

# Small scale biomass heating



**Biomass heating is a 'low-carbon' technology and is both sustainable and renewable.**

Heating a single room using a wood burning stove – or a whole property using a wood-fuelled boiler – is known as biomass heating. Biomass can usually be integrated into a home's existing heating and hot water system and can be an attractive option for households with a reliable wood supply, reasonable storage space and delivery access.

Because the CO<sub>2</sub> absorbed by the trees when they are growing is approximately the same as the CO<sub>2</sub> released when the fuel burns they are considered to be 'low carbon'. They are not 'carbon neutral' or 'zero carbon' because there are still carbon emissions associated with the fuel's extraction, processing and transportation.

*The price of logs, woodchips and pellets varies according to supply and quantity purchased*



## Two main types of biomass heating appliance

**1) Stoves:** Stoves can burn logs or pellets to provide space heating for individual rooms, but only pellet stoves are eligible for the RHI (see p2). Stoves can also be fitted with a back boiler to provide hot water for the kitchen and bathroom. Stoves are usually around 7kW and have an efficiency of between 60-80%.

**2) Boilers:** Larger and more industrial in design, these provide whole house heating and hot water. Domestic log boilers range from 20-50kW and are stoked by hand. Pellet boilers range from 8-30kW and often incorporate a pellet hopper, which automatically feeds the boiler with fuel.

Chip boilers are most efficient for larger (50kW+) systems so are generally not suitable for individual domestic properties. Some biomass boilers are designed to take a variety of wood fuels, including logs, chips and sawdust, and might be viable if you have access to a range of different wood sources.

## There are three main types of wood fuel that can be used in domestic systems: logs, wood chips and wood pellets

### Logs

Logs require little processing except for seasoning (drying out). This process can take up to 3 years and brings their moisture content down to about 20% meaning the logs burn hotter and produce less smoke. Logs are usually cheaper than other types of wood fuel but need more space for storage and can only be used in manual-feed boilers or stoves.



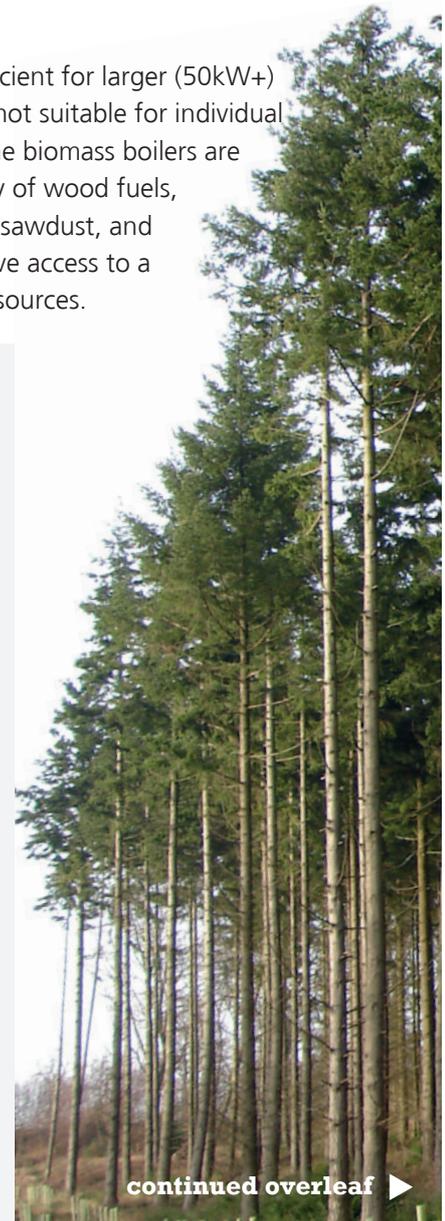
### Wood chips

These are sourced from forestry 'thinnings' or made from untreated waste wood. Wood chips are typically used in larger heating systems such as those found in schools or blocks of flats. When they are used in smaller (e.g. domestic) systems the chips must be produced to a standard size and with low moisture content.



### Pellets

Wood pellets are made from by-products such as saw dust and have a low moisture content of between 8-10%. As a consequence they are more energy-dense than logs or chips and require about a third of the storage space. The uniform shape makes pellets ideal for automated systems.



continued overleaf ►

## Cost & savings

The initial cost of installation depends on the size and type of system: a stand-alone pellet stove costs around £3,000; and an auto-feed pellet boiler for an typical family house around £11,500. You should allow for a further £100 per year for annual maintenance for a boiler.

The financial and CO<sub>2</sub> savings you will make from your biomass system will vary depending on what fuel you are currently using for heating your home. If you're using electricity or oil biomass will save more than if you're using mains gas. And ensuring your property is fully insulated will reduce your heating demand and mean you can fit a smaller and cheaper system.

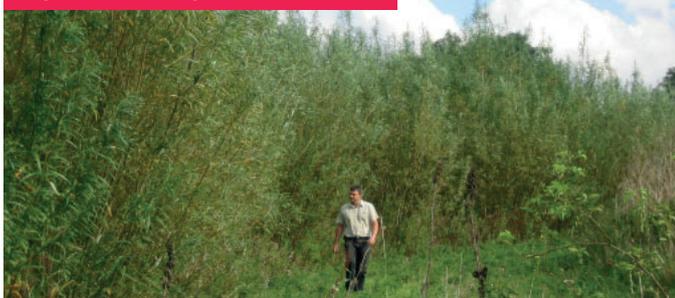
The following table shows potential financial and CO<sub>2</sub> savings for a 4 bedroom detached property with loft and cavity wall insulation, and an old heating system \*:

Fuel replaced	Savings £/year	Savings CO <sub>2</sub> /year
Mains gas	£9-88	6.2-8.5 tonnes
Oil	£440-530	8.4-11.0 tonnes
Coal	£8-10	0.6-14.3 tonnes
Electricity	£645-960	8.0-11.5 tonnes
LPG	£955-1,205	7.2-9.5 tonnes

An additional financial benefit is the **Renewable Heat Incentive (RHI)** which pays you for each unit of heat that your renewable heat technology produces (around £1,500 a year for the home in the table above). But, there are certain criteria, including that both system and installer must be registered with the Microgeneration Certification Scheme.

Installers that are also members of the Renewable Energy Consumer Code scheme will have agreed to stand by a consumer code that covers contracts, completing the order and after-sales activities. If your installer is registered with a Competent Persons Scheme such as HETAS, your system will comply with all regulations; if not, your local council's building control department will have to check and sign-off the installation (see our RHI factsheet).

Some biomass, like this willow, is grown in large plantations



Our reference: [www.energysavingtrust.org.uk/renewable-energy/heat/biomass](http://www.energysavingtrust.org.uk/renewable-energy/heat/biomass)

## Other things to consider:

Biomass heating systems need air to circulate around the unit, so adequate **air supply & ventilation** are essential. This may require a flue and additional vents. An existing chimney flue may need to be strengthened or lined.

If you're going for biomass you'll need a **reliable supply** of wood fuel. And if you are worried about environmental impacts then you need to check that the pellets, logs or chips come from a sustainable source, and using a local supplier will reduce emissions from transportation.

Biomass systems and their flues must meet current **UK building regulations**, and in designated smoke control areas (e.g. many towns and cities) only certain exempted boilers and stoves can be used. You can find out about these restrictions from your local authority.

Biomass boilers and stoves don't generally need **planning permission** as long as the flue sticks up less than 1m above the roof height and is not on the home's 'principal elevation'. But if you live in a listed building, a conservation area or a World Heritage Site this may not be the case, and you should contact your local planning department.



Domestic pellet boiler



**Microgeneration Certification Scheme**  
[www.microgenerationcertification.org](http://www.microgenerationcertification.org)

**Renewable Energy Consumer Code** [www.recc.org.uk](http://www.recc.org.uk)

**HETAS (official body that approves biomass heating appliances, fuels and services)** [www.hetas.co.uk](http://www.hetas.co.uk)

**Domestic Renewable Heat Incentive**  
[www.ofgem.gov.uk/environmental-programmes/domestic-rhi](http://www.ofgem.gov.uk/environmental-programmes/domestic-rhi)



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Founded: 1979

The Centre for Sustainable Energy is a national charity that helps people change the way they think and act on energy.

Our Home Energy Team offers free advice on domestic energy use to householders in Bristol, Somerset, Wiltshire, South Gloucestershire and Dorset.

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