Revitalising India’s Solar Energy Capacity

This editorial is based on **“An energy conundrum: On India betting big on solar power”** which was published in The Hindu on 15/12/2022. It talks about India's solar energy capacity and associated challenges.

For Prelims: Solar energy, Energy Security, Thermal energy, International Solar Alliance National Solar Mission, Kisan Urja Suraksha evam Utthaan Mahabhiyan (PM-KUSUM) One Sun, One World, One Grid (OSOWOG), Solar waste, Extended Producer Responsibility, Conference of the Parties (COP-21).

For Mains: Need of Solar Energy, Challenges Related to the Solar Sector in India, Government Schemes to Enhance Solar Energy Production in India.

India’s need to increase energy provision for its population and fast growing economy poses a formidable challenge which is perceived as both a **great opportunity as well as a necessity for the country** to increase the **share of** renewables **in the overall energy mix.**

Solar energy is **driving India towards the adoption of** cleaner energy generation technologies. From less than **10 MW in 2010,** India has added significant solar capacity over the past decade, **achieving over 50 GW by 2022.**

Based on a commitment to address the global climate crisis, **India has promised to source nearly half its energy from non-fossil fuel sources by 2030** and, in the shorter term, source at least **60% of its renewable energy from solar power.**

In order to meet these targets, it is **essential to look towards self-sufficiency in solar energy production** as well as its **affordability and accessibility.**

What is the Need of Solar Energy?

- **Energy Security:** India 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.**
- **Economic Development:** India being a developing economy **needs proper electricity for industrial growth and** agriculture.
    - India also needs **self sufficiency and minimal cost in power generation,** assured regular supply, which will boost industries and economy.
- **Social Development:** The problem of power cuts and **unavailability of electricity especially in rural areas,** leads to improper human development.
    - Mostly energy demands are fulfilled by **subsidised kerosene**, leading to loss for exchequer.

- **Environment Concern:** India's large part of energy demand is fulfilled by thermal energy **largely dependent on fossil fuels.**
    - It also causes **environmental pollution.** Solar energy is a clean form of energy resource, which can be a **substitute.**

What are the 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 are the Challenges Related to the Solar Sector in India?

- **Insufficient Contribution to Power Sector:** 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.**
    - 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.**
- **High Import Dependence:** India's current solar module manufacturing capacity is limited to **~15 GW per year.** Also, India has **no manufacturing capacity for solar wafers and polysilicon ingots,** and currently **imports 100% of silicon wafers and around 80% of cells even at the current deployment levels.**
    - **Risk of Weaponization of Supply Chain:** Silicon wafer especially, the most expensive raw material, is not manufactured in India. Since **>90% of the world's** solar wafer manufacturing currently happens in China, the current geopolitical tensions between India and China could lead to the weaponization of the supply chain in future.
- **Space Scarcity: Ground-mounted solar projects** require a lot of space to install, and **land availability is low in India.**
    - For a small piece of land, solar cells near substations may have to compete with other land-based necessities, resulting in **conflict with local communities.**
- **Solar Waste:** India's solar waste has been predicted to grow by **1.8 million tonnes by 2050.** Currently, India's **e-waste rules are not mandatory on solar cell manufacturers** which leads to a **large generation of** solar waste **every year.**
- **Losses in Cost and T&D (Transmission and Distribution):** Solar energy is also having problems with **cost competitiveness** and competing with other sources of energy.
    - The **cost of T&D losses** is approximately **40%,** making generation through solar energy sources highly **unfeasible.**

What Should be the Way Forward?

- **Extended Producer Responsibility (EPR) in Solar Sector:** India could look at developing appropriate guidelines around Extended Producer Responsibility **(EPR),** which means holding **manufacturers accountable for the entire life cycle of solar 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.**
- **Self-reliance in Solar Energy:** As part of **Atmanirbhar Bharat's** vision, **India must cultivate a strong domestic solar energy market.** The best way to **promote solar PV manufacturing is to directly support upstream startups,** such as through **incentives for Design and Production.**
    - India can also explore the use of **bio solar cells by generating electricity from**

microbial photosynthetic and respiration processes.

- **Localised Solar Power Generation: Mini-grids and community rooftop solar installations** can facilitate the solar shift in India, while **localised solar energy production and utilisation, implemented by panchayats and municipalities** can be the cornerstone of the **net-zero India we envision by 2070.**
- **Solar Diplomacy:** International Solar Alliance (ISA) established by India and France at **Conference of the Parties (COP-21) in 2015**, can be a platform to bring countries **together to facilitate collaboration on issues such as mobilising investments,** capacity building, **diversification of supply chain** and **advocacy of solar energy for global good.**

Drishti Mains Question

Examine the challenges associated with solar energy production in India and how the International Solar Alliance can contribute to global energy security.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q. 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)

Mains

Q. “Access to affordable, reliable, sustainable and modern energy is the sine qua non to achieve Sustainable Development Goals (SDGs)”.Comment on the progress made in India in this regard. **(2018)**