



India's First 24x7 Solar-Powered Village

For Prelims: India's first solar-powered village, Ground Mounted Solar power plant, Rooftop solar systems, Battery Energy storage systems (BESS)

For Mains: India's achievements in the renewable energy sector and India's Solar Power Capacity

Why in News?

Recently, the Prime Minister declared **Modhera**, a village in the Mehsana district of Gujarat as India's first **solar-powered village**.

What are the Key Highlights of India's First Solar Powered Village?

- **About Modhera Village:** Modhera is famous for its **Sun temple**, a protected ancient site, which is situated on the river Pushpavati. It was built by **King Bhima-I of the Chalukya dynasty in 1026-27**.
 - The temple will acquire a 3-D projection facility which will inform tourists about the history of Modhera.
- **Solar Power Generation:** The solar power village would be self-sufficient in solar energy generation, as it will utilise 1000 solar panels that have been installed on the village houses, **generating electricity round the clock for the villagers**.
 - It is developed through **Ground Mounted Solar power plant** and more than 1300 **Rooftop solar systems** on residential and Government buildings, all integrated with **Battery Energy storage systems (BESS)**.
 - A BESS is a type of energy storage system that uses batteries to store and distribute energy in the form of electricity.
- **Benefits:**
 - The project will demonstrate how India's renewable energy prowess can **empower people at the grassroots**.
 - The people in the village wouldn't pay for electricity, rather they could **start selling it and earn from energy produced by the solar panel** by selling it to the government grid.
 - It will generate employment at the village level, and ultimately improve the standard of living.
 - It will enhance the **sustainable implementation of various welfare projects** in the area.
 - Residents of the area will be able to **save 60-100% of their electricity bills**.
 - It will **reduce the drudgery among rural women and girls** engaged in the collection of fuel wood from long distances and cooking in smoky kitchens.
 - It will also result in **minimization of the risks of contracting lung and eye ailments**.

What is the Status of Solar Energy in India?

- **About:** The installed [solar energy](#) capacity has increased by 19.3 times in the last 8 years and stands at 56.6 GW.
 - Further, India has set an **ambitious target to achieve a capacity of 175 GW worth of [renewable energy](#) by the end of 2022**, which expands to 500 GW by 2030. This is the world's largest expansion plan for renewable energy.
 - India was the **second-largest market in Asia for new solar PV capacity** and third globally. It ranked fourth for total installations (60.4 GW), overtaking Germany (59.2 GW) for the first time.
 - As of June 2022, **Rajasthan and Gujarat were the top states** for large-scale solar, accounting for 53% and 14% of installations, respectively, **followed by Maharashtra with 9%**.
- **Related Initiatives:**
 - **Solar Park Scheme:** The [Solar Park Scheme](#) plans to build a number of solar parks, each with a capacity of nearly 500 MW, across several states.
 - **Rooftop Solar Scheme:** The [Rooftop Solar Scheme](#) aims to harness solar power by installing **solar panels** on the roof of houses.
 - **Atal Jyoti Yojana (AJAY):** The AJAY scheme was launched in September 2016 for the installation of **solar street lighting** (SSL) systems in states with less than 50% of households covered with **grid power** (as per [Census 2011](#)).
 - **National Solar Mission:** It is a major initiative of the Government of India and State Governments to promote ecologically sustainable growth while addressing India's energy security challenge.
 - **SRISTI Scheme: Sustainable rooftop implementation of Solar transfiguration of India** (SRISTI) scheme to promote rooftop solar power projects in India.

What are the Challenges Related to Solar Energy in India?

- **Heavy Dependence on Imports:** India doesn't have enough module and PV cell manufacturing capacity.
 - The current solar module manufacturing capacity is **limited to 15 GW per year, whereas the domestic production is around 3.5 GW only**.
 - Further, out of the 15 GW of module manufacturing capacity, **only 3-4 GW of modules are technologically competitive** and worthy of deployment in grid-based projects.
- **Raw Material Supply:** The silicon wafer, the most expensive raw material, is not manufactured in India.
 - It currently imports 100% **silicon wafers** and around 80% cells.
 - Further, other key raw materials, such as **silver and aluminium metal pastes for making electrical contacts, are also almost 100% imported**.
- **Inefficiencies in Solar PV cells:** The utility-scale **solar PV sector continues to face challenges** like land costs, high T&D losses and other inefficiencies, and grid integration challenges.
- **Issues related to Biodiversity:** There have also been **conflicts with local communities and biodiversity protection norms**.
- **Pricing issue:** 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.

Way Forward

- India is making significant progress in the development of solar PV modules, but for it to become a manufacturing hub, it will require more policy interventions like developing home-grown technologies which could, in the short-term, work with the industry to provide them with trained human resource, process learnings, root-cause analysis through right testing and, in the long term, develop India's own technologies.

UPSC Civil Services Examination Previous Year Question (PYQ)

Prelims

Q. Consider the following statements: (2016)

1. The International Solar Alliance was launched at the United Nations Climate Change Conference in 2015.
2. The Alliance includes all the member countries of the United Nations.

Which of the statements given above is/are correct?

- (a) 1 only
(b) 2 only
(c) Both 1 and 2
(d) Neither 1 nor 2

Ans: (a)

Exp:

- India and France launched the International Solar Alliance (ISA) to boost solar energy in developing countries. It was launched at the United Nations Climate Change Conference in Paris in November 2015 by the Indian Prime Minister and French President. Its secretariat is located in Gurugram, India. **Hence, statement 1 is correct.**
- At initial stage ISA was opened to membership of countries lying fully or partly between the Tropics of Cancer and Capricorn (torrid zone).
- In 2018, the membership of ISA was opened for all the UN members. However, all the member countries of the UN are not its members. **Hence, statement 2 is not correct.**
- Currently, 80 countries have signed and ratified the ISA Framework Agreement while 98 countries have signed the ISA Framework Agreement. **Therefore, option (a) is the correct answer.**

Mains

Q. India has immense potential of solar energy though there are regional variations in its developments. Elaborate (2020)

Source: ET

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