

# A householder's guide to wood fuel

For people who are considering using wood fuel to heat their homes



woodfuelWALES  
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## Our members

We have a range of members from stove shop owners and heating system installers to woodland owners and firewood suppliers, who work within the wood fuel supply chain to make sure you have access to a high quality wood fuel resource.

Find a full list of our suppliers on our online database, visit [www.woodfuelwales.org.uk](http://www.woodfuelwales.org.uk)

## Welcome from Nic Snell

*“Woodfuel Wales helps you use wood as a fuel in your home. We work with wood fuel businesses and private individuals, as well as public organisations, to develop quality wood fuel supply in the form of logs, chips, briquettes and pellets in Wales and the Marches.*

*“We are working to help Wales reach its targets to reduce carbon emissions, and aim to make it easier for people to use wood to heat their homes.*

*“This leaflet will tell you how to heat your house with wood in the most efficient way that suits you and your home. It will give advice on*

*everything from which heating systems to use, to how to find a good fuel supplier.”*



Nic Snell,  
Chair,  
Woodfuel Wales

Woodfuel Wales represents firewood suppliers, heating system installers and designers, woodland owners and stove suppliers - everyone who you might need to help you heat your home with wood. Find a list of our members at:

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

## A versatile and sustainable choice

Wales needs to reach its targets to reduce carbon emissions. Wood is a 'carbon neutral' fuel in that the carbon dioxide it gives off when burned, is absorbed by other growing trees. This does not happen with fossil fuels, such as oil, gas and coal. Fossil fuels give off carbon dioxide, but do not absorb it back, therefore causing pollution levels to rise.

Wood fuel is often called biomass - a plant used for energy, also known as bio-energy - and has traditionally been a by-product of timber industries. However, with increasing demand trees are also being harvested with firewood as the main crop.

Of course, it takes energy to bring a fuel to the point of being used - wood needs to be felled and cut up before it can be used to heat a home. This is called its "embodied energy". The embodied energy of wood fuel - i.e. how much energy it takes to turn a growing tree into a cut log - can be as low as 0.1% of the energy that log gives out. With fossil fuels, it can be 10% or more (not including transport miles).

Modern wood burning appliances are far more efficient at heating homes and offices than the older models were, and there is greater variety in technology, size, style and design to suit your needs and the layout of your home.



# The right system

If you're thinking of changing to wood fuel to heat your home, you need to make sure you get the right system for you. Advances in technology mean that wood burning stoves and boilers are even more efficient and flexible than ever. Here are some things to consider:

First, you need to decide what system will do the job you need it to do. Know whether you are looking at a whole house heating system, (primary heating) in which case you need to be looking at boilers, or whether you are looking to heat parts of your house, for example just the sitting room, (secondary heating) in which case you will need to be looking at log or pellet-burning stoves.

## Questions to ask

### Q: Where will I get my wood fuel from?

- 🔥 Research the wood fuel products available in your area. Ideally you want a ready supply of quality logs / pellets / chips / briquettes to be sourced locally, as that will keep delivery costs as low as possible.
- 🔥 Don't discount pellets, briquettes or kiln dried logs if they are not made nearby - the transportation networks are improving all the time and a dry storage space the size of a garden shed might be enough to store a year's supply.
- 🔥 If you are pushed for time, there are even on-line delivery options, so that someone else does the sourcing and organising of the product you need.

### Q: Can I use any type of wood to burn in a boiler or stove?

- 🔥 You need to consider the quality of the products available. A common misconception is that you can use un-seasoned logs (generally above 50% moisture content) to burn in your boiler or stove. This is absolutely not recommended as it will be inefficient and may damage your appliance. You should never use treated or painted timber.

### Q: What must I have in my home to make wood fuel a good option for me?

- 🔥 You need to consider how the whole system will fit physically within your property. Although work can be carried out to install any type of burner, you need to be aware that a log stove will need a proper chimney, whereas a pellet stove can be fitted into a room with just a flue to the outside. Therefore, for those in more modern homes or in, say, a flat, a pellet burner might be the cheaper and simpler option to install.
- 🔥 A log stove could be serviced by as little as a few square feet in a porch to store logs that are delivered weekly, whereas a boiler system would need space in a utility room or outbuilding, as well as greater storage space.
- 🔥 You also need to consider transportation of the fuel to the fire - you don't want to be barrowing wood for an hour a day because your store is too far from the boiler!
- 🔥 Ash also needs to be disposed of: you will need an outdoor space to allow the ash to cool before binning it. If you have a garden, some

of the ash (not all) could also be used as a soil additive. A large wood boiler will generate a lot of ash, whereas a domestic pellet stove creates as little as a handful a day.

**Q: Would switching to wood fuel affect my lifestyle in any way?**

- 💧 Think about the aesthetics! Do you like sitting around a real log fire during the evening? If so, a boiler in the garage might not do the job, and a pellet stove certainly does not compare with the flame and look of a log fire.
- 💧 Wood fuel does have an impact on your lifestyle. A log stove will require regular manual re-fuelling, whereas an auto-feed pellet boiler will feed automatically from the hopper. An indoor pellet burning stove may only require a few shovels-full of pellets per day which might be a useful consideration for those who couldn't manage - or don't want to manage - carrying logs from store to fireplace.
- 💧 If you are away from home all day, a log stove may mean you return to a cold house, so maybe a wood fuelled boiler would be better. Pellet stove burners have temperature controls, so they could be left on low during the day, and then turned up during the evening when people are sitting in front of them.

**Q: How efficient are wood burning stoves and boilers?**

- 💧 Once you have decided upon your system, research the makes and models. Open fires may look nice, but they only operate at around 15-20% efficiency, whereas modern wood-burning stoves will operate at a level of 70-80% efficiency. Wood fuel boilers can work even more efficiently and reach highs of 85-90%.
- 💧 These figures are offered as an industry guide and you should take into consideration variations between different manufacturers and models.
- 💧 Even if you already have an appliance - consider up-grading it: newer models have a far higher rate of efficiency, and pay-back time for the investment could be small.

**Hot tips**

The key questions our members recommend you ask any retailer are:

- 1) What system would best fit my home and my needs?
- 2) Can you provide me with a list of some local good quality fuel suppliers?
- 3) What would the installation costs be - will my house need modifying?
- 4) How would running costs compare to my current system?
- 5) What safety equipment will I need?



# The right type of wood fuel for you

There are four main types of wood fuel: logs, briquettes, pellets and chips. All have different benefits and drawbacks. Choose your system and type of fuel to suit your situation.

Consider the space you need to heat, your storage area, your budget, fuel availability and how systems fit your personal lifestyle.



## About briquettes

- ❖ Briquettes are usually made out of dry sawdust, which is compressed into different shapes and sizes. However, they can also be made out of peat, straw, leaves, rapeseed and even bio-digestant. They tend to be supplied in small 10kg bags, or blocks.
- ❖ A briquette is heavier than a similarly sized log due to its density, but has a lower moisture content (below 10%), so is more efficient for those with less storage.
- ❖ A briquette can be used in a similar way to logs (open fires, stoves, boilers) and will tend to burn for longer and at a higher temperature. Caution is needed when placing on open fires as they tend to expand when hot.



- ❖ Some forms may produce higher ash content; this will depend on the raw material used. Also be aware that if they get wet, they will disintegrate so dry storage is vital.

## About wood chips

- Wood chips are chopped-up pieces of wood which are fed from a hopper into a wood chip burner, via an auger. Water is heated and piped around the buildings to provide the warmth.
- Chips are most suitable for medium to large scale boiler systems e.g. in schools or hospitals and very large homes or estates.
- Chips are manufactured from a range of sources: forestry, clean recycled wood, arboriculture and factory wastes. Chips can range in size (2mm to 5cm) and have a relatively low energy density. Their moisture content will typically be 25-30%.
- The running of wood chip boilers can be affected if chip size or moisture levels differ, or if there is too much ash - due perhaps to chips with bark on.



- Chip boiler systems need large storage space, and boiler shutdown is normally associated with inconsistent fuel supply rather than the hardware itself.
- A good wood chip system will provide a large home or complex with relatively cheap and environmentally friendly heat and hot water.

## About pellets

- Pellets are usually made from waste sawdust compressed into a small cylindrical shape. They are commonly about 6mm long, similar in appearance to chicken feed pellets! Pellet size is critical to a smooth appliance operation.
- With 8% moisture content, pellets have a high and consistent energy density compared with logs and chip; they also produce little ash.



- For bulk users, pellets can be delivered by lorry and be dispatched into a storage hopper with a fully-automated boiler feed system.
- For smaller scale users who have single room heaters, pellets can be purchased in small bags weighing around 10-20kgs.
- Avoid poor quality pellets that fall apart easily and create dust. Instead, choose pellets of a consistent length with a smooth finish and certified to ENplus standards.

## About logs

Logs are the most versatile and available form of wood fuel and, of all the wood fuels, are the easiest way of heating a home with a chimney. Logs can fuel open fires, stoves and modern boilers in homes of all sizes. However, when buying your logs, you need to ask these questions:

### Ask about delivery options...

- 🔥 Ask how your supplier can deliver to your home - do you want them dumped at the gate, in returnable bags, or do you want them stacked into your log store?
- 🔥 Remember to ask about delivery charges, bag deposits and stacking costs.
- 🔥 Make sure you have a suitable storage area. Logs stored outside need to be raised above the ground in a well ventilated area and protected from the rain, and not only close to the house but convenient for the delivery.
- 🔥 Check that the logs delivered are suitable in terms of size for your stove or boiler. A standard log length is about 25cm.

### Ask about weight and volume...

- 🌿 Understand what you are buying. Logs are sold by the load, in tonnes, loose cubic metres, stacked cubic metres or in small bags. If you buy by the 'load', always ask what volume the load contains.
- 🌿 Always buy logs by volume and not by weight, because volume does not take into account moisture content. Purchasing by weight



means you might be just buying a lot of water!

- 🌿 When buying by cubic metre, check if it's a loose or stacked cubic metre. A loose cubic metre (when logs are piled randomly) contains a third less wood than a stacked cubic metre (when logs are stacked neatly).

### Ask about the moisture content...

- 🌿 If you buy unseasoned (green) logs they will have a higher moisture content, but should be cheaper, although you'll need to dry them before burning. If you have a spare and suitable covered area that you could leave next year's supply to dry in, this might be a good financial option.
- 🌿 When using a moisture meter, always test the split surface of a freshly split log - the difference between the inside and outside can be as much as 15%, but the average moisture content across the log should be no more than 25%.
- 🌿 Logs are ideally split to a 5-12cm diameter for most efficient drying and burning.

## Case study



### Better heating for our Carmarthenshire modern home

Paul and Pam Bennett have been using wood to fuel their whole heating system at their modern home in Llandeilo since summer 2011. Here, Paul explains why it's the right choice for them:

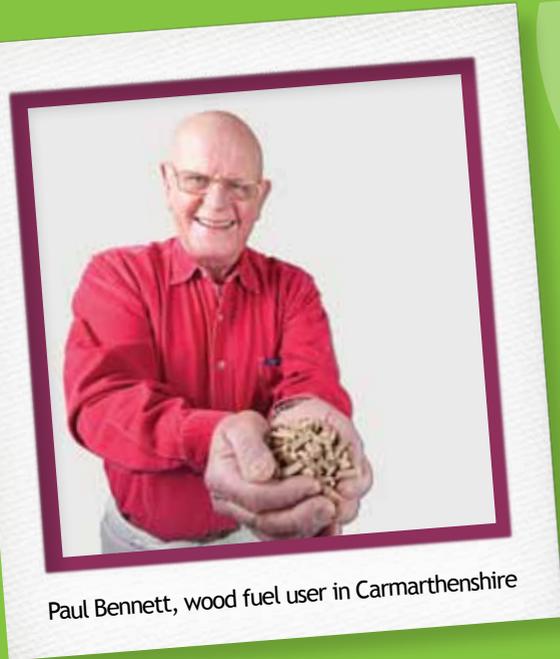
*"We moved into our home about eight years ago and didn't spare a thought for heating options. Like many new-builds, our house was built with an oil supply, but with oil prices continuing to*

*rise, we realised that we needed to think about the way we'd be heating our home in the future.*

*"We live in a rural area and so wood fuel seemed a natural option for us to consider. We didn't have any knowledge about wood burners or previous experience of using wood fuel, so we decided to do some research.*

*"I contacted a local boiler and stove retailer - a Woodfuel Wales member - based in Swansea following a local recommendation. A very helpful fellow came to our house, looked at our existing set-up, and explained what options would suit best. It was important for us to have a unit that would tie in with our existing central heating system and not be too intrusive, once it was set up in the garage.*

*"We finally opted for an auto-feed pellet boiler and within four months we had made the switch from oil to wood. Since the installation, our heating system is working equally as well as it did with oil. Wood fuel is not a dwindling source of fuel, and by using it to heat our home we are helping the environment by using a sustainable source. Although installation may not be cheap, we view it as a long-term solution that will provide savings."*



Paul Bennett, wood fuel user in Carmarthenshire

# The right quality of wood fuel

To make sure you get the maximum heat from your wood fuel appliance, you need the best wood to put in it.

The two things to bear in mind when buying your wood are the type and the moisture content.

## Wood type

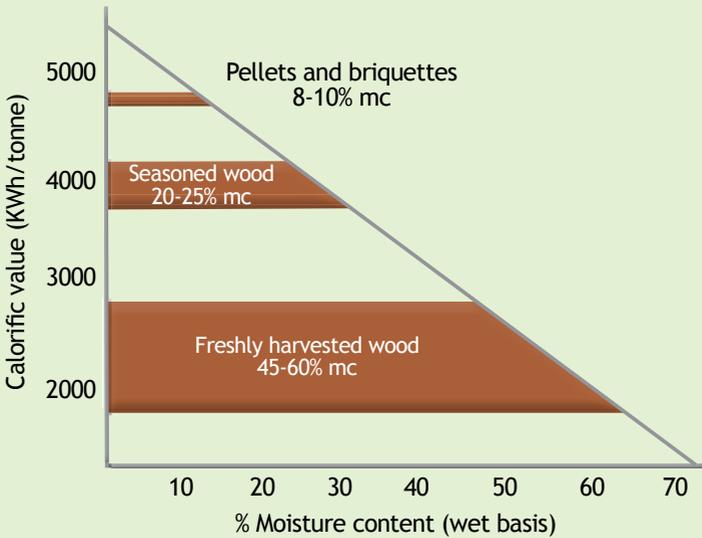
The heat given off from burning wood is measured as its calorific value. We have traditionally thought that hardwoods, such as oak, ash, beech and sycamore are better for firewood than softwoods, such as larch or spruce. However, although hardwoods are denser and therefore heavier, they have the same calorific value, per kilogram, as softwoods do, but you could need as much as twice the volume of softwood for the same heat output. Hardwoods tend to be more expensive, but burn slower than a softwood log of the same size. If you have more storage space, want to get a fire going quickly, are happy to re-fill your fire more often and are looking for the cheaper alternative, softwoods are a good option.

## Moisture content

It is important to know what the moisture content is of any wood you are buying to burn. The more water contained in the wood, the less heat will be released to warm your home as that heat will be used to evaporate the water from the wood. This will also create unwanted steam which will reduce the level of heat even further. Therefore, a log that is heavy may not burn as well as a lighter log, as it may contain a lot more water. To burn as efficiently as possible, wood needs to be dry or seasoned before it is burned.

As well as being inefficient, wet wood can also damage your system as it will cause tar to build up in your stove and flue - this is ultimately what causes chimney fires. Have you ever experienced your stove glass turning black? If so, it's almost certainly because your wood is not dry enough. The correct moisture content in wood will ensure a clean efficient burn and a clean chimney, although even with dry wood, you still need to have your chimney swept at least once a year. Some log suppliers now use kilns to speed up the drying process and provide a more consistent product. These kilns can even be fired with wood waste or by solar, or using biofuels. Ask your supplier how the wood was dried and using what fuel. Also ask the source as kiln dried is often imported.

## So what's the optimum moisture content?



Freshly harvested wood will have a moisture content of over 50%, but the industry quality standard for firewood has been set at 25% (wet basis) or less. Drying wood fuel to around 20 to 25% moisture content can almost double its calorific value and therefore heat output.

To ensure you get the best out of wood fuel we recommend using a moisture meter to test firewood, placing it along a freshly split surface of a log. A good wood fuel supplier will always know the moisture content of their product and be able to demonstrate it with a meter.

### The Woodfuel Wales Quality Assurance Manual

The manual outlines the commitment HETAS shares with Woodfuel Wales for the production of high quality wood fuel and sets out a pathway towards becoming a HETAS certified quality wood fuel producer under the QAF scheme. The scheme covers all wood fuels, firewood logs, wood chips, pellets and briquettes.

For the highest standards of Quality Assured Fuel, look for HETAS approved suppliers that use the logo below.

### Ensure your appliance is fitted safely

For advice and information about finding a registered and competent wood burning appliance installer go to the HETAS website [www.hetas.co.uk](http://www.hetas.co.uk)





Woodfuel Wales is an initiative of the Welsh Timber Forum that represents and promotes the wood fuel industry in Wales and The Marches.

A Welsh version of this Guide is available to download on the Woodfuel Wales website.

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