

WHAT IS BIOMASS?

Biomass is fuel that is developed from organic materials, a renewable and sustainable source of energy used to create electricity or other forms of power.

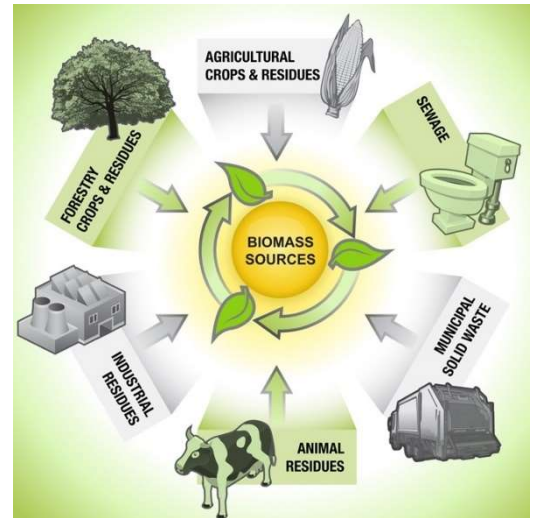
Some examples of materials that make up biomass fuels are:

- scrap lumber
- forest debris
- certain crops
- manure
- some types of waste residues

With a constant supply of waste from construction and demolition activities, wood not used in papermaking, municipal solid waste and so on, green energy production can continue indefinitely.

Biomass is a renewable source of fuel to produce energy because:

- waste residues will always exist (scrap wood, mill residuals, forest resources)
- properly managed forests will always have more trees
- humans produce large amounts of food crops and these produce residual biological matter



WHAT IS BIOMASS POWER?

Biomass power is carbon neutral electricity generated from renewable organic waste that would otherwise be dumped in landfill, burned, or left as fodder for forest fires.

Biomass can be converted to bioenergy using a range of technologies depending on the type of raw material, the scale (size) of the project, and the form of energy to be produced.

Conversion technologies include:

- Combustion (burning)
- Pyrolysis (thermal decomposition)
- Gasification (using heat, steam & oxygen to convert to hydrogen)
- Transesterification (chemical process that converts fats to biodiesel)
- Anaerobic digestion (uses microbes in an oxygen-empty tank to break down into biogas & biofertilizer)
- Fermentation (microorganisms convert biomass to ethanol and carbon dioxide)



When burned, the energy in biomass is released as heat. If you have a wood-fueled heater or fireplace, you already are participating in the use of biomass as the wood you burn in it is a biomass fuel. In biomass power plants, wood waste or other waste is burned to produce steam that runs a turbine to make electricity, or that provides heat to industries and homes.

New technologies including pollution controls and combustion engineering have advanced to the point that any emissions from burning biomass in industrial facilities are generally less than emissions produced when using fossil fuels (coal, natural gas, oil). Some conversion processes also produce byproducts that can be used in materials such as bitumen and concrete. Additional benefits include emissions reduction, waste disposal, providing support for rural economies, and improving air quality.

BIOMASS CHALLENGES

Transport & storage

Biomass raw materials are organic matter – they break down. Transporting or storing raw materials for long periods of time can prove difficult or expensive. Biomass resources are scattered, and it's not always possible to put the processing facility close to the source.

Regional and seasonal availability

The availability of raw materials varies depending on the season and other factors. This affects the fuel price. Inefficient resource management contributes to this, but many governments are unwilling to intervene.

Lack of investment

Because the availability of raw material fluctuates, it is seen as high market risk. Investors very rarely take the initiative to invest in the biomass power generation industry

Small-scale not feasible

Biomass pre-treatment technologies have high initial costs and require high input to be efficient, which means that scattered farmers and small-scale fuel companies cannot afford to choose this option.

Land use

Land use issues leads to the loss of ecosystems, preservation, and the homes of indigenous people.

Impact on the environment

High quality biomass (wood) is considerable but limited, expensive and not always sustainable. Biomass plantations can deplete nutrients from soil, promote aesthetic degradation and increase the loss of biodiversity. Other social impacts will result from installation of energy farms within rural areas like increased need of services, increased traffic, etc.

Governments favor fossil fuels

Governments in many countries subsidize (put money towards) domestic fuel prices. This makes the cost of generating electricity from conventional sources lower than it is to generate it from biomass.

Regulation

As biomass fuels are a fairly new technology, many countries do not regulate or control how it is produced. There are often no penalties for using unethical or unsafe practices.

Energy density

Biomass often contains a lot of water. For example, for every 1 ton of wood transported, 300 kg is water. For this reason, compaction and densification are crucial for an efficient biomass supply.

BIOMASS IN AUSTRALIA & THE WORLD

Biomass fuels currently provide about 1 percent of the energy used in Australia (about 2,500 GWh per year), and around 11 percent of all renewable electricity production

Researchers are trying to develop ways to burn more biomass and fewer fossil fuels. Using biomass for energy cuts back on waste and greenhouse gas emissions.

Biomass offers other significant environmental and consumer benefits, including improving forest health, protecting air quality, and offering the most dependable renewable energy source.

Bioenergy technologies are well-developed worldwide. Globally, bioenergy was the source of half of all renewable energy used in 2017 and is forecast to rise exponentially. The International Energy Agency's market analysis and forecast report, *Renewables 2018*, identified modern bioenergy as the 'overlooked giant within renewable energy'.

A report for the International Renewable Energy Agency, *Renewable Power Generation Costs in 2017*, found the cost of electricity from biomass to be equal to that from onshore wind projects, and well within the range of maximum and minimum costs of fossil fuel generation.

