

# Energy from crops

**Five hectares of energy crop - miscanthus or 'Elephant Grass' - have been planted in the field ahead of you. The crop will be burnt in a specially designed biomass boiler to provide the main source of heat for the office buildings.**

## Why is it good for the environment?

Biomass (which includes energy crops, forestry waste and farm waste) is a carbon-neutral energy source because the carbon dioxide released when it is burnt is eventually re-absorbed by the growing plants. Fossil fuels, on the other hand, (coal, oil and gas) release their CO<sup>2</sup> into the atmosphere permanently and therefore contribute to global climate change.

Other pollutants released during the crop combustion process are kept to a minimum by the state-of-the-art boiler technology and meet strict Clean Air Act standards.

*Did you know...* the total amount of biomass on the surface of the Earth contains as much energy as all the world's known fossil fuel reserves?

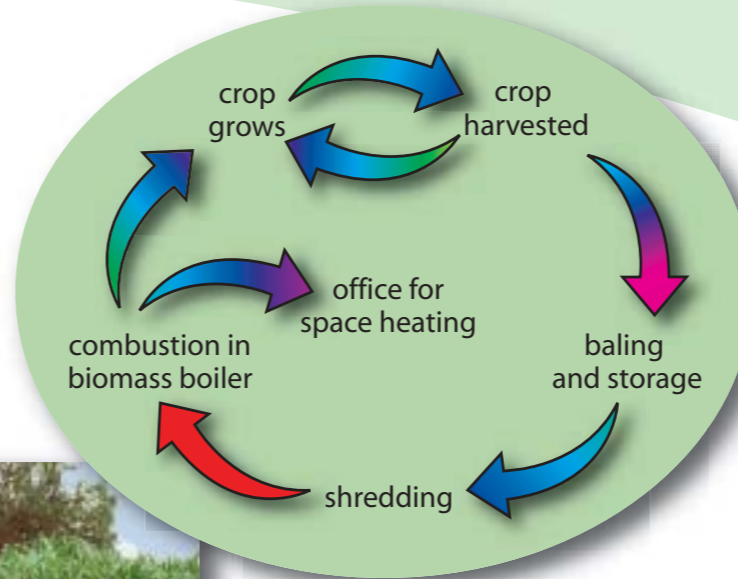
The energy value of 20 tonnes of dry miscanthus is equivalent to that of 12 tonnes of coal.

## Biodiversity

Energy crops can be managed to become a haven for wildlife, such as birds, mammals and insects. Although it is a monoculture, studies have shown that miscanthus provides a better habitat than cereal crops, supporting a greater number and diversity of spider species, mammals and birds and acts as a nesting habitat for ground nesting birds (eg skylarks) in early spring, and reed nesting birds (eg reed warbler) later in the summer. It requires low inputs of agrochemical fertilisers and pesticides.



'Advice on various aspects of the biomass crop has been provided by Bio-Renewables Ltd/ADAS. (Photo courtesy of Bio-Renewables Ltd)'



## How does it work?

The miscanthus is harvested annually in late winter, using conventional harvesting equipment. The field is expected to yield 60 oven-dried-tonnes per year with a calorific value of 17GJ/tonne.

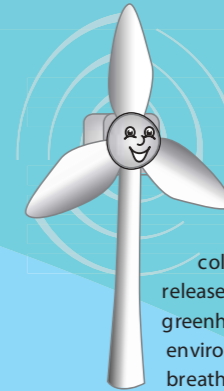
The crop is then dried and stored as bales in the specially-built crop store (beneath the solar panels). When needed, the bales are shredded before being fed by a mechanical screw auger into the biomass boiler located near the Coach House.

The 100kW boiler will provide high-grade heat for the office in winter. Eventually it is planned that the boiler will be Combined Heat & Power (CHP) - i.e. it will generate electricity as well as heat.

Expected peak energy generation per annum: 160MWh  
Potential surplus Miscanthus for heat export: 102 MWh

Generating energy from this crop will prevent around 225 tonnes of carbon dioxide (CO<sup>2</sup>) being emitted into the atmosphere every year

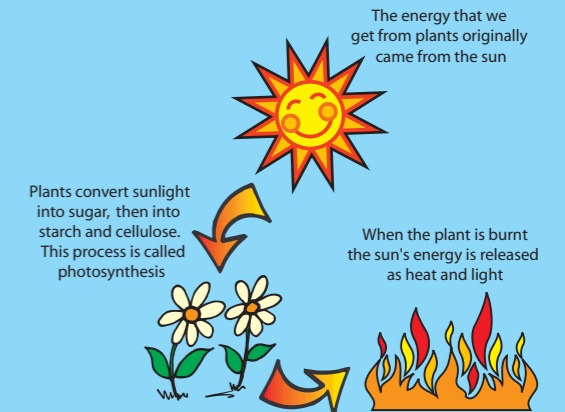
## BEAUFORT'S ENERGY TRAIL



Miscanthus is called Elephant Grass because it is very tall!

We burn the Elephant Grass to heat up water, which then keeps our office warm when it's cold outside. Although burning it releases carbon dioxide (CO<sub>2</sub>), the main greenhouse gas, it does not harm the environment. Plants like CO<sub>2</sub> - they breathe it like we breathe oxygen!

There are all sorts of plants that can be turned into fuel - such as willow trees, sugar beet and straw. For example, some cars run on cooking oil made from plants rather than petrol!



⚡ A Mars bar contains 1180kJ of energy; a tonne of miscanthus contains 17,000,000kJ. Therefore one kilogram of miscanthus has as much energy in it as roughly how many Mars bars?

⚡ Can you spot any wildlife in the elephant grass? What about elephants?!

