



Biomass Co-Firing

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

For Mains: Biomass Co-Firing, Significance and Challenges

Why in News?

Unavailability of Biomass Pellets of agricultural residues is slowing down the implementation of the Ministry of Powers' direction to [Co-Fire biomass with coal](#) in thermal power plants.

- The Union Ministry of Power, while presenting the [Union Budget in February 2022](#), mandated 5-10 % co-firing at every thermal power plant in the country.
- Biomass Pellets are a popular type of biomass fuel, generally made from **wood wastes, agricultural biomass, commercial grasses and forestry residues**.

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 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 \(Green house Gases\) 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.

▪ Significance:

- Biomass co-firing is an effective way to curb emissions from open burning of crop residue, it also decarbonises 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:

- Substituting 5-7% of coal with biomass in coal-based power plants can save 38 million tonnes of carbon dioxide emissions, but the existing **infrastructure is not robust enough** to turn this into reality.
- 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 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**.

[Source: DTE](#)

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