



**coordinated
woodfuel Initiative**

A guide to small-scale wood fuel (biomass) heating systems
Infoline number 08450 74 06 74

This guide has been written by the South West Wood Fuel Advice Service; a project funded by Woodland Renaissance, Areas of Outstanding Natural Beauty in the South West (AONBs) and the Forestry Commission. It is for people interested in finding out more about biomass boiler systems.

As a priority, before considering the installation of a biomass heating system, you should investigate the potential for energy efficiency measures. These will help to lower heating demands and result in the installation of a smaller and cheaper biomass system requiring less fuel.

Domestic projects should contact their local energy efficiency advice centre today on 0800 512 012.

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1. Introduction to using wood fuel

In this guide we will refer to wood fuel as biomass.

People have been producing energy from biomass for centuries, and in many parts of the world it is still the principle source of heat. However modern technologies are far more efficient and cleaner than the traditional open fire and there are an increasing number of fuels are being used namely logs, wood chips, wood pellets and wood briquettes.

Energy from biomass refers to energy produced from organic matter of recent origin. This excludes fossil fuels which have taken millions of years to evolve. Biomass is also referred to as 'bioenergy' or 'biofuels' (in terms of renewable energy). Biofuels have been defined by the Energy Technology Support Unit (ETSU, 1991) as:

'any solid, liquid or gaseous fuels produced from organic materials either directly from plants or indirectly from industrial, commercial, domestic or agricultural wastes'.

However, throughout this document we are concerned with woody biomass – logs, wood chips, wood pellets and wood briquettes.

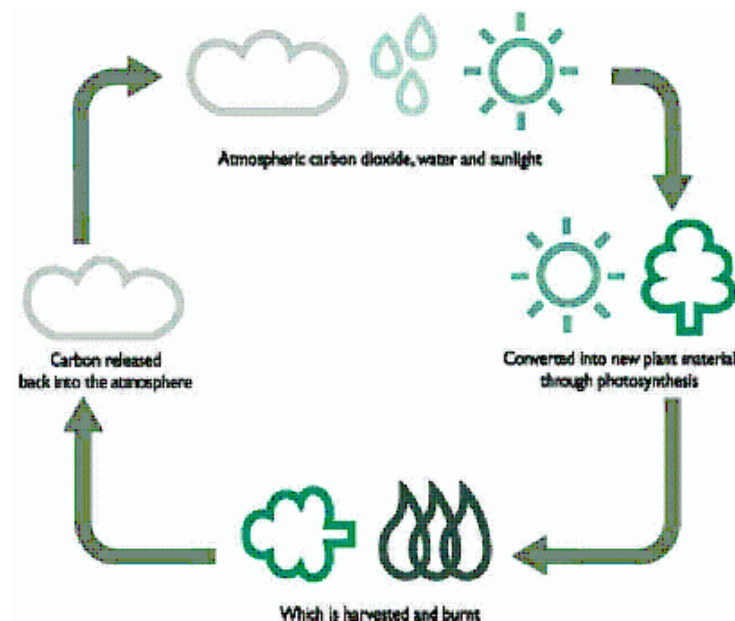
Producing energy from wood brings environmental and economic advantages both nationally and locally and has considerable potential within the UK.

Biomass heating systems, unlike other renewable energy sources, do emit carbon dioxide. However, it is the carbon dioxide (CO₂) taken from the atmosphere by trees for photosynthesis that is released during burning. This closed CO₂ cycle means that biomass heating is considered a renewable energy source.

For sustainably managed woodland, or energy crops, the process is similar. Wood is never removed faster than it is added by new growth, therefore the CO₂ released when the wood fuel is burned is never more than the CO₂ absorbed by new tree growth.

Figure 1. The carbon neutral wood heating cycle

However, biomass heating systems in reality create small net emissions of CO₂ to the atmosphere



through operations including harvesting, transport, processing and the construction and commissioning of the boiler. Wood fuel emits 25 grams of CO₂ per kilowatt-hour (g/kWh); wind energy emits 8g/kWh; gas emits 194g/kWh; oil emits 265g/kWh and coal emits 291g/kWh .

1.1 Categorising biomass

Biomass used for fuel falls into two main categories:

1. Woody biomass, including:

- Forest residues – from woodland thinnings, “lop and top” after felling and arboricultural trimmings
- Untreated wood waste – e.g. from sawmills, furniture factories
- Crop residues – e.g. straw
- Short Rotation Coppice (SRC) – e.g. willow, miscanthus (elephant grass)

2. Non-woody biomass, including:

- Animal wastes – e.g. slurry from cows and pigs, chicken litter
- Industrial and municipal wastes including food processing wastes
- High energy crops – e.g. rape, sugar cane, maize

SRC and high energy crops are sometimes referred to under the more general term of ‘Energy Crops’; i.e. crops that are grown specifically for energy production.

Animal wastes and industrial and municipal wastes are not covered in this guide because these types of feedstock require different technologies other than biomass boilers, such as Anaerobic Digestion.

1.2 The benefits of using biomass as a fuel

Biomass is a renewable, low carbon fuel that is already widely, and often economically, available throughout the UK. Its production and use also brings additional environmental and social benefits.

Correctly managed, biomass is a sustainable fuel that can offer a significant reduction in net carbon emissions compared with fossil fuels and also many ancillary benefits:

- Biomass can be sourced locally, within the UK, on an indefinite basis, contributing to security of fuel supply
- UK sourced biomass can offer local business opportunities and support the rural economy
- The establishment of local networks of production and usage allows financial and environmental costs of transport to be minimised. There is no region in the UK that cannot be a producer of biomass, although some will have greater levels of productivity than others
- Woodlands, forestry and agriculture are generally perceived by the UK population to be an environmentally and socially attractive amenity; providing opportunities for recreation and leisure activities
- Biomass fuels generate significantly lower levels of atmospheric pollutants than fossil fuels, e.g. sulphur dioxide (a major cause of 'acid rain')
- Modern biomass combustion systems are highly sophisticated, offering combustion efficiencies comparable with the best fossil fuel boilers
- Using arboricultural residues, forestry arisings, sawmill co-products and waste as fuel diverts materials that would otherwise be consigned to landfill. This eliminates costs for disposal, and reduces the burden on limited landfill resources
- Utilising biomass as fuel encourages more woodlands to be sustainably managed, thus benefiting biodiversity.

1.3 How much biomass?

The annual demand for biomass fuel for a particular site depends on the following:

- Scale of the installation
- Conversion option (heat only, combined heat & power [CHP], boiler or stove)
- Operating hours
- Boiler efficiency
- The energy content (net calorific value or energy density) of the fuel (Mj/tonne or kWh/tonne), which is determined by:
 - o Moisture content of the fuel
 - o Species of tree
 - o Type of wood (conifer/hardwood, whole tree/residues)

A useful rule of thumb for a heat only installation is 1 tonne of wood chip at 30% moisture content per year per kilowatt installed.

Table 1 below shows approximate figures for how much energy is contained in different fuels per unit weight, or the 'energy density' of a fuel. The table illustrates that 1 tonne of wood chip contains three times less energy than 1 tonne of oil. Because wood is less energy dense than oil or gas, a greater volume and weight is required to provide the same value of energy.

Fuel	Energy density by mass GJ/tonne	Energy density by mass kWh/kg	Bulk density kg/m ³	Energy density by volume MJ/m ³	Energy density by volume kWh/m ³
Wood chips (Very dependent on MC)	7-15	2-4	175-350	2,000-3,600	600-1,000
Log wood (stacked - air dry: 20% MC)	15	4.2	300-550	4,500-8,300	1,300-2,300
Wood (solid - oven dry)	18-21	5-5.8	450-800	8,100-16,800	2,300-4,600
Wood pellets	18	5	600-700	10,800-12,600	3,000-3,500
Miscanthus (bale)	17	4.7	120-160	2,000-2,700	560-750
Coal (lignite to anthracite)	20-30	5.6-8.3	800-1,100	16,000-33,000	4,500-9,100
Oil	42	11.7	870	36,500	10,200
Natural gas (NTP)	54	15	0.7	39	10.8

Table1. Energy density and bulk density of fuels (1Mj = 0.27kWh & 1Gj = 277.8kWh). MC refers to Moisture Content as a %.

Source: Forestry Commission.

1.4 What you should expect from your biomass fuel supplier

As mentioned previously, the quality of your biomass supply will influence whether or not your project will be a success or not. This is particularly relevant to with wood chip which can vary a great deal in terms of quality. If you are going to be using wood chip you should ensure the following:

- The wood chip comes from a supplier who understands biomass fuel. If this is the case they will be able to sell you wood chip either by the tonne, volume or energy content (number of kWh)
- Moisture content must be consistent and matched to your boiler type
- The wood chip must be of a consistent size; containing no slivers that will clog or jam the fuel feed mechanism (although for larger installations, > 500kW, this is much less of an issue, because the fuel feed systems are large enough to accommodate all sizes of fuel)
- The wood chip must be free from contaminants. For example, if the wood chip is coming from arboricultural or tree surgery arisings it may contain grit, litter and dust. Any foreign objects could damage your boiler
- If you are unable to use ash on your garden or site, the supplier may be able to remove it
- Deliveries should be regular, easy to schedule and reliable
- Your supplier should be willing to provide you with details of quality assurance
- The supplier should be able to deliver fuel into your fuel storage container
- If you are purchasing logs they should be seasoned and of uniform size and shape (some suppliers will stack logs for you).

1.5 Finding a biomass fuel supply

The contacts list at the end of this document can be used to help you find a reliable biomass fuel supply, whether you need logs, wood chips or wood pellets. Please note we will be regularly updating this list as we hear about new fuel suppliers.

1.6 Using your own wood resource

Some customers are able to utilise their own woodland resource. As long as the wood is managed sustainably, where appropriate and fuel is processed properly, this option will reduce running costs and improve the financial viability of the project. Processing your own wood for fuel may also open up the opportunity to sell surplus wood chip to other biomass heating installations in the vicinity.

You may need to apply for felling permission from the Forestry Commission if you plan on using your own woodland resource, see www.forestry.gov.uk/forestry/INFD-6DFKXF for more information on Felling Licences, or contact the Forestry Commission on 01223 314 546.

If purchasing your own wood chipper or log splitter is not an option, it is possible to hire a wood fuel contractor (see the fuel supplier list for more details) to process your wood; you can also hire chippers.

Experienced wood fuel suppliers suggest that drum chippers produce the most consistent high quality chip, however good quality disc chippers are also suitable.

In some cases grants from the Forestry Commission's English Woodland Grant Scheme may be available, see <http://www.forestry.gov.uk/forestry/infd-6dccen> or call 01223 314 546 for more

information.

Managing woodlands also has the added benefit of improving biodiversity.

1.7 Woodfuel Standards

The species and quality of trees used for wood fuel production, and in particular wood chips, primarily determines the overall quality of the fuel. In many instances, woodland and tree management determines which trees are to be removed and therefore directly affects quality. For instance forestry thinnings, arboricultural waste, sawmill co-products, tree stumps and forest residues that include needles/leaves and bark will all be different.

It is vitally important for customer confidence to have fuel which is fit for purpose and delivered to a quality standard and specification. This has been demonstrated time and time again internationally. Even with a specific form of fuel, such as wood chips, there can be major differences in characteristics and properties between different batches chipped using different chippers, from different material, with different moisture content.

This means that while it is all eminently usable, one batch will allow a particular piece of equipment to operate according to specification, but another may cause blockages in the fuel feed line, inefficient operation, emissions, condensation in the flue, or automatic shut down of the equipment as it moves outside its design operating regime. In different equipment, however, the second batch of fuel may be perfectly acceptable.

Clear technical specifications are needed which can be incorporated into supply contracts. The European Union has developed specifications and standards – CEN/TC 335 for solid biofuels.

CEN/TC 335 is the technical committee developing the draft standard to describe all forms of solid biofuels within Europe, including wood chips, wood pellets and briquettes, logs, sawdust and straw bales.

CEN/TC 335 allows all relevant properties of the fuel to be described, and includes both normative information that must be provided about the fuel, and informative information that can be included but is not required. As well as the physical and chemical characteristics of the fuel as it is, CEN/TC 335 also provides information on the source of the material. For more information about CEN/TC 335 visit the Forestry Commission's Biomass Energy Centre website .

Normative specifications for wood chips:

- Origin
- Particle size
- Moisture content
- Ash content

For wood pellets standards are in use across the EU, CEN/TC 335 will include pellets. Wood pellets are only as good as the standard to which they are manufactured. Poor quality pellets tend to disintegrate into sawdust more readily than those of better quality. They may also have lower energy densities.

2 Modern biomass heating systems

If you are considering installing a biomass boiler system there are many important things you must consider for successful project. Perhaps the three most important points are:

1. Know which fuel is suitable for your project – Logs, wood chips or wood pellets
2. Use proven technology – Your project should not try to do anything that hasn't been done before!
3. Ensure you use good quality wood fuel – Most problems encountered with wood heating projects tend to be caused by poor quality or incorrect wood fuel rather than the system installed

By the end of this guide you should be able to go some way towards addressing each of these points, and with the help of the Wood Fuel South West Advice Service, we hope to ensure you have access to a reliable heat supply.

This guide is principally concerned with wood fuelled boiler systems, not room stoves (although we do provide basic information on stoves). Typically the boilers will be fed with either wood chip or wood pellets, however smaller systems for domestic buildings may also use logs.

We will refer to wood fuel boilers as biomass boilers in this guide. Biomass boiler technology is proven, reliable, clean and efficient. Modern biomass boilers are very common across Europe, particularly in Austria, Sweden and Finland. Austria has approximately 100,000 biomass boilers installed, with a reliable local wood fuel supply network in place. Biomass boilers can operate at 92% efficiency levels, comparable with modern gas condensing boilers.

Within this information pack we have included a list of suppliers and installers who are able to undertake projects in the South West. Many of these companies use technology from Austria, Sweden, Germany and other countries who have been working with biomass boilers extensively over the last 20 years.

The images below show different sized biomass boilers (nb – the uses are not limited to those depicted)



Figure 2. A Veto (80kW) wood chip boiler heating a farmhouse, two cottages, a café and business units



Figure 3. A Vigas (25kW) log boiler, suitable for a 4 bed property (size of medium sized fridge)

2.1 How do modern biomass boilers work?

In the case of wood chip and wood pellet boilers, the fuel is fed automatically into the boiler from the fuel store using an auger screw system (see Figure 11). The fuel then burns in the combustion

chamber, where a regulated flow of oxygen ensures a clean and efficient combustion process. The resulting hot gases then heat water in a heat exchanger which feeds the hot water storage tank, or for smaller stoves a back boiler, and ultimately the heating circuit (radiators in most cases). You can read more about the specific design of combustion systems on most boiler installer and manufacturer websites; it makes interesting reading for the technically minded!

Biomass boilers are as controllable as modern gas condensing systems; heating controls allow the user to adjust all personal parameters for the central heating and domestic hot water. Some controls even allow the user to switch on the boiler remotely via text messaging!

2.2 Selecting the right boiler

There are several factors that will influence the type of boiler suitable for a particular project. Below is a list of the most important points for consideration.

Space – If there is limited space on site then storage of wood fuel could be a restriction. Wood chips will occupy up three times more room than wood pellets for the same weight of wood. Biomass boilers also tend to be larger than conventional fossil fuel boilers, you will need to have a large enough space to house the unit.

Size of the building – Typically the larger the building is, the greater requirement for space heating and therefore the larger the boiler needs to be. Larger systems will consume more fuel and therefore tend to be automated systems with minimal manual intervention. Biomass boilers with automatic auger feed mechanisms and fuel stores are generally too large for domestic installations. However, domestic systems allow the user to fill a hopper attached to the boiler.



Figure 4. Farm 2000. Suitable for heating farm buildings and estates; will burn a variety of fuels



Figure 5. KWB (25kW) wood chip boiler heating an organic farm shop



Figure 6. Binder (50kW) wood chip boiler meets 50% of large educational centre's hot water



Figure 7. KWB Easyfire (15kW-30kW) pellet boiler, suitable for small scale domestic use

Access – For most systems a fuel delivery vehicle will need to access your site. Fuel can be delivered in a variety of ways, however for bulk chips and pellet orders direct access to the fuel store is critical. For small domestic deliveries it is important to have a dry place to stack logs or store bags of pellets. Projects in urban areas will need to be mindful of the number of fuel deliveries

(large vehicle movements) necessary throughout the year as this may have planning implications.

Fuel supply – You may have your own fuel supply, in which case using logs or chips would dictate the boiler type. Generally if space and access are not a problem larger projects would consider wood chip; however if space is at a premium or the area is sensitive to a greater number of fuel deliveries then pellets are the preferred option.



Figure 8. Pellet stove with back boiler suitable for small scale domestic use to heat hot water and radiators



Figure 9. Inside a log boiler

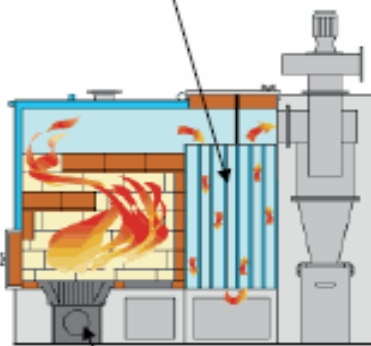


Figure 10. Inside a chip boiler

Fuel feed auger



Figure 11. Wood chip auger screw

2.3 Capital and running costs

All costs quoted should be used as a guide only and are based on 2006 data. Prices vary significantly depending on the type of boiler you select. As a general guide for domestic installations the price per installed kW (including flue, fuel storage, fuel feed, commissioning and design, exc VAT) is around £450 - £600. So a 15kW pellet boiler would cost approximately £9,000. Wood chip boilers cost approximately £250 - £450 per kW installed; a farmhouse considering a 25kW boiler could expect to pay around £11,000. Log boilers tend to be cheaper than both wood chip and wood pellet boilers; for example a 20kW system suitable for a 3 or 4 bed property would cost in the region of £150 - £200 per kW installed (£3,000 to £4,000).

Additional costs include housing for fuel storage and, for larger installations with multiple buildings, a heat main to distribute hot water to where it is needed. A general rule of thumb for the installation of heat mains is approximately £75 per metre.

In terms of running costs these will vary depending on the type of wood fuel used. For example, wood pellets are currently more expensive than wood chips and logs. The graph below is based on

current fuel prices and shows the cost (in pence) per unit of energy (kWh). One tonne of wood pellets is currently selling for approximately £160 (5,000kWh), a tonne of wood chip approx. £35 to £65 (2,000-4,000kWh) and a tonne of logs approx. £50-£60 (4,200kWh).

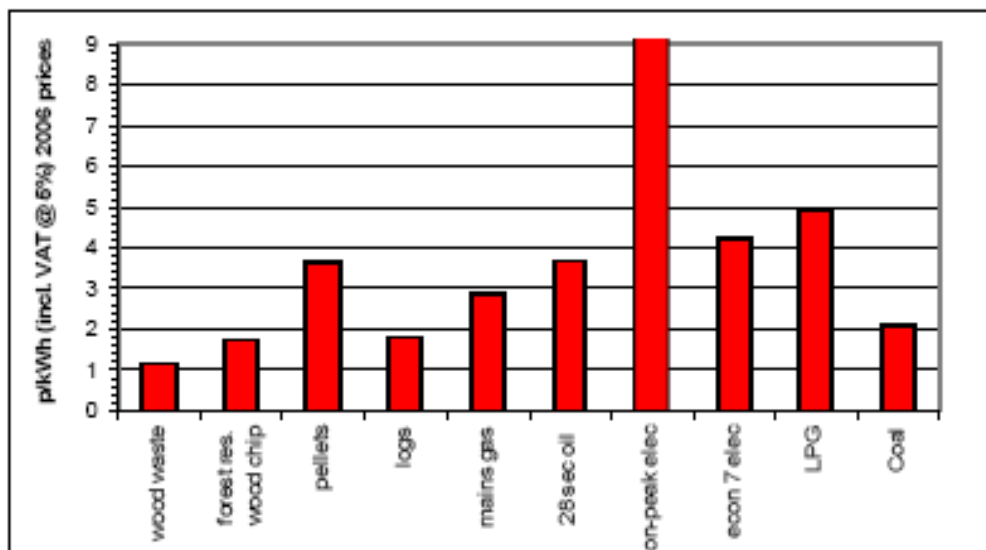


Figure 12. Graph showing fuel prices in pence per unit of heat (p/kWh)

2.4 Operating and maintenance

As with gas and oil fired boilers, biomass boilers will need an annual safety and maintenance check.

Unlike open fires biomass boilers produce very little ash; as a rule of thumb about 0.5% of the original volume of wood burned. This is because modern biomass boilers combust fuel very efficiently and cleanly. The ash produced is deposited in an ash pan for easy removal. You can dispose of the ash as low grade fertiliser on your garden or alternatively it might be possible to arrange for your fuel supplier to remove ash when they deliver your fuel.

3 Basic calculations

Sizing a biomass boiler is an exercise your installer will undertake. However, several people who contacted the advice service expressed an interest in knowing how this is done, as well as how to calculating annual biomass fuel needs.

This section looks at various basic calculations to find out what size boiler your project will require; the quantity and volume of wood fuel you will need, as well as what carbon dioxide savings you can expect by installing a biomass boiler.

3.1 Boiler sizing

Traditionally fossil fuel boiler installers over-size systems to meet peak heat load requirements. Because biomass installations tend to include hot water/ thermal storage or accumulator tanks, the peak heating loads can be managed and a smaller boiler can be fitted. This means the biomass boiler you install will need to be a slightly lower kW rating than your current system.

Calculating required boiler capacity (typically stated in kilowatts, kW) is not as straightforward as

replacing your current boiler with a biomass boiler of the same size; installers use a combination of experience and detailed heat load calculations. Fortunately there are some rules of thumb we can use to work out approximate figures instead of employing more complicated procedures

Three methods for calculating the kW capacity or size of boiler you might need:

Method 1

Using a large detached 4 or 5 bed property as an example.

Multiply the volume of the building by 0.035.

e.g Volume = length x width x height.

$$600\text{m}^3 = 20\text{m} \times 10\text{m} \times 4\text{m}$$

$$600\text{m}^3 \times 0.035 = 21\text{kW}$$

Tip – use the Planning Portal volume calculator to calculate the volume of your building
<http://www.planningportal.gov.uk/england/genpub/en/1115311947796.html>

Method 2

If you know your annual fuel spend it is possible to calculate a rough estimate of the size of boiler you might need in kW. In this worked example we take a 3 bedroom house spending £1,000 per year on oil.

Step 1 - Calculate your annual consumption in litres

Assuming you pay 35p per litre of oil, this works out at $\text{£}1000/\text{yr} \div \text{£}0.35/\text{l} = 2,857$ litres/yr.

Step 2 – How much energy is in 2,857 litres of heating oil

Heating oil or 28sec oil has an energy density of 37Mj (mega joules) per litre.

$$37\text{Mj} \times 2,857 \text{ litres} = 105,709\text{Mj} \text{ or } 105.7\text{Gj} \text{ (giga joules)}. \quad 1\text{Gj} = 277.78\text{kWh}.$$

$$105.7\text{Gj} \times 277.78 = 29,561\text{kWh}.$$

So 2,857 litres of 28 sec heating oil contains approximately 29,384kWh.

Step 3 – Calculating useful energy

Unfortunately you will not be able to use all 29,384kWh directly for heating and hot water, a proportion of the energy is lost when it is burned in the boiler. Boiler efficiency determines what proportion you are able to use. The efficiency of a 25 year old oil boiler will be about 60%. Therefore the useful energy used for heating and hot water is $29,384 \times 60\% = 17,630\text{kWh}$.

Step 4 – How many kilowatts (kW)?

Because we know the house needs 17,630kWh, we want to remove the hours to leave us with kilowatts. A very approximate way of doing this is to divide our heating consumption in kWh by the number of full load hours the boiler will be running for. Because boiler use varies daily, weekly and seasonally we use a simplification called Full Load Heating Hours Equivalent or FLHE. For a domestic property we expect about 1,200 FLHE. $17,630\text{kWh} \div 1,200\text{hrs} = 14.7\text{kW}$. About what you would expect for a 3 bed property.

Method 3

The third option is to use an online tool, such as the one hosted by South West Wood Fuels:
<http://www.swwf.info/images/boilersizewpdf.pdf> - boiler sizing worksheet.

3.2 Annual biomass consumption and storage space

Although this method gives only approximate quantities and volumes it is a useful calculation to perform as it will indicate running costs, quantity (of logs, wood chips or wood pellets) and associated volume.

Step 1 – Convert your heating demand into biomass quantities

Taking the 3 bed example above, converting 17,630kWh into biomass quantities is straightforward

To do this you need to know the energy densities of biomass fuels, see table 1. Before calculating biomass quantities though, it is important to make another boiler efficiency adjustment. If you install a wood boiler it will be 90% efficient, $17,630\text{kWh} \div 90\% = 19,589\text{kWh}$. So in order to generate 17,630kWh, a 90% efficient biomass boiler will require an input of 19,589kWh.

- Wood chip = $19,589\text{kWh} \div 3,000\text{kWh/tonne} = 6.5$ tonnes (at 30% moisture content)
- Wood pellets = $19,589\text{kWh} \div 5,000\text{kWh/tonne} = 4$ tonnes
- Logs = $19,589 \div 4,200\text{kWh/tonne} = 4.7$ tonnes (20% air dried stacked logs)

Step 2 – Convert the biomass quantities into required storage space

Each type of biomass has a different bulk density (see table 1), the weight per unit volume, in this case kilograms per cubic metre (kg/m^3).

- Wood chip = 6.5 tonnes = $6,500\text{kg} \div 275\text{kg/m}^3 = 23.6\text{m}^3$
- Wood pellets = 4 tonnes = $4,000\text{kg} \div 650\text{kg/m}^3 = 6.2\text{m}^3$
- Logs = 4.7 tonnes = $4,700\text{kg} \div 400\text{kg/m}^3 = 11.8\text{m}^3$

For a 3 bedroom property, storage space is likely to be a major constraint and therefore a biomass storage space larger than 5m^3 is likely to be unfeasible. This means multiple deliveries will be necessary. Assuming a 5m^3 storage space the example property would need 5 deliveries of wood chip, 1 to 2 deliveries of pellets and 2 to 3 deliveries of logs per year.

4 Legal and planning issues

There are several things you must check with your local planning department, depending on your situation. However, we recommend that for any installation it is advisable to contact your local planning department to inform them of your intentions.

- If you live in an urban area you should check if it is in a smoke control zone. If this is the case the biomass boiler you install must be an exempted appliance. See the lists below or ask your installer.

Follow this link to find out if you live in a smoke control zone:

<http://uksmokecontrolareas.co.uk/locations.php>

Then check to see if the appliances you are considering are exempt:

<http://uksmokecontrolareas.co.uk/appliances.php>

- Outside smoke control areas there is no legislation other than a general prohibition on not creating a nuisance, and a requirement not to emit "dark smoke". Burning dry wood on well designed appliances should give no cause for concern. Chimneys should be designed in accordance with Building Regulations Document J.

- Visual impact. If you live in a listed building, conservation area, AONB, National Park or other designated area then you will need to consult your local planning authority about the installation and construction of a chimney flue, fuel storage silo or boiler house.
- Fuel deliveries. For larger installations the number of vehicle movements may be a planning issue, as might the size and type of delivery trucks.

5 Grant funding

5.1 The Low Carbon Buildings Programme

Provides grants for householders, communities, non-profit organisations and businesses. The website contains everything you need to know about this government funded capital grants initiative. www.lowcarbonbuildings.org.uk. Householders are able to apply online. The funding for biomass systems is as follows:

Householders

Pellet stoves and pellet room heaters	£600 regardless of size
Wood boiler systems	£1,500 regardless of size
Log stoves	No funding available

Before applying for a grant towards a biomass system, householders are required to undertake a number of energy efficiency measures:

- Insulate the whole loft of the property to meet current building regulations (270mm)
- Install cavity wall insulation (if the property has cavity walls)
- Fit low energy light bulbs in all appropriate light fittings
- Install basic controls for the heating system (thermostats and programmers/ timers)

In order to take advantage of any offers in your area you should contact your local Energy Efficiency Advice Centre on 0800 512 012.

Community groups, schools, local authorities, charities

Non-profit community organisations such as registered charities, community groups, local authorities and schools can apply to the Low Carbon Buildings Programme. Organisations can apply for up to £30,000, or 50% of the capital and installation cost of the biomass system.

5.2 AONB Sustainable Development Fund

Is available for any project considering a biomass heating installation located in an Area of Outstanding Natural Beauty. Call the Wood Fuel South West Advice Service for more information 08450 74 06 74. Grant deadlines are September 2007.

5.3 Utility Green Funds

Are available for not-for-profit organisations considering biomass heating installations. Up to £30,000 is available for capital funding. For more information call the Wood Fuel South West Advice Service on 08450 74 06 74, or see the following website: <http://www.eon-uk.com/about/2689.aspx>

5.4 Renewable Energy 4 Devon

Operates in Objective 2 areas (this is EU structural funding which helps regions to overcome economic and social problems). Free information packs and advice are available for householders. Free project support, including capital funding is available for businesses and not-for-profit organisations. You must be located within an Objective 2 area of Devon. Call 0800 512 012 for more details.

Objective 2 areas include the following areas: North Devon, Torrington, West Devon, South Hams and parts of Mid-Devon. Or use this link to see if you are located inside an Objective 2 area: www.objectivetwo.co.uk .

5.5 Enhanced Capital Allowance (ECA) for Businesses

'Tax breaks' are available for business installing energy-saving equipment including biomass heating systems. ECA eligible products can be found on The Energy Technology List (ETL) published by the Carbon Trust. ECA claims should be submitted as part of your normal corporate or income tax return.

For businesses with questions about the ECA scheme or want to find out which products are on the ETL, please visit www.eca.gov.uk or contact the Carbon Trust Advice Line on 0800 085 2005 or email customercentre@carbontrust.co.uk

For tax enquiries relating to the ECA scheme, please contact Nick Williams at HM Revenue & Customs on 020 7147 2541, or email nicholas.williams@hmrc.gsi.gov.uk or visit www.hmrc.gov.uk/capital_allowances/eca-guidance.htm

5.6 Interest Free Loans for SMEs

Are available from the Carbon Trust for SMEs installing renewables and energy efficiency measures. SMEs that meet their criteria can borrow from £5,000 to £100,000 with the repayments based on the savings they stand to make by using less energy.

To find out more and to check if your business is eligible call the Carbon Trust on 0800 085 2005 or visit www.carbontrust.co.uk/energy/takingaction/loans_renewables.htm (Renewable Loans)
www.carbontrust.co.uk/energy/takingaction/loans.htm (Energy Efficiency Loans)

6 Further information

The following is a list of links and organisations where you can get further information about wood heating:

The Forestry Commission	www.biomassenergycentre.org.uk	Information about fuel supply and boiler types
Northwoods	www.northwoods.org.uk	General information about wood energy and fuel harvesting
Energy Saving Trust	www.est.org.uk/myhome/generating/types/biomass	Downloadable fact sheets
Bioenergy group	www.bioenergygroup.org.uk	Good case studies
Biomass task force	www.defra.gov.uk/farm/crops/industrial/energy/biomass-taskforce	Detailed review of current activity in the sector
Biomass sector review	www.carbontrust.co.uk/publications/publicationdetail?productid=CTC512	Carbon trust information for larger scale systems
Forum for the future	www.forumforthefuture.org.uk/publications/ruralestatesustainability_page419.aspx	Rural estate sustainability report
Woodfuel Wales	www.woodfuelwales.org.uk	Excellent website with information on many aspects of biomass heating
Wood energy business	www.woodenergybusiness.co.uk	Factsheets and a boiler sizing tool
Centre for Alternative Technology	www.cat.org.uk	Residential courses, resource guides and information booklets
Bioheat.info	www.bioheat.info	EU initiative providing plenty of information
National fireplace association	www.nfa.org.uk/stoves	Searchable database of suppliers and installers

7 Installers and suppliers of wood boilers

Please call us on 0845 74 06 74 if you would like to make any amendments			
Business name	Address	Website	Phone
South West based:			
Bioheat	Farmageddon, Stoke Trister, Wincanton, Somerset.	www.biomassheating.co.uk	01963 32604
Dunster Woodfuels Ltd	Loxhole Saw mills, Dunster, Minehead, Somerset.	www.dunsterwoodfuels.co.uk	01643 821188
Eco-Exmoor Ltd	The Old Post Office, Parracombe, Barnstaple, Devon.	www.eco-exmoor.co.uk	01598 763595
Eco-Plumb	The Old Bakehouse, Butts Lane, Christow, Devon	www.eco-plumb.biz	01647 252226
Econergy Limited	69 Hampton Park, Redland, Bristol. BS6 6LQ.	www.econergy.ltd.uk	0870 054 5554
Optimum Heating	Unit 1, Brannon Court, Brannon Crescent, Barnstaple, Devon	www.optimumheating.co.uk	01271 372888
Treco Ltd	Howe Complex, Kentisbeare, Cullumpton, Devon.	www.treco.co.uk	0845 130 9012
Wood Energy Ltd	Pink Worthy Barn, Oakford, Tiverton, Devon.	www.woodenergyltd.co.uk	01398 351349
Outside South West:			
3G Energi Ltd	Unit 3, The Knowles, Kelso, Roxburghshire.	www.3genergi.co.uk	01573 229198
Ashwell Engineering Services Ltd	36- 38 Marsden Avenue, Queniborough, Leicester,	www.ashwellengineering.com	0116 260 4050
Bioenergy Technology Ltd	Pound Lane, Framfield, Uckfield, East Sussex.	www.bioenergy.org	01825 890140
Energy Innovations (UK) Ltd	Units 5 & 6 Richmond Old Dairy, Gedgrave, Woodbridge, Suffolk.	www.energyinnovationsuk.com	0844 800 6805
The Energy Crops Co	32 Anyards Road, Cobham, Surrey.	www.energy-crops.com	01932 584455
FBC	Sells Close, High Street, Barley, Royston, Hertfordshire.	www.fbcgroup.co.uk	01763 849468
Greeneearth Energy Ltd	Unit 2A Westwood Industrial Estate, Pontrilas, Hereford,	www.greeneearthenergy.co.uk	01981 241399
Mercia Energy Ltd	86 Grosvenor Road, Rugby, Warwickshire.	www.mercia-energy.co.uk	01788 842377
Midlands Wood Fuel Supply Ltd	The Barns, Harnage Grange, Harnage Cressage, Shrewsbury,	www.wood-fuel.co.uk	01952 510001
Organic Energy	The Organic Energy Company, Severn Road, Welshpool	www.organicenergy.co.uk	0845 458 4076
Rural Energy Ltd	Manor Farm, Main Street, Oakham, Leicestershire.	www.ruralenergy.co.uk	01664 454989
Solar Thermal Ltd	The Old Engine House, Goodes Hill, Corsham, Wiltshire.	www.solarthermal.co.uk	01249 715295
Talbott's Heating Ltd	Drummond Road, Astonfields Industrial Estate, Stafford,	www.talbotts.co.uk	01785 213366
Teisen Products Ltd	Bradley Green, Redditch, Worcestershire.	www.farm2000.co.uk	01527 821621

8 Suppliers of biomass fuel - South West delivery

Wood chip

Please call us on 0845 74 06 74 if you would like to make any amendments

Localised suppliers with graded chip size and specified moisture content

Business Name	Delivery area	Chip size	Fuel moisture content	Website	Phone
EnerTree Services	Dependent on method	G30, G50, G100	W35	Under development	01453 543387
Gloucestershire Wood Fuels Limited	Gloucestershire and immediately adjacent area	G30 and G50	25%- 50% depending on client's requirements	www.swea.co.uk	01594 545366
Econergy Ltd				www.econergy.co.uk	0870 054 5554
Forest Fuels Ltd				www.woodfuelsolutions.co.uk	01409 281 977
Wood Energy Ltd				www.woodenergyltd.co.uk	01398 351349

Localised suppliers with variable chip size and moisture content

Business Name	Delivery area	Chip size	Fuel moisture content	Website	Phone
Cole & Sons Tree Surgeons	Bristol				0117 956 7298
Scott Brown Tree Services	Comwall				01209 210 154
Tregothnan Estate Woodlands	Comwall				01872 520 325
Mount Pleasant Garden Services	Comwall				01726 843918
Cornish Garden Nurseries	Comwall				01872 864 380
Comovia Tree Services	Comwall				01209 715 010
Harp Enterprises	Comwall				0845 459 838
Knighton Forestry	Dorset				01929 463640
RP Joyce Tree Specialists	Dorset				01202 825579
Bamyards Ltd	Dorset				01202 828 800
Wessex Independent Help Ltd	Dorset			www.wish-charity.co.uk	01258 446 258
Your Choice	Dorset			www.yourchoiceplus.co.uk	01258 471665
Teign Trees	Devon				01626 773499
Autumn Leaf Tree Care	Devon				07762 644957
Theo Bailache Tree Surgeons	Devon				01404 881318
Bowish Sawmills	Devon				01822 612803
Tamar Joinery Company	Devon			www.tamarjoinerycompany.co.uk	01822 840848
Exmoor Tree Services	Devon				01398 351395
Fredwood Forestry	Gloucestershire				01453 753601
Cheltenham Tree Services	Gloucestershire				01242 581541
Brendon Hill Tree Services	Somerset				07971 531333
Dunster Wood Fuels	Somerset			www.dunsterwoodfuels.co.uk	01643 821188
South Wood Waste Management	Somerset			www.southwoodskips.co.uk	01749 830 688
Higher Court Farm	Somerset				01984 641179
Exmoor Woodfuel	Somerset				01 823 401537

Wood pellet

Please call us on 0845 74 06 74 if you would like to make any amendments

Localised producers of wood pellet

Business Name	Location	Pellet production location	Website	Phone
Brookridge Timber	Hemyock, Devon	Hemyock, Devon	www.brookridge.co.uk	01823 680546

Producers from outside the SW

Business Name	Location	Pellet production location	Website	Phone
Welsh Biofuels	Bridgend, S. Wales	Bridgend, S. Wales	www.welsh-biofuels.co.uk	01656 729714

9 Installers and suppliers of wood stoves

Please call us on 0845 74 06 74 if you would like to make any amendments			
Business name	Address	Website	Phone
A Davidson Chimney Services	44 Norman Rd., Swindon, Wiltshire. .		01793 491494
Alf Revell	11 New Road, Newlyn, Penzance, Cornwall. .		01736 369418
Almondsbury Forge	Sundays Hill, Almondsbury, Bristol. .	www.almondsburyforge.co.uk	01454 613315
Casterbridge Fires	15 Casterbridge Industrial Estate, London Road, Dorchester, Dorset. DT1 1PL.		01305 262829
Corninium Stoves	Unit 14 Elliot Road, Love Lane Industrial Estate, Cirencester, Gloucestershire. GL7 1YS.	www.corninium-stoves.co.uk	01285 659887
Faraday Heating	Shaves House, Northleigh, Colyton, Devon. EX24 6BT.	www.wood-burning-stoves.net	01404 831292
Fosse Fires	Sheep Street, Stow-on-the-Wold, Gloucestershire. GL54 1AA.		01451 831519
Gazco Ltd	Osprey Road, Sowton Industrial Estate, Exeter, Devon, EX2 7JG		01392 444030
Gloucestershire Stove Centre	21c Ermin Street, Brockworth, Gloucester, Gloucestershire. GL3 4EG		01452 623817
Kernow Coal & Fires	Unit 2 Tenant Industrial Estate, Wadebridge, Cornwall. PL27 6HB	www.kernowcoalandfires.co.uk	01208 812527
Lyme Regis Eng Co Ltd	Villager Stoves, Millwey Industrial Estate, Axminster, Devon. EX13 5HU	www.villager.co.uk	01297 35596
Mendip Fireplaces	Windsor Hill, Shepton Mallett, Somerset. BA4 4JE	www.mendipfireplaces.co.uk	01749 344015
Moreton Stove Centre	Mearsdon Manor, Cross Street, Moretonhampstead, Devon. TQ13 9NL		01647 440483
Multifuel Heating Centre	209 Ringwood Road, St Leonards, Ringwood, Hampshire. BH24 2QA		01202 890321
R W Knight And Son	Castle Farm, Marshfield, Chippenham, Wiltshire. SN14 8HU		01225 891469
Stovax Ltd	Falcon Road, Sowton Industrial Estate, Exeter, Devon. EX2 7LF	www.stovax.com	01392 474000
Stove Shop Liskeard	7 Pike Street, Liskeard, Cornwall. PL14 3JE		01579 345018
The Heating Centre	Staunton Court, Ledbury Road, Staunton, Gloucestershire. GL19 3QE		01452 840878
The Stove Centre	103 East Street, South Molton, Devon. EX36 3DF		01769 574411
Wendron Stoves Ltd	Mallow Court, Wendron, Helston, Cornwall. TR13 0NA		01326 572878
Yeoman Stoves Ltd	Hill Barton Business Park, Sidmouth Road, Clyst St. Mary, Devon. EX5 1BP	www.yeoman-stoves.co.uk	01395 233122
South West Woodburning Centre	The Airfield, Torrington Road, Winkleigh, Devon. EX19 8HR	www.stoves-cookers.co.uk	01837 83333
Metal Development Ltd	The Workshop, Wheatcroft farm, Cullompton, Devon. EX15 1RA	www.metaldev.demon.co.uk	01884 35806
Woodhayes	Dunkeswell, Devon. EX14 4QQ		07866 241783