



Solar Energy and India's Net-Zero Target

This article is based on [“Solar energy can help India achieve net zero ”](#) which was published in Hindustan Times on 07/11/2022. It discusses how solar energy can help India achieve its Net-Zero target.

For Prelims: Clean Energy, Solar waste, International Solar Alliance National Solar Mission, PM-KUSUM, One Sun One World One Grid (OSOWOG), Atmanirbhar Bharat, Net-Zero Emission Target.

For Mains: Solar Energy and Development in India, Challenges Related to Solar Energy, Government Schemes to Enhance Solar Energy Production in India.

The world is on the cusp of a [Solar Revolution](#). Not only is solar the world's **most abundant and clean energy source**, with its widespread acceptance, it has become the common energy imperative to drive [international climate action](#).

Many countries are in line to solar acceptance, with India leading the way, **giving it the scale and affordability that global climate action asks for**. Solar energy is playing a key role not **only in the developing world to tackle energy access and energy security**, but also in developed countries to **facilitate [energy transition](#)**.

Despite technological superiority over other energy technologies, solar energy is facing an important challenge as the **global photovoltaic (PV) manufacturing supply chain is concentrated in a handful of countries**, which resulted in **recent price surges** because of the choking of **existing limited supply chains**.

How can Solar Energy Facilitate Development in India?

- **Job Generation:** The Solar Sector has immense potential to create new jobs, **1 GW of Solar manufacturing facility generates approximately 4000 direct and indirect jobs**.
 - In addition solar deployment, operation and maintenance can create additional recurring jobs in the sector.
- **Environmental Development:** India's energy demands are largely fulfilled by [non-renewable sources of energy](#).
 - The **scarcity of these fossil resources** stresses the need for renewable energy sources. Abundance of solar energy can fulfil India's [clean energy demands](#).
- **Energy Security:** India being a **developing economy** needs proper electricity for industrial growth and agriculture.
 - For achieving **self-sufficiency and minimal cost in power generation**, assured regular supply, solar energy can play a vital role.
- **Social development:** The problem of power cuts and unavailability of electricity, especially in rural areas, leads to **improper human development**.

- The use of **solar energy can enable [social development](#)** in even the most remote areas of India.

What are the Challenges Related to Solar Energy in India?

- **High Dependency on Imports:** India still is largely dependent on foreign countries like China for **solar modules**.
 - **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**.
- **Land Scarcity:** Solar projects that are **ground-mounted require** a vast area for installation. **Per capita land availability in India is very low**, and land is a scarce resource.
 - Installing solar cells near substations may have to compete with other land-based necessities for a small area of land.
- **Losses in Cost and T&D (Transmission and Distribution):** Solar energy is also having problems with **cost competitiveness** and competing against other energy generation technologies.
 - The cost of **T&D losses is approximately 40%**, making generation through solar energy sources highly **unfeasible**.
- **No Solar Waste Management Policy:** Despite ambitious solar installation targets, India does not have a policy for managing its **solar waste**. Solar waste consists of discarded solar panels. It is predicted to grow by **4 to 5 times** within the next ten years.
- **Acceptability Concern:** Despite the fact that solar energy production techniques have been improvised in India, **it has not yet been commercialised**.
 - Topographically and climatically, **sun rays are not uniformly available at any particular place throughout the year**, and people (particularly farmers), have not yet been educated about its advantages and benefits.
- **Low Cost to Benefit Ratio:** 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.

What are the Related Government Schemes to Enhance Solar Energy Production in India?

- [International Solar Alliance](#)
- [National Solar Mission](#)
- [Kisan Urja Suraksha evam Utthaan Mahabhiyan \(PM-KUSUM\)](#)
- [One Sun, One World, One Grid \(OSOWOG\)](#)

What Should be the Way Forward?

- **Solar Self Reliance:** India needs to **cultivate a strong domestic solar energy market supporting the vision of [Atmanirbhar Bharat](#)**.
 - The best way to support the development of solar PV manufacturing projects is direct support to **upstream actors**, for instance through **Design and Production Linked Incentives**.
- **Bio Solar Cells:** India can also explore the use of **bio solar cells** by generating electricity from **microbial photosynthetic and respiration processes**.
- **Towards Global Solar Manufacturing Hub:** Given its **geographical location and abundance of resources**, India is nicely positioned to become a global hub of solar manufacturing.
 - **India's solar story** will continue to provide important lessons for other developing countries that are looking to **transition to clean energy**.

- With 110 members and signatory countries, the India led **International Solar Alliance is making efforts to bring about this change.**
 - **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.
- **Catalysing Net Zero Target: Solar Mini Grids and community rooftop solar installations** can enable the solar shift in India. **Localised Solar energy** is the one which could become the cornerstone of the [net-zero India that we are aiming to see in 2070.](#)
- **Reducing T&D Loss:** India can encourage **R&D activities to find more innovative solutions to cut down T&D loss** by establishing research centres and funding gives some relief to solar energy players.
 - In addition, India can collaborate with world-renowned universities for the upgradation of substations and T&D lines to **reduce T&D losses.**

Drishti Mains Question

“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”. Discuss.

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)

Mains

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