

# Biomass



Grains



Wood



Garbage

Biomass is anything that is, or once was, alive. Biomass is wood, plants, and garbage.



# Biomass

## TEACHER

**Biomass** is anything that is alive. It is also anything that was alive a short time ago. Trees, crops, garbage, and animal waste are all biomass. Most of the biomass we use for energy today is wood. We burn wood to make heat.

Biomass gets its energy from the sun. Plants store the sun's energy in their leaves, stems, fruits, and roots. When we eat biomass, we use the energy to move and grow. When we burn biomass, we use the energy to make heat. We can also change the energy in biomass into gas and liquid fuels.

Biomass energy is **renewable**. That means we can make more. We can always grow more plants. We should plant new trees when we cut down old ones for wood. We also need to take care of the soil in which our crops grow.

People and animals get their energy from biomass. The energy in everything we eat comes from plants. Bread is made from wheat, a plant. Hamburgers were once cows that ate grass.

Until about 150 years ago, biomass gave people most of the energy they used. The cave dwellers and settlers burned wood for heat. They burned wood to cook food. In many developing countries, wood is still used for most energy needs. People also burn corn cobs and straw. In places without trees, people burn the waste from cows and pigs.

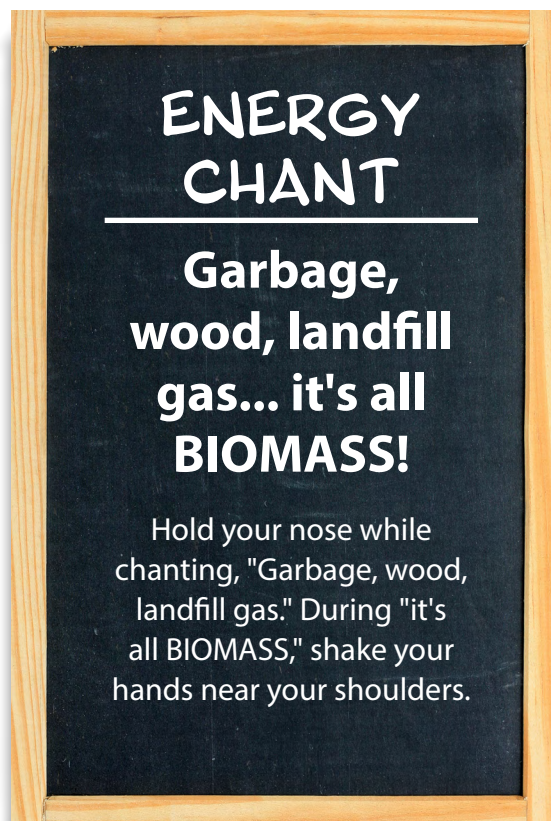
Biomass can be used to make electricity. Many towns burn their garbage in **waste-to-energy plants**. Instead of putting the garbage in landfills, they burn it to make electricity. This saves landfill space and gives them electricity, too.

Burning biomass does not cause as much pollution as burning coal or oil, but many people do not like to burn waste near their towns. Sometimes it smells bad. Waste-to-energy plants work hard to scrub the air from the burning waste to reduce pollution and odor. Burning biomass does make **carbon dioxide** and other emissions.

Biomass can be used to make a gas called **methane**. Methane makes up the natural gas we use in our stoves and furnaces. Methane made from biomass is called **renewable natural gas**.

In China, farmers use all of their garbage, even animal waste, to make **biogas**, a gas made by biomass. They put the waste into a big tank without air. It makes methane as it rots. Farmers use the gas to cook food and light their homes. The waste that is left can be used as fertilizer to grow more crops.

Biomass can also be turned into a fuel like gasoline, just as apples can be made into cider and corn, grass, and wheat can be made into ethanol. **Ethanol** is a fuel a lot like gasoline. Most gasoline contains some ethanol.







Plants store the sun's energy in their roots, stems, fruits, and leaves.

The energy in biomass  
comes from the sun.





Crops are biomass.

Biomass is renewable.  
You can grow more plants.





Wood is biomass.

You can burn biomass to make  
heat and electricity.



**Ethanol Pump**

Image courtesy of NEED Designer

We can turn biomass into fuels called ethanol and biodiesel. Ethanol and biodiesel can be used in many types of vehicles.