Biomass Co-Firing In Thermal Power Plants

For Prelims: Crop Residue Management (CRM), Biomass Co-Firing, National Capital Region (NCR), Commission for Air Quality Management (CAQM), Thermal Power Plants (TPP), Stubble Burning.

For Mains: Impact and relevance of Biomass Co-Firing on conservation of environment and nature.

Source: DTE

Why in News?

In recent years, the government has tried to tackle the issue of **stubble burning** by bringing the focus on ex-situ mechanisms of handling biomass or crop residue management (CRM) **such as** biomass co-firing **and production of** bio-CNG.

- The Centre for Science and Environment (CSE) conducted a survey-based study in 2022 to understand the on-ground progress of the policy implementation on co-firing biomass in **coal-fired thermal power plants in the National Capital Region (NCR).**

What Are the Highlights of the Survey Conducted by CSE ?

- **Limited Biomass Co-Firing Progress:**
  - The study found that, as of the end of 2022, co-firing was sporadic, with most plants only conducting trial runs. Unfortunately, **the situation has not significantly improved since then. Only three plants reported increased biomass co-firing** from December 2022 to August 2023.
- **Reasons for Delay in Biomass Co-Firing Implementation:**
  - CSE **investigated the reasons behind the delay in implementing the mandated 5% co-firing by coal thermal power plants (TPP) in the NCR and adjoining areas.**
    - The **Harduaganj Thermal Power Plant** attributed its success in co-firing biomass to a consistent and affordable biomass supply. However, they **acknowledge that the supply chain needs further strengthening.**
    - In contrast, **Haryana Power Generation Corporation Limited (HPGCL)** faced challenges due to **technical limitations and a shortage of torrefied biomass pellet manufacturers.**
    - **Mahatma Gandhi Thermal Power Plant** faced technical limitations of only being able to co-fire up to 1.5% biomass pellets instead of 5% as mandated and would **need significant investments to increase biomass co-firing to the mandated level, impacting electricity tariffs.**
    - **Talwandi Saboo TPP struggled to find vendors** for its plant due to the absence of established technology for manufacturing torrefied biomass pellets.
- **Efforts to Overcome Supply Challenges:**
  - Several plants, like Indira Gandhi TPP, have initiated measures to address the supply challenge **by issuing tenders for raw materials to set up in-house pellet manufacturing units and** also explored **partnerships and in-house manufacturing**

for biomass pellets.

- **Challenges in Implementing Biomass Co-Firing for Farm Fire Reduction:**
  - Despite government directives and efforts to enhance pellet manufacturing capacity, the study suggests tha**t biomass co-firing may not significantly reduce farm fires.**
  - **Timely planning and a coordinated approach, from tendering by coal TPPs to crop residue procurement by pellet manufacturers,** are essential to effectively address stubble burning, which is time-sensitive.

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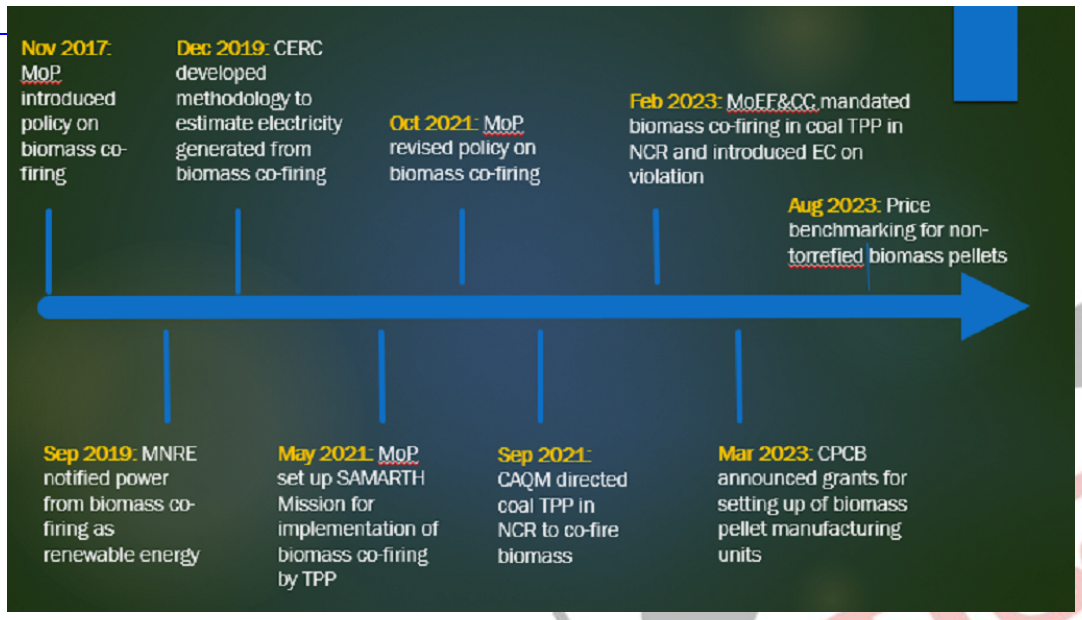

What is Biomass Co-firing?

- **About:**
  - Biomass co-firing is the practice of substituting a part of the fuel with biomass at **coal thermal plants.**
  - Biomass co-firing stands for adding biomass as a partial substitute fuel in high efficiency coal boilers.
    - 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 (Greenhouse Gases) emissions** of the power plant.
  - Biomass co-firing is a globally accepted cost-effective method for **decarbonising** a coal fleet.
    - 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.
    - Co-firing **5 to 7% biomass pellets** in thermal power plants can prevent 38 million tonnes of carbon dioxide every year, as per the Finance Minister in the budget speech in 2022.
- **Agro Residues for Biomass Pellet Production:**
  - The Ministry of Power has identified various surplus agro residues that can be utilized for biomass pellet production. These include:
    - **Crop Residues:**
      - Agro-residues from crops such as Paddy, Soya, Arhar, Gwar, Cotton, Gram, Jawar, Bajra, Moong, Mustard, Sesame, Til, Maize, Sunflower, Jute, Coffee, etc.
    - **Shell Waste:**
      - Waste products like Groundnut Shell, Coconut Shell, Castor Seed Shell, etc.
- **Additional Biomass Sources:**
  - Bamboo and its by-products, horticulture waste, and other biomass materials like Pine

Cone/Needle, Elephant Grass, Sarkanda, etc.

What are the Government Interventions Related to Biomass Co-firing?

- **Financial Assistance:**
  - The MNRE and **Central Pollution Control Board (CPCB)** have introduced Finance Assistance Schemes to support biomass pellet manufacturing units.
  - The **Reserve Bank of India (RBI)** has approved 'Biomass pellet manufacturing' as an eligible activity under **Priority Sector Lending (PSL),** fostering financial viability for such endeavors.
- **Procurement and Supply Chain:**
  - A dedicated Procurement Provision of Biomass Category has been established on the **Government e-Marketplace (GeM)** portal.
  - Ministry of Power has **introduced a Revised Model Long-Term Contract for Biomass Supply**, ensuring a consistent supply chain.
  - The provision of **Udyam Aadhaar on the National Single Window System** streamlines administrative processes for biomass-related projects.
    - The Udyam Aadhaar registration process is based on the concept of self-declaration, **enabling MSMEs to register themselves for free and obtain the Udyam Aadhaar number.**

Way Forward

- **Ensuring a Steady Supply of Biomass to Power Plants:**
  - Steady supply of biomass to power plants can be ensured by developing a reliable supply chain that can transport biomass from source to plant.
    - This could involve **partnering with farmers, forestry companies, or other biomass suppliers** to secure a steady supply of biomass.
- **Building Infrastructure and Logistics:**
  - Developing the necessary infrastructure and logistics to transport, store, and process biomass is critical to the success of biomass co-firing.
    - This could **involve building new storage facilities, upgrading transportation networks**, or investing in new processing technologies.
- **Robust Regulatory Framework:**
  - The Biomass Co-firing Policy needs to be backed by a **strong policy and regulatory framework** that provides incentives and support for biomass co-firing.
    - It also includes developing **specialized boilers, burners, and control systems that can handle the unique characteristics of biomass**, as well as retrofitting existing equipment to accommodate biomass co-firing.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Q. Consider the following: (2019)

1. Carbon monoxide
2. Methane
3. Ozone
4. Sulphur dioxide

Which of the above are released into the 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)

Q. With reference to the usefulness of the by-products of sugar industry, which of the following statements is/are correct? (2013)

1. Bagasse can be used as biomass fuel for the generation of energy.
2. Molasses can be used as one of the feedstocks for the production of synthetic chemical fertilizers.
3. Molasses can be used for the production of ethanol.

Select the correct answer using the codes given below:

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

Ans: (c)