



# Small scale biomass heating



## What is it?

Biomass is living and dead biological material such as wood and animal waste. Wood in the form of logs, chips and pellets (compressed sawdust) as well as cereal grains can be used in domestic and other small scale systems to provide space and water heating.



25kW log boiler  
Mapperton Estate, Dorset

Unlike old-fashioned open fires, modern wood fuelled stoves and boilers burn very efficiently (80-90%).

Also, modern pellet and wood chip systems involve automatic fuel-feed and are controlled through thermostats and timers with almost the same convenience as a fossil fired boiler system. There are currently automated 24 wood chip, log and wood pellet boilers installed in Dorset and tens of thousands of log burning woodstoves installed in the UK.

## Why is burning wood and crops renewable energy?

Although carbon dioxide (CO<sub>2</sub>) is released when wood is burnt this is absorbed by new trees planted to replace those that are cut down. This is known as the carbon cycle. There are some additional CO<sub>2</sub> emissions from fuel used during harvesting and transport but overall this amounts to a small fraction of that produced from burning fossil fuels. A typical detached house which was converted to a wood pellet boiler from an oil heating system would reduce its CO<sub>2</sub> emissions from 5.3 tonnes to 0.8 tonnes per annum.

## Can I produce all my heating with this technology?

Yes, but it depends on which technology you go for. A room heater fuelled by wood pellets is like having a gas fire or wood stove and provides additional heating to a room. Some models can be fitted with a back boiler to provide hot water. Log and pellet boilers are larger installations that can provide all the space and water heating of a house. Wood chip boilers are cost effective for high heat loads such as a large farmhouse with farm offices or a school.

## How much wood fuel will I need?

The moisture content (MC) of your wood supply dictates the amount needed and the boiler technology used - a wetter fuel such as tree surgery thinnings (MC approximately 50%) will require a moving grate type of boiler whilst with drier fuels such as air dried chipped round wood (about 30% MC) a fixed hearth may be used. The moving grate is more expensive but this is compensated by the cheaper fuel used.

Fuel	Moisture content	Amount of wood fuel required* (tonnes per annum)
Wood pellets	< 10%	5.4
Grain	10%	6.0
Wood chips from air dried round wood or pallets	25%	6.3
Wood chips from tree surgery	50%	9.5

\* Based on a typical detached house with annual heating requirement of 25,000 kWh



**How much space is required?**

Wood has a lower energy content than fossil fuels so you need more of it to provide the same amount of heat. A typical detached house would require roughly 3 m<sup>3</sup> of oil but 7 m<sup>3</sup> of pellets or 21-35 m<sup>3</sup> of wood chip weighing between 5-10 tonnes, depending on moisture content.



Wood pellets

Hence, if you wish to go for the boiler option you must have sufficient space to accommodate bulk deliveries of wood fuel. You will also need space to accommodate the boiler and fuel hopper – about double the space required by an oil boiler.

Automated log boilers do not need a hopper but may need a large hot water store of approximately 1000 litres sited near the boiler.

Pellet fuelled room heaters tend to be a similar size to propane room heaters. The fuel could be accommodated by storing bagged wood pellets in a typical garage. All biomass systems require a flue.

**How much maintenance is required?**

You will have to empty the ash pan from time to time. This might be weekly for large boilers and monthly for room heaters. The ash content of wood is less than 2%, so for the room heater example, 360 kg of pellets would lead to about 7 kg of ash per annum.

Once a year the burner should be cleaned and this can be taken care of as part of a maintenance contract with a fuel supplier or boiler manufacturer.

**What does it cost?**

A stand alone room heater costs from £2,000-£3,000. A log or pellet boiler for a typical house costs from £5,000-£12,000 whilst a 100 kW wood chip boiler for a farmhouse and offices might cost £40,000 - £70,000. Costs can vary according to the technology used, the amount of pipework,



Woodstove

any thermal storage required etc. Unlike other renewable technologies you will need to budget for fuel. However, wood chip is very competitive and is currently cheaper than fossil fuels.

**Can I get a grant?**

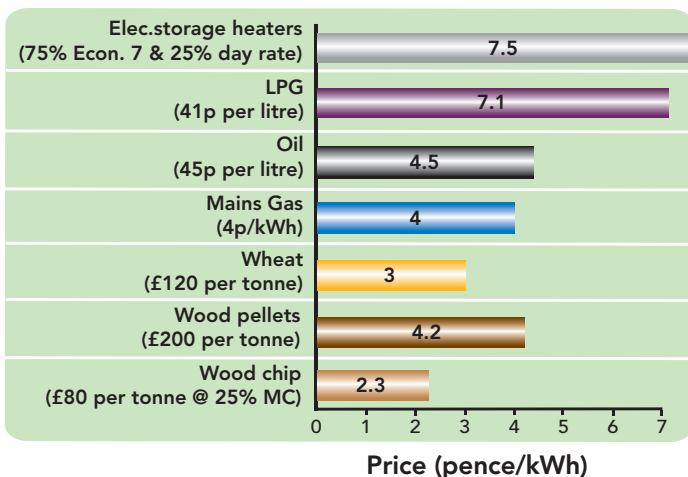
The Low Carbon Buildings Programme (LCBP) offers a maximum £600 grant

for automated wood pellet room heaters, subject to a 20% limit of total installed cost. For wood fuelled boiler systems the maximum grant is £1,500 regardless of size, subject to an overall 30% limit. A condition of the LCBP grant is that you must already have installed a basic level of energy efficiency measures including wall and loft insulation, adequate heating controls and low energy light bulbs. The LCBP grants will be available up to March 2011 after which a Renewable Heat Incentive will replace grants at all scales of biomass heating. The Bioenergy Capital Grants Scheme may also be available for non-domestic wood fuel boiler installations and Community Sustainable Energy Programme plus LCBP Phase 2 grants for community buildings and schools.

**What is the pay back?**

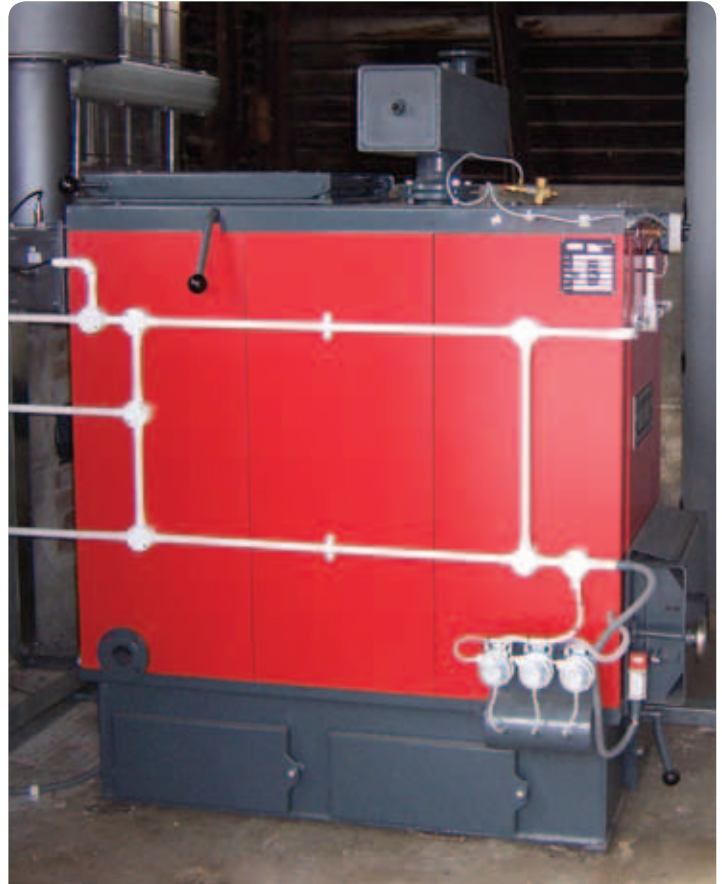
Savings are best in off-gas areas and for properties with high heat loads. For instance a large farmhouse with a heating requirement of 75,000 kWh per annum and oil heating might pay back the cost of conversion to a wood chip or pellet boiler in 4-8 years based on current prices and getting a grant. For smaller 3 bedroom properties with an annual demand of 25,000 kWh, the best current paybacks

**Heating costs of biomass fuels versus fossil fuels**





Logs at Moreton, Dorset



Boiler and accumulator  
Guys Marsh, Dorset

(5-9 years) are for log boilers when replacing electrical heating systems

**Are there any planning issues?**

Always check with your local authority, before installing a system. There are few restrictions if you are using clean wood chip. Since April 2008 the flues of wood burning appliances have been classed as permitted development except in conservation areas and in listed buildings. If you have to construct a separate boiler house and fuel store this will probably require planning permission. There are a number of wood fuel heating products that are eligible for smoke control zones – see the link in “More information”. Note that most of Dorset is not a smoke control zone, although clean burning appliances should always be selected whenever possible.

**What is the potential for the technology in Dorset?**

A recent Dorset Woodfuel Study commissioned by the Dorset Area of Natural Beauty (see link in “More information”) estimated that there are potentially 100,000 tonnes of woodfuel which could be harvested sustainably in Dorset each year. Currently only 1,500 tonnes are used in 24 automated log, chip and pellet boilers plus an unknown quantity of logs used by domestic woodstoves. The Dorset Woodlink project aims to improve the prospects for biomass by bringing wood fuel suppliers into contact with consumers.



50kW pellet boiler  
Kingcombe Centre, Dorset



### Pros and cons of wood fuel heating

#### Pros

- ✓ Good value space and water heating with fairly short paybacks
- ✓ Most woodfuel is cheaper than fossil fuels
- ✓ Options for different sized properties

#### Cons

- ✗ Boilers are bigger and more expensive than fossil fuel equivalent
- ✗ Need storage space for fuel
- ✗ More hands on than other technologies e.g. needs de-ashing

### Biomass installers based in the South West

In order to access grants from the Low Carbon Buildings Programme accredited installers and accredited products must be used. These are listed on the Microgeneration Certification Scheme (MCS)

website: [www.microgenerationcertification.org](http://www.microgenerationcertification.org) Telephone: **020 7090 1082**

**The Dorset Energy Group recommend getting 2 quotations and using local installers whenever possible.**

## More information

Wood fuel suppliers in the South West:

Dorset Woodfuel Study:

Forestry Commission:

01420 526197

Carbon Trust

Smoke Control Areas and exempt appliance

[www.southwestwoodshed.co.uk](http://www.southwestwoodshed.co.uk)

[www.dorsetaonb.org.uk/our-work/woodlink/managing-woodland.html](http://www.dorsetaonb.org.uk/our-work/woodlink/managing-woodland.html)

[www.biomassenergycentre.org.uk](http://www.biomassenergycentre.org.uk)

[www.carbontrust.co.uk/biomass](http://www.carbontrust.co.uk/biomass)

[www.uksmokecontrolareas.co.uk](http://www.uksmokecontrolareas.co.uk)

#### Grants

Low Carbon Buildings Programme

0800 9150990

[www.lowcarbonbuildings.org.uk](http://www.lowcarbonbuildings.org.uk)

Community Sustainable Energy Programme

0845 3 671 671

[www.communitysustainable.org.uk](http://www.communitysustainable.org.uk)

0800 915 0990

[www.lowcarbonbuildings.org.uk/info/permitted/](http://www.lowcarbonbuildings.org.uk/info/permitted/)

#### Renewable energy advice for householders:

SW Energy Saving Trust Advice Centre

0800 512012

[www.energysavingtrust.org.uk](http://www.energysavingtrust.org.uk)

#### Renewable energy advice for businesses in Dorset:

Business Link

0845 600 9966

[www.businesslink.gov.uk/southwest](http://www.businesslink.gov.uk/southwest)

#### Renewable energy in Dorset and advice for community groups:

Renewable Energy Development Officer, Dorset County Council

01305 228530

[p.west@dorsetcc.gov.uk](mailto:p.west@dorsetcc.gov.uk)  
[www.dorsetforyou.com/climatechange](http://www.dorsetforyou.com/climatechange)

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