

Biomass Energy

This is a series of information sheets amplifying local planning objectives in a clear and concise format in order to promote the benefits of using small-scale renewable energy generation, energy efficiency and improving building design standards.

The guidance forms a material consideration in the determination of all relevant planning applications.

The following are currently available:

This leaflet is available in accessible formats

Introduction

The earth's living matter, an energy store replenished continually by the sun and stored in plants, is usually recycled naturally through chemical and physical processes in the plant, the soil, the surrounding atmosphere and other living matter.

Biomass energy is produced from organic matter, either directly from plants or indirectly from industrial, commercial, domestic or agricultural products, of recent origin. The carbon dioxide emitted from burning biomass is equivelant to the amount of carbon dioxide absorbed when the wood grows and is, therefore, a carbon neutral process as long as the wood source is part of a sustainably managed forest.

Components

Biofuels are either wood based biomass (e.g. forest products, untreated wood products, energy crops, and short rotation coppice) or non-wood based biomass (e.g. animal wastes, industrial and biodegradable municipal products from food processing and high-energy crops).

Fuel for biomass systems comprises wood pellets, wood chips and wood logs. Wood pellets are compact, have a low moisture content and a high energy density and, although currently more expensive than wood chips and wood logs, are easier to handle and ideal for automated systems.

The energy content of the fuel relates to its moisture content: the higher the moisture content the slower the combustion process as the moisture must first boil off before the fuel can burn. Full combustion is the cleanest process, leaving no unwanted bi-products like carbon monoxide, particulates or unburnt volatile hydrocarbons.

Biomass domestic space heating can be provided through:

- stand-alone stoves - fuelled by wood pellets or wood logs (unsuitable for automatic feed) which can achieve efficiencies of more than 80%.

  They are normally used to provide background heating but are also often fitted with a back boiler to provide water heating, whilst adding aesthetic value. Higher output versions may be fitted with an integral back boiler to provide domestic hot water and, if required, central heating via radiators; or

- boilers - suitable for wood pellets, wood chips, or wood logs connected to central heating and hot water systems.

  Log boilers require manual loading. Automatic wood pellet and wood chip systems can be more expensive. Many boilers will dual-fire both wood chips and pellets, although the wood chip boilers will require larger hoppers to provide the same time interval between refuelling.

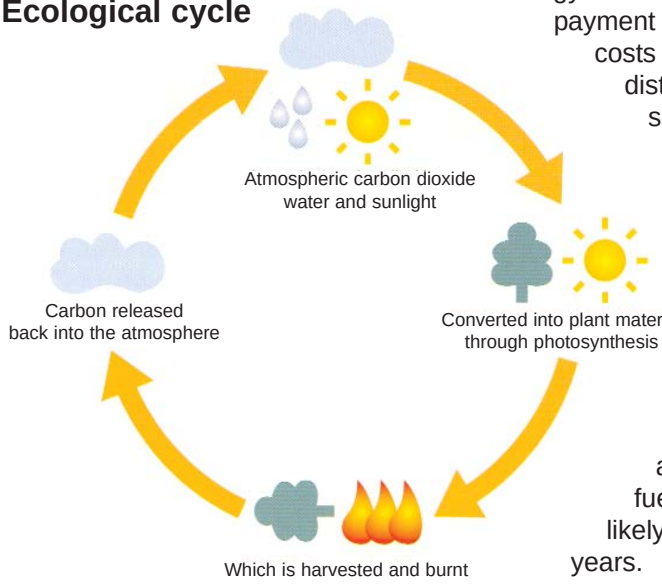
  Boilers can include an integral hot water energy storage tank or accumulator tank that stores water up to 90oc, enabling the

supply of heat to be further de-coupled from the combustion of the fuel. This is particularly helpful with log boilers where systems operate at full load and the matching of demand with load is performed by the accumulator.

System Requirements

Systems require storage space for fuel, appropriate access to the boiler for loading, a local fuel supplier, vent material specifically designed for wood fuel appliances and sufficient air movement for proper operation of the stove. Chimneys can be fitted with a lined flue. Wood can only be burnt on exempted appliances under the Clean Air Act.

Ecological cycle



System Output

Stand-alone stoves produce 6 -12 kW while the output from boilers exceeds 15 kW.

Cost and maintenance

Stand alone room heaters cost £1,500 - £3,000 installed.

Boilers vary according to fuel choice; a typical 20 kW output (average size required for a three bed semi-detached house) wood pellet boiler costs around £5,000 installed, including the cost of the flue and commissioning. A manual log feed system of the same size would be slightly cheaper.

Unlike other forms or renewable energy biomass systems require payment for the fuel. Fuel costs vary according to distance from the fuel supplier.

Running costs are generally more favourable in an off-gas grid area.

The payback period varies according to the fuel being replaced and the type of wood fuel being used but is likely to be around ten years.

For further information contact:
Planning Policy
Planning Department
Wrexham County Borough Council
Lambpit Street
Wrexham
LL11 1AR
Tel: 01978 292013
www.wrexham.gov.uk/planning

wrexham COUNTY BOROUGH
BWRDEISTREF SIROL wrecsam

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