India lags in Biomass Co-firing Targets

For Prelims: Biomass and its Benefits, Decarbonization, Green House Gas.

For Mains: Biomass Co-Firing, Significance and Challenges.

Why in News?

The Ministry of Power is considering cutting coal supply to plants, which do not comply with biomass cofiring Norms.

- The Power Ministry in October 2021 had decreed that all thermal power plants ensure 5% compliance by October 2022.
- In 2020-21, only eight power plants **had co-fired biomass pellets,** and this number had risen to 39 recently.

What is Biomass Co-firing?

- **About:**
  - Biomass co-firing is the practice of substituting a part of the fuel with biomass at **coal thermal plants.**
    - Coal and biomass are combusted together in boilers that have been designed to burn coal. For this purpose, the existing coal power plant has to be partly reconstructed and retrofitted.
    - Co-firing is an option to convert biomass to electricity, in an efficient and clean way, and to reduce **GHG (Green house Gases) emissions** of the power plant.
  - Biomass co-firing is a globally accepted cost-effective method for **decarbonising** a coal fleets.
  - India is a country where biomass is usually burnt on the field which reflects apathy towards resolving the problem of clean coal using a very simple solution that is readily available.
- **Significance:**
  - Biomass co-firing is an effective way to curb emissions from open burning of crop residue, it also decarbonised the process of electricity generation using coal.
    - Substituting 5-7 % of coal with biomass in coal-based power plants can save 38 million tonnes of carbon dioxide emissions.
  - It can help cut emissions from combustion of fossil fuels, **address** India's burgeoning problem of **farm stubble burning** to some extent, reduce waste burden while also creating jobs in rural areas.
  - India has large biomass availability as well as rapid growth in coal-fired capacity.
- **Challenges:**
  - The existing infrastructure is not robust enough to substitute **5-7% of coal with biomass in coal-based power plants, which indeed** can save 38 million Tonnes of carbon dioxide emissions.
  - **Around 95,000-96,000 tonnes** of biomass pellets are required per day for co-firing, but India's pellet manufacturing capacity is 7,000 tonnes per day at present despite a surplus

228 million tonnes of agricultural residue available in the country.
        - This huge gap is due to the seasonal availability and unreliable supply of biomass pellets to the utility.
    - It is challenging to store biomass pellets for long durations at the plant sites since they absorb moisture from air quickly, rendering them useless for co-firing.
    - Only pellets with **up to 14% of moisture can be used for combustion** along with coal.

What is Biomass?

- **About:**
    - Biomass is plant or animal material used as fuel to produce electricity or heat. Examples are wood, energy crops and waste from forests, yards, or farms.
    - Biomass has always been an important energy source for the country considering the benefits it offers.
- **Benefits:**
    - It is renewable, widely available, carbon-neutral and has the potential to provide significant employment in the rural areas.
    - It is also capable of providing firm energy. About 32% of the total primary energy use in the country is still derived from biomass and more than 70% of the country's population depends upon it for its energy needs.
- **Biomass Power & Cogeneration Programme:**
    - **About:**
        - Initiated by the Ministry of New and Renewable Energy.
        - For efficient utilization of biomass, bagasse-based cogeneration in sugar mills and biomass power generation have been taken up under the programme.
        - Biomass materials used for power generation include Rice husk, straw, cotton stalk, coconut shells, soya husk, de-oiled cakes, coffee waste, jute wastes, groundnut shells, saw dust etc.
    - **Objective:**
        - Promoting technologies for optimum use of the country's biomass resources for grid power generation.

What are the other Related Initiatives?

- **National Mission on use of Biomass in Coal Based Thermal Power Plants**
- **Carbon Capture and Storage**
- Coal Beneficiation

Way Forward

- Platforms need to be established to ensure farmers have an intrinsic role in this business model of pellet manufacturing and co-firing in power plants.
- To exploit co-firing potential without adverse environmental impact, emerging economies need technology and policy preparation.
- Sustainability indicators for bioenergy, including protection of soil and water resources, biodiversity, land allocation and tenure, and food prices, need to be integrated into policy measures.

UPSC Civil Services Examination Previous Year Question (PYQ)

Q. Consider the following: (2019)

1. Carbon monoxide
2. Methane

3. Ozone
4. Sulphur dioxide

Which of the above are released into atmosphere due to the burning of crop/biomass residue?

(a) 1 and 2 only
(b) 2, 3 and 4 only
(c) 1 and 4 only
(d) 1, 2, 3 and 4

Ans: (d)

Exp:

- Biomass is organic material that comes from plants and animals, and it is a renewable source of energy. Biomass contains stored energy from the Sun. Plants absorb the Sun's energy in a process called photosynthesis. When biomass is burned, the chemical energy in biomass is released as heat.
- Crop residue and biomass burning (forest fires) is considered as a major source of Carbon Dioxide (CO_2), Carbon Monoxide (CO), Methane (CH_4), volatile organic compounds (VOC), and Nitrogen Oxides (NOX). Burning of rice crop residue releases Suspended Particulate Matter, SO_2, NO_2 and O_3 in the atmosphere.
- **Therefore, option (d) is the correct answer.**

Source: TH