

## UNIT 7      BIOMASS – Part 1

**Read the definition of biomass. Check the meaning of 'organic matter' if necessary.**

Biomass is any organic matter that is used as a source of energy. Organic matter comes from living organisms such as plants and animals, and contains organically produced carbon.

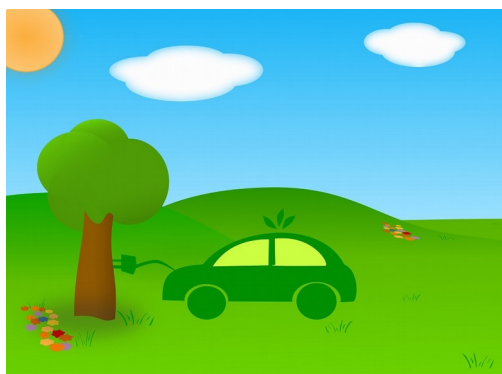


**Which of these materials are considered organic matter?**

wood	yes
clean air	no
rocks	no
agricultural crops	yes
animal waste	yes
metals	no
pure water	no
glass	no
dead leaves	yes

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**Read the text below.**



### What is biomass?

To many people, the most familiar forms of renewable energy are the wind and the sun. But biomass (plant material and animal waste) is the oldest source of renewable energy, used since our ancestors learned the secret of fire.

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Biomass is a renewable energy source not only because the energy in it comes from the sun, but also because biomass can re-grow over a relatively short period of time compared with the hundreds of millions of years that it took for fossil fuels to form. Through the process of photosynthesis, chlorophyll in plants captures the sun's energy by converting carbon dioxide from the air and water from the ground into carbohydrates—complex compounds composed of carbon, hydrogen, and oxygen. When these carbohydrates are burned, they turn back into carbon dioxide and water and release the energy they captured from the sun.

Source: [http://www.ucsusa.org/clean\\_energy/our-energy-choices/renewable-energy/how-biomass-energy-works.html#.VozQD6SVvb0](http://www.ucsusa.org/clean_energy/our-energy-choices/renewable-energy/how-biomass-energy-works.html#.VozQD6SVvb0)

ancestors – a person's relatives who lived a long time ago

to capture – to catch

### **Are these sentences true or false on the basis of the text?**

- |   |       |
|---|-------|
| 1. Most people associate renewable energy with solar and wind energy.         | true  |
| 2. Our ancestors think that biomass is the oldest source of renewable energy. | false |
| 3. Plant material and animal waste re-grow faster than fossil fuels.          | true  |
| 4. Fossil fuels were formed over a relatively short time.                     | false |
| 5. The energy in organic matter comes from the sun.                           | true  |
| 6. When biomass is burnt, it releases carbon dioxide.                         | true  |

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**In the following pictures, you can see some organic matter used as sources of energy. Choose their names from the list below, and write the correct letter next to the picture.**

- a) saw dust
- b) wood chips
- c) wood pellets
- d) corn stalks
- e) straw

1.



2.



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3.



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4.



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5.



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Read the text below.

### Sources of biomass

The most common sources of biomass are:

- plants;
- animals;
- municipal solid waste.

#### Plants

The energy industry uses different wood products, such as wood chips, saw dust, scrap wood and forest residues (dead trees, branches). Certain parts of agricultural crops are also used for energy generation. Dried vegetation like straw, dry leaves, corn stalks, and all kinds of crop residues are suitable for this purpose.

However, there are also so called 'energy crops' that are grown specifically for use as fuel. They include fast growing trees, grasses and other non-woody energy crops, as well as aquatic plants such as algae and lake weeds.

#### Animals

Many farm animals produce wastes which can be used as energy sources. Some examples are poultry litter, and animal manures and slurries.

#### Municipal solid waste (MSW)

Municipal solid waste is commonly known as garbage (US) or rubbish (UK). It includes all kinds of everyday items that are thrown out by the public. It usually does not include industrial or agricultural wastes. MSW is generally collected in landfills. The rubbish is dumped into a hole or on the side of a hill, compacted by large machines, and then covered with a plastic sheet and several feet of dirt.

#### Which category of biomass do these products belong to?

Algae and lake weeds	energy crops
everyday rubbish	municipal solid waste
corn stalks and other crop residues	agricultural crops
animal manure	animal waste
forest residues such as dead trees and branches	wood products
poultry litter	animal waste

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**Choose the correct answer.**

1. It ... millions of years for fossil fuels to form in rock and earth.  
a) makes  
b) takes (yes)  
c) take  
d) last
2. 'I am not familiar with this source of renewable energy.' means the same as ...  
a) This source of renewable energy is not for my family.  
b) I don't know anything about this source of renewable energy. (yes)  
c) I have a good knowledge of this source of renewable energy.  
d) My family doesn't use this source of energy.
3. Thousands of years ago, our ... burned wood to make fire.  
a) relative  
b) great-grandparents  
c) ancestors (yes)  
d) ancistors
4. Biomass can be re-grown in a ... short time.  
a) quite  
b) quiet  
c) related  
d) relatively (yes)
5. Photosynthesis is a process used by plants to ... light energy ... chemical energy.  
a) convert; to  
b) compare; into  
c) convert; into (yes)  
d) compare; to
6. When burning, biomass ... the energy stored in it.  
a) releases (yes)  
b) relases  
c) let  
d) allows
7. The most common sources of biomass are ...  
a) plants and animals.  
b) plants, animals and municipal liquid waste.  
c) plants and municipal solid waste.  
c) plants, animals and municipal solid waste. (igen)
8. Wood chips and saw dust are ...  
a) municipal solid waste.  
b) agricultural residues.  
c) wood products. (yes)  
d) forest residues.



9. Algae can be used ...

- a) for energy generation. (yes)
- b) to collect dried vegetation.
- c) to produce corn stalks.
- d) as crop residues.

10. Many farm animal wastes, such as ..., can be used as energy sources.

- a) poultry manures
- b) poultry slurry
- c) poultry litter (yes)
- d) poultry scraps

**These are the most important words of this unit. Check the meanings of the words or phrases that you do not know.**

wood chips  
saw dust  
scrap wood  
forest residues  
branch of a tree  
agricultural crops  
dried vegetation  
straw  
corn stalks  
crop residues  
non-woody energy crops  
aquatic plants  
algae  
lake weeds  
animal waste  
poultry litter  
manure  
municipal solid waste (MSW)  
landfill  
to dump  
dirt

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**Forum topic:**

Why are trees renewable and why are coal and oil not?