



FACTSHEET 1: Introduction to Wood Fuelled Heating

Introduction

Wood is a renewable, sustainable, cheap, clean and safe source of energy. The UK has good potential for competitively priced wood fuel production.

Wood fuel is carbon neutral – when wood is burnt it emits the same amount of CO₂ into the atmosphere as absorbed during the life cycle of the growing plant. There are no toxic risks associated with its use, unlike other fuel sources such as oil and gas.



Traditionally wood fuel has been used to heat homes, either in open fires or in primitive wood burning stoves. These methods of burning fuel are usually quite inefficient, with around 85% of the heat produced going up the chimney.

This traditional image of wood heating involving smoky open fires that fail to heat the whole room effectively is no longer valid. Modern wood heating, as a result of new wood-burning technology, is clean, efficient and cost effective. Wood pellet burners can provide efficient automated space heating in place of traditional wood stoves and open fires. Wood fuel boilers can now fill the same role as traditional fossil fuel boilers, and provide competitively priced hot water for any number of central heating or hot water needs.

1. The Fuel

Automated wood heating systems run on either wood chips or wood pellets. The two main considerations for wood fuel are the moisture content, and its volume. All wood fuel will have moisture content – the lower the moisture content the greater efficiency and the cheaper more cost effective it is to transport (as less water is transported).

The volume of wood fuels is an issue – wood fuel requires a lot more storage space than fossil fuels, and this can be a problem. Wood pellets will require 3 times, and wood chips 10 times, the storage volume of oil to provide similar amounts of heat. Storage space can be built sub-terrain to minimise visual intrusion.

The transport of low-density materials is also a major consideration, and will greatly affect the cost of the fuel. To be economic the supply of wood fuel should be as local as possible.



FIGURE 1: WOOD CHIP WITH SCALE INDICATOR

Wood chips are traditional chipped wood, and should be of a fairly uniform size for smaller schemes, so as to work well in an automated machine. The benefits of wood chip fuel are its associated low cost and its abundant availability. Well-prepared wood chip should have moisture content of 30% or less, and at this level it will constitute a cost effective and efficient fuel, providing heat for around 0.8p/kWh (significantly cheaper than oil, LPG, and mains gas).

Wood pellets are made from compressed sawdust and wood shavings (and also other biomass products such as straw and biomass crops), and can be produced to very uniform specifications – typically short pellets of 6mm-10mm in diameter, resembling animal feed. These pellets can be produced to a much greater density than wood chip, and hence take up less space. Their uniformity of size and their ability to flow makes wood pellets ideally suited to automated

Machines. Wood pellet fuel requires a lot less storage, and can also be supplied in sacks so lorry access is not always necessary – in many ways it is a much more suitable fuel for the smaller domestic schemes. The main issue with wood pellets is cost. Wood pellets are only about 10% cheaper than oil (p/kWh). This could improve dramatically as fossil fuel prices continue to rise, and wood pellet production becomes more widespread in the West Country.



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efficiencies. All this ensures that these systems can reliably provide hot water to a constant temperature.



FIGURE 2: WOOD PELLETS

2. Automated pellet stoves

Pellet stoves fulfil the role of traditional wood stoves and open fires, heating any room with a chimney or flue. They are, though, fundamentally different in the way they provide space heating.

Automated pellet stoves offer automatic ignition, thermostatic control, they are clean and easy to use, and operate at an 85-90% level of efficiency. Integrated into the burner is a fuel hopper that provides fuel automatically to keep the temperature constant at the level set. They use convection to spread the heat rather than radiation, which means that spaces are heated much more efficiently and evenly, and so fuel is used very efficiently. These stoves can also be connected to the hot water system and some of their heat used to provide hot water, further increasing their efficiency.

3. Automatic wood burning boilers

Automatic wood burning boilers can fill the role of traditional fossil fuel powered boilers in providing hot water for space heating or other hot water needs. Boilers are manufactured to burn either pellets or wood chips.

Wood fuelled central heating and water heating systems are now very reliable, highly efficient and totally automated. They require a slight amount of input, typically a fortnightly emptying out of ash, but besides from this they offer all the convenience of an oil or gas boiler. They have fully automated thermostatic control, precise automatic fuel feed, a precisely controlled air supply ensuring optimum air-fuel ratios enabling the systems to run at very high



FIGURE 3: DOMESTIC PELLET BOILER

4. Cost Considerations

At the moment the capital cost of installations is more expensive than traditional wood stoves or fossil fuel fired boilers. Each system will also require a fuel store and/or fuel hopper that will increase costs. An automated wood pellet heater will be in the range of £1500-£2000, a domestic sized wood fired boiler from £5000-£8000, with larger wood boiler systems over 50kW costing around £100-£120 per installed kW.

Yet with wood chips being so much cheaper than traditional fuels the economics can work out favourably, especially for larger systems. Wood pellet systems currently do not work out as well economically in comparison to wood chip, however they remain a highly attractive and functional solution to heating needs.