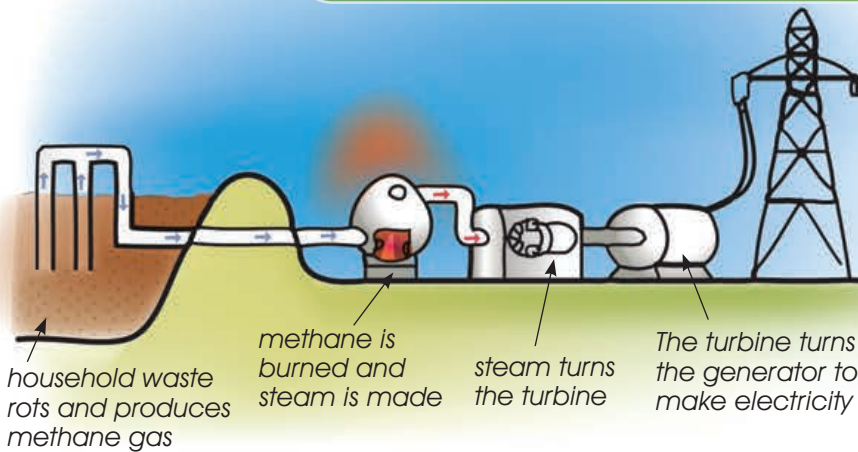




Bio-energy is energy from plant and animal matter.

Wood and animal dung have been burnt for thousands of years to keep people warm. However there are also other sources of bio-energy we can use today:

- ◆ Methane from decomposing waste at landfill sites
- ◆ Straw & waste from food crops
- ◆ Sewage
- ◆ Wood shavings and sawdust
- ◆ Crops grown specially for making fuel.



## BIO-ENERGY - METHANE GAS

- ◆ Waste is dumped in landfill sites
- ◆ As plant and animal matter in the waste decomposes, it gives off methane gas
- ◆ The gas is collected and used as a fuel to heat water and make steam
- ◆ The steam turns a generator, which makes electricity

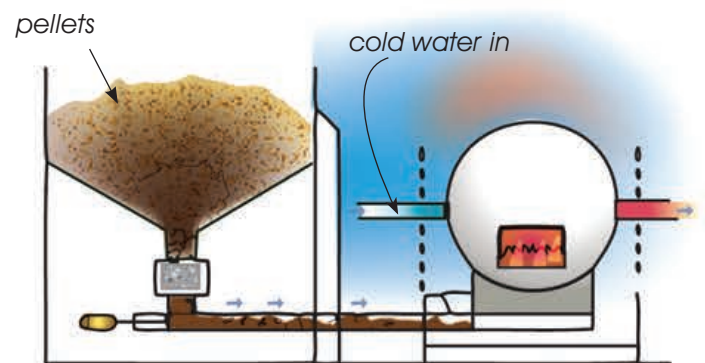
## BIO-ENERGY FACTS

What are bio-fuels?	Bio-fuels are fuels made with plant sugars and plant oils
What is bio-diesel made from?	Bio-diesel is made from plant oils like cooking oil, palm oil and oilseed rape
What is bio-ethanol made from?	Bio-ethanol is made from petrol mixed with plant sugars like sugar cane
Amount of the UK's heat and energy which is made from bio-energy power stations	About 2%
Does bio-energy produce the greenhouse gas, CO <sub>2</sub> ?	Yes, but an equal amount of CO <sub>2</sub> is absorbed when crops are replanted

## BIO-ENERGY - BOILERS

- ◆ Household waste, animal and factory waste, wood and straw can all be used as fuel in bio-energy power plants to heat water for heating systems
- ◆ In large bio-energy power plants, the heated water can turn turbines to generate electricity

## PELLET BURNER



- ◆ Pellets\* can be made from wood chips and sawdust
- ◆ The pellets are burned in a boiler to heat water

\*There is a sample of these pellets in the Bio-energy Activity pouch

PLEASE RETURN THIS CARD TO THE FACT SHEET POUCH

diagrams adapted from <http://www.berr.gov.uk/energy/sources/renewables/schools/index.html>



photo Pat Thomson

Straw can be burnt to generate electricity. Thousands of tonnes of straw are used by a power station in Cambridgeshire.



The Balgate Sawmill at Kiltirilly, Inverness-shire photo HLE

Waste products from sawmills, like shavings and sawdust can be turned into pellets for domestic and industrial boilers.



photo from iStock International

A crop of oilseed rape - the oil in the seeds can be used to make bio-diesel.



photo Liz Bolherry

Logs - a traditional form of bio-energy.



## ADVANTAGES OF BIO-ENERGY

- ◆ Bio-energy is renewable, as long as the crops and trees are re-planted.
- ◆ Bio-energy produces very little pollution.
- ◆ Bio-energy can stop the landfill gas, methane, from going into the air, where it then becomes a greenhouse gas.
- ◆ Bio-energy can be stored for use when needed.
- ◆ Bio-energy can use up waste.
- ◆ Bio-energy is available all over the world.



## DISADVANTAGES OF BIO-ENERGY

- ◆ Burning fuels (e.g. rubbish) does cause some air pollution.
- ◆ The materials to make bio-energy, like wood and straw, are bulky to transport.
- ◆ Bio-energy crops and straw are only available at certain times of the year.
- ◆ Bio-energy crops like sugar cane and palm oil may take land and water away from food crops.