**BIOENERGY**

**Dr.Tanushree Goswami**

Department of Animal Reproduction Gynaecology and Obstetrics

College of Veterinary Sciences and Animal Husbandry, Selesih, Aizawl

Central Agricultural University (CAU), Imphal

Bioenergy is energy generated from biomass. Biomass is actually formed by recently living organisms, principally plants. Some commonly used biomass are wood, food crops like corns sugercaneetc., grassy and woody plants, residues from agriculture or forestry, oil-rich algae, and the organic component of municipal and industrial wastes.Bioenergy is a renewable form of energy as it’s source is inexhaustible, as plant obtain their energy from sun by means of photosynthesis which can be replenished.Use of bioenergy ranges from small stove used in home to large power generating plants. In world China (2022) is largest producer of Bioenergy.

Bioenergy technologies convert renewable biomass fuels into heat and electricity using processes similar to those used with fossil fuels. There are three ways to release the energy stored in biomass to produce bioenergy: burning, bacterial decay, and conversion to gas/liquid fuel.

**Burning**

Most electricity generated from biomass is produced by direct combustion. Biomass is burned in a boiler to produce high-pressure steam. This steam flows over a series of turbine blades, androtate them. The rotation of the turbine drives a generator, producing electricity.

**Bacterial decomposition:**

Organic waste material, from animal and human origin are collected in anaerobic condition and allow to fermentation. And from there biogas is produced, which can be used in cooking purpose. Fromsugercane or sweet sorghum,ethanol is generated which is used as biofuel in country like Germany.

**Liquid or gaseous fuel:**

Biomass can be converted to a gaseous or liquid fuel through gasification and pyrolysis. In gasification solid biomass is exposed to high temperature with very small amount of oxygen. A mixture of gas is produced which is mainly consists of carbon monoxide and hydrogen. This gas is used to produce electricity.

In pyrolysis biomass is exposed at a lower temperature and in anaerobic condition to produce a crude bio-oil. This bio-oil is then substituted for fuel oil or diesel in furnaces, turbines, and engines for electricity production.

**Indian scenario**

Recently, the Ministry of New and Renewable Energy organized a seminar on the National Bio Energy Programme in New Delhi in partnership with UNIDO and GEF as part of AzadiKaAmritMahotsav.

* **The Ministry of New and Renewable Energy** has notified the National Bioenergy Programme in November 2022.
* MNRE has continued the National Bioenergy Programme for the period from FY 2021-22 to 2025-26.

**Sub-schemes of National Bioenergy Program:**

* **Waste to Energy Programme**

From Urban, Industrial and Agricultural Wastes, Biogas, BioCNGwill be produced. The program will be implemented by **Indian Renewable Energy Development Agency (IREDA).**

**Biomass Programme**

It is a supportive scheme formanufacturing of Briquettes & Pellets and Promotion of Biomass (non-bagasse) based cogeneration in Industries to support setting up of pellets and briquettes for use in power generation and non-bagasse based power generation projects.

**Biogas Programme**

To support setting up of family and medium size Biogas in rural areas.

**Advantages of Bioenergy**

1. Setting up of biogas plants for clean cooking fuel, lighting, meeting thermal and small power needs of users which results in GHG reduction, improved sanitation, women empowerment and creation of rural employment.
2. It is carbon neutral: As a natural part of photosynthesis, biomass fuels only release the same amount of carbon into the atmosphere.
3. It reduces the use of fossil fuels.
4. Less expensive than fossil fuels.
5. Available throughout the year.

**Disadvantages of Bioenergy**

1. Biomass energy is not as efficient as fossil fuels: Some biofuels, like Ethanol, are relatively inefficient as compared to gasoline.
2. Requires more space for production.
3. Can lead to deforestation as one of the most used source is wood.
4. Construction cost for the biomass plant is not cheap.

References

1. <https://en.m.wikipedia.org/wiki/Bioenergy>
2. <https://www.energy.gov/eere/bioenergy/biopower-basics#:~:text=Biopower%20technologies%20convert%20renewable%20biomass,conversion%20to%20gas%2Fliquid%20fuel>.
3. <https://www.solarreviews.com/blog/biomass-energy-pros-and-cons>
4. <https://www.nextias.com/current-affairs/19-11-2022/national-bio-energy-programme#:~:text=MNRE%20has%20continued%20the%20National,858%20crores>.
5. <https://www.statista.com/statistics/476416/global-capacity-of-bioenergy-in-selected-countries/#:~:text=In%202022%2C%20China%20was%20the,bioenergy%20capacity%20of%2017.2%20gigawatts>.
6. <https://www.montclair.edu/clean-energy-sustainability-analytics/resources/clean-energy-information/bioenergy/#:~:text=Types%20of%20bioenergy%20include%20biogas,photosynthesis%20which%20can%20be%20replenished>.
7. <https://www.nrel.gov/research/re-biomass.html#:~:text=Wood%20is%20still%20the%20largest,of%20municipal%20and%20industrial%20wastes>.