Photovoltaic Waste Management

Why in news?

The solar photovoltaic waste has been increasing in recent times and there are policy gaps in addressing it.

What is solar photovoltaic?

- Photovoltaics (often shortened as PV) gets its name from the process of converting light to electricity which is called the *photovoltaic effect*.
- A single PV device is known as a cell.
- These PV cells such as semiconductor materials *such as silicon, and selenium.*
- When the light falls, the selenium compound releases electrons that are sufficient to maintain the flow of current through the external circuit.

What is photovoltaic waste?

- The solar photovoltaic contain elements such as silver, tin, lead, glass sheet, aluminum frame, copper wires, panel encapsulant and silicon wafers.
- Leaching of toxic metals (such as lead and cadmium) into the soil contaminates the local water.
- Gradual incineration of the panel encapsulant releases sulphur dioxide, hydrogen fluoride and hydrogen cyanide into the atmosphere.
- According to International Renewable Energy Agency (IRENA) India could generate 50,000-3,25,000tons of cumulative photovoltaic waste by 2030 and more than 4 million tons by 2050.
- India is expected to become one of the top five leading photovoltaic waste producers globally by 2045-2050.

R.K. Singh committee had been constituted to propose an action plan to evolve a "circular economy" in solar panel through reuse/recycling of waste generated.

What measures were taken for the reduction of PV waste?

- **Revised electronic waste (e-waste) management Rules in 2022**-Brought solar photovoltaic cells, panels, and modules under its ambit.
- **Green Credit Programme**-Aims to promote green growth and sustainable practices addressing solar photovoltaic wastes.

What are the challenges?

- **Lack of commercial recovery units**–Lack of commercial raw material recovery facility for solar e-waste operations in India.
- **Informal units**-Growing informal units in handling photovoltaic waste
- **Landfills** -The 80% of photovoltaic waste are landed in landfills
- **Lack of policy**-No policy in the collection, storage, recycling, and repurposing of photovoltaic waste.
- The solar wastes are included in the e-waste but there is no separate policy for it.
- **Lack of markets**-The market to repurpose or reuse recycled photovoltaic waste is less in India.
- **Lack of institutions**–A body to measure, monitor, and report solar photovoltaic waste is absent.

India's status

- ***Solar PV*** is the ***second largest*** absolute generation growth of all renewable technologies in 2021 after wind.
- India stands ***fourth in solar photovoltaic deployment***.
- India is the world's ***third largest producer of renewable energy.***

India's targets

- **National Solar Mission (NSM)** - To install 100 GW grid-connected solar power plants by the year 2022.
- At **COP-21** in Paris in 2015 India committed to a 40% share of power generation from non-fossil fuel sources.
- The country's vision is to achieve *Net Zero Emissions by 2070.*
- Increasing renewables capacity to 500 GW by 2030.
- Reducing cumulative emissions by one billion tonnes by 2030.
- Reducing emissions intensity of India's gross domestic product (GDP) by 45% by 2030.

References

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