

INTRODUCTION TO LOG-FUEL STOVES

1. Introduction

This leaflet provides introductory information on choosing, installing and operating log-burning stoves for people using or interested in using logs for space or water heating. For detailed technical information see the sources listed in Leaflet 2 - Resources.

For lists of stove manufacturers, suppliers and installers, see Leaflet 2 or www.scottishwoodfuelnews.org.uk. For information on heating with woodchips or pellets, see www.usewoodfuel.co.uk.

2. Why woodfuel

Cost - Woodfuel is often cheaper than other sources of fuel. Heating a medium-sized house may use 7-10 tonnes of woodfuel per year, at a cost of £50-150/t – a total of £350 - 1,500 per year.

Environment - Woodfuel is a low-carbon fuel. Growing trees absorbs CO₂, so there are no net CO₂ emissions from burning it. The only emissions come from harvesting, cutting and splitting and transport, plus a little for woodland management operations like fencing. These are very small compared to the carbon in the wood. Burning woodfuel emits slightly more nitrous oxides and particulates than gas, (but less than coal or oil), and this can be

minimised by choosing a well-designed stove and operating it efficiently. Growing woodfuel means more woodlands, which provide vital habitats for wildlife.

Local economy - Log fuel is mostly supplied by small local businesses and forestry workers, providing employment in rural areas. Local sources mean less haulage and closer links between supplier and customer - meaning the customer can have a lot of influence on the way the supplier does business.

Open fires lose 80% of the heat up the chimney

Self-reliance - Once you have your winter's stock of woodfuel laid in, you're in control of your heating – no risk of freezing if your electricity is cut off or your gas, oil or coal can't be delivered.

3. Choosing wood-fuelled heating equipment for your home

Things to consider

If you are in a Smoke Control Area ("smokeless zone" see: www.smokecontrol.co.uk), you should have a clean-burn stove that meets the relevant legal criteria (see: www.stovesonline.co.uk/cleanburn-cleanheat-stove.html). Woodstoves suitable for smokeless zones should carry a label indicating that.

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Hot stoves are dangerous for small children, although properly fixed fireguards are very effective.

Do you want to heat one or more rooms separately or the whole house? Does your house have usable chimneys or will you need to create a flue?

Working out what size of stove you need

This depends on the size of room, number of external walls, construction including insulation, and several other factors. Simple calculators are available on websites (e.g. www.stovesonline.co.uk/calculator.asp) or you can buy a plastic calculator (Domestic Central Heating Calculator - www.mhmear.com/shop_frame.htm). In very rough terms, a small room (3m x 3m x 2.4m high) in an old building without insulation might need 2-3kW.

Domestic options and rationale for choice

Most woodstoves simply heat the space around them and are rated from about 4kW to 15kW. Boiler stoves are larger (mainly in the range of 15-20kW). They provide space heating but also have water jackets or other heat-exchangers to heat water that can then be circulated to radiators in other rooms (and, via a heat-exchanger, to a hot water

storage cylinder for taps and showers). You can also get larger log-fuelled boilers (mainly 20-300kW)

Stoves are easy to re-light with dry wood and dry kindling

which only provide hot water, but these are not covered here.

If you are at home most of the time, then it's easy to keep a log stove going, but if you are out much of the day, you'll need to light the stove when you come in. A good stove will start heating the room within a few minutes and they are very easy to light.

An alternative is a radiator-based system with an accumulator tank heated by a boiler stove (for smaller houses) or a larger log-fuelled boiler. With such a system, a single firing can provide hot water sufficient for one or two days.

Many log stoves have glass windows to allow you to see the fire. This doesn't affect their performance and modern internal pre-heated air circulation systems prevent tar and soot build-up obscuring the glass.

Multi-fuel stoves

Many log stoves have a multifuel option, which allows you to burn coal instead of wood. These can be as efficient as log-only stoves, but it is best not to burn coal and wood at the same time, as their burning characteristics are different.

4. Installing a woodburning stove

Location

Log stoves give out heat all round, so a location set out from a wall will provide maximum air circulation around the stove and most effective heating of the room. They must be connected to a working chimney and sit on a fireproof hearth to meet current building regulations.

Don't try to keep in a fire overnight by closing air vents as this creates smoke

Chimney

If you have a chimney, have it swept and checked for damage or blockages before installing a stove. Install a cowl to prevent things falling down the chimney and blocking it. It's always worth checking that the chimney-stack is in good condition.

If you don't have a usable chimney, you may be able to install a prefabricated chimney system using either twin-wall stainless steel pipes or an insulated block system. The chimney should rise to about 1 metre above the ridge height of your building and should not be overshadowed by higher adjacent structures.

Chimney lining

Most chimneys are unlined – meaning that the brick or stone is





Ventilation

Burning wood needs oxygen, and so stoves need fresh air. This is occasionally provided by vents from the underfloor airspace, but more usually by vents in windows, walls or doors. Your installer will be able to tell you what's needed.

5. Operating a woodburning stove

How much woodfuel will I need in a year? About 3.5 to 4.5 cubic meters of stacked and dry wood for a mid-sized stove.

Never burn wet wood

What types of woodfuel are there?

The key distinction is between wet and dry wood. Never burn wet wood in a stove. It is difficult to ignite and keep alight; it gives far less heat (much of the heat is used in evaporating the water) and it gives off corrosive gases which can damage your chimney as well as tars which can cause chimney fires.

Freshly-felled trees contain about 50% water (i.e. 50% moisture content or MC). A log that has been properly air-dried will have 15-20% MC, which is recommended for efficient burning, although drier wood is even better. Wood that has rotted to the extent that it is soft has lost a lot of its energy value. Drying can take varying times, depending on the time of year and climatic region (hence weather), protection from rain, openness to airflow, type of wood (horse chestnut dries much faster than

oak, for instance) and dimensions of logs (smaller logs dry quicker). A rough rule of thumb is that a log will be sufficiently dry after a year under cover in an airy stack, although some woods (e.g. oak, elm, holly) may need longer. You can buy a moisture-meter, but that only measures MC as deep as the probes go. Beware of buying kiln-dried logs, as kilning often only dries out the surface layers.

The other main distinction is between hard and soft-woods (from broadleaved and coniferous trees respectively). Coniferous trees tend to contain more water, but dry more quickly and are lighter when dry. Softwoods often contain more resins, resulting in tars when burnt badly, but efficient burning of dry wood can eliminate this problem. Hardwoods are usually denser when dry and so will last longer and give out more heat.

You can also burn wood pellets, chips and briquettes in a log stove, although they have different characteristics so get advice

Buy a flue-gas thermometer for about £8. It's like having a speedometer fitted to your car!

exposed on the inside of the chimney. As they are un-insulated, wood combustion products may find it easy to condense on the inside of your chimney which could either block the chimney or cause tars to seep through the masonry. There may also be loose stones or mortar, which can fall down blocking the chimney. It is always best to have your chimney lined when installing a log stove. Linings are either twin-wall flexible stainless-steel pipe or "cast in-situ" cement linings. Cost depends on the condition of the chimney, length to be lined, and the material used. Lined chimneys heat quicker improving draw and so getting the fire going more quickly.

Hearth

All stoves require a hearth of non-combustible material (e.g. stone or concrete) to both support the stove and also to protect against burning embers falling out onto the floor. The hearth must extend beyond the edge of the stove's footprint.(approx. 12 inches to front and 8 inches to sides). Stoves are also required to be set away from walls to allow air circulation and prevent damage to potentially combustible materials.



before using them. Don't burn chipboard, plywood or MDF, as they contain bonding agents which can be toxic when burnt. Burning painted wood may give off toxic fumes.

Most woodfuel is split logs, but unsplit branchwood down to 2-inch diameter is perfectly acceptable, although smaller pieces may burn quicker than big logs. Very small pieces can be used for kindling.

Buying woodfuel

Find a reputable supplier. A list of these is included in Leaflet 2 - Resources.

There are no standard quantities for woodfuel. It is supplied in small bags (of different sizes), ton bags (rarely containing a ton), and trailer-loads. Ask your supplier how they dry their wood and for how long.

Storage and drying

Since it's very difficult to ensure that you get only properly dried wood, you should have a log-drying woodstore. You'll also need this to keep your stock of wood dry after delivery. The main requirement is a rain-proof covering and at least one open side to allow draughts to carry away damp air. More



open sides means more air flow and so better drying. Protect your stack from rain blowing in the sides by extending the roof beyond the stack. The logs need to be stacked so that they don't fall down (unless they're held in a cage). Buttress the stack at each end against a wall or with posts sunk into the ground. Raise the bottom layer off the ground on bricks or they may rot. Split any logs down to a usable size before stacking to speed drying. The ideal store would hold 2 years supply of

logs. For a mid-sized stove this would be about 9 cubic metres.

Operating the woodstove efficiently

Your stove should come with instructions covering lighting and operation, which may vary slightly depending on the make and model. In general, use kindling that's as dry as possible. The fire is most efficient when it's burning with a gentle flame or just glowing charcoal (flue gas temp 100-250°C).

Smoke indicates inefficient burning and should only be noticeable when lighting the fire; damping down a big fire by closing air vents leads to smoke; smoke contains soot particles and volatile chemicals (tars) which can settle inside the chimney – serious build-ups of soot and tar can cause chimney fires.

Maintenance

Get your chimney swept regularly (once a year) by a chimney-sweep used to dealing with woodstoves. If your stove has fire-bricks, replace any that are broken or heat may cause the stove casing to warp or crack. Make sure air vents and airways aren't blocked with ash or soot.



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