamitra’ to build a skilled workforce for RTS infrastructure.

### 5. Policy and Regulation:

- Update RTS policies, net-metering regulations, grid-integration standards, and building codes to support the ‘Muft Bijli Yojana’ and address emerging challenges.

## Go back to basics:

### Rooftop Solar Programme Overview:

#### Jawaharlal Nehru National Solar Mission:

- The programme was launched in 2010.
- It marked the initial significant effort to foster solar energy growth.



## Primary Objective:

- Aimed to generate 20 GW of solar energy, including RTS, across three phases:
  - Phase 1: 2010-2013
  - Phase 2: 2013-2017
  - Phase 3: 2017-2022

## Extension of Targets:

- As of December 2022, India had an installed RTS capacity of 7.5 GW, with the 40 GW target extended to 2026.

## Reasons for Improvement:

- Favorable initiatives (SUPRABHA, SRISTI schemes).
- Financial incentives.
- Technological advancements.
- Awareness campaigns and training programs.

## PM Suryodaya Yojana:

- **Installation of System:** Households that have a monthly electricity consumption of less than **300 units a month** will be able to install a mid-sized system with the government bearing the expense.
- **Rise in Subsidy:** The subsidy will increase to 60% from 40% and the rest will be financed by a private developer who is affiliated to a public sector enterprise connected to the Power Ministry, earlier the remainder having to be borne by the consumers.
- **Mechanism of Net-Metering:** The surplus electricity produced by households can be sold back to the grid to make good the loan, though the actual way of implementation can be complex.
- **Target:** Installing rooftop solar on 1 crore houses.

## Aim:

- To expand India's rooftop solar installed capacity in the residential sector by providing Central Financial Assistance - the financial assistance to the eligible projects as per **MNRE Guidelines and incentives to DISCOMs (distribution companies)**.

## Goal:

- To increase rooftop solar installed capacity to **40 GW by March 2026** and it is currently in its second phase.
  - Owing to the scheme, the country's rooftop solar has increased from 1.8 GW as of March 2019 to 10.4 GW as of November 2023.



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## Capacity Addition:

- An average system size of 2 kW per household will lead to an additional RTS capacity of 20 GW.

## Features:

- A consumer can avail of benefits of the scheme through DISCOM tendered projects or through the **National Portal (www.solarrooftop.gov.in)**.
- **The consumer has the choice to select any vendor** and choose the brand and quality/efficiency of solar equipment on the national portal.
- The **DISCOMs role is limited** to issuing of technical feasibility approval, installation of net-meter and inspecting the system.
- After installation and inspection of the system, the subsidy is sent directly to the bank account of the consumer.
- The surplus solar power units generated from the rooftop solar plant can be **exported to the grid** as per the metering provisions issued by respective SERCs (State Electricity Regulatory Commissions)/JERCs (Joint Electricity Regulatory Commission).
- The consumer can **receive monetary benefits** for the surplus exported power as per the prevailing regulations.

## Go back to basics:

### States with Top Solar Capacity:

1. Rajasthan
2. Gujarat
3. Maharashtra

### States with Top Rooftop Capacity:

1. Gujarat
2. Maharashtra
3. Karnataka