Using wood and coal for home heating

Environmental Protection UK

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Solid fuel heating

Solid fuel can be a cost-effective way of heating your home and providing hot water, particularly in rural areas where mains gas is not available. In recent years interest has also grown in biomass heating (wood burning) especially as it has been described as a potentially environmentally friendly way of heating homes. This promotion is, however, open to challenge.

Types of solid fuel

Solid fuels fall into two main categories – mineral and biomass. Mineral fuels include bituminous coal, natural smokeless fuel (anthracite and dry steam coal), manufactured smokeless fuel and manufactured non-smokeless fuel. The most common biomass fuel used is wood.

Wood is available in many forms including logs, manufactured logs (usually a mixture of wood and wax), chips and pellets. Other mineral and biomass fuels exist, however you should not use these unless you have absolutely clear instructions that these can be used in your solid fuel appliance without creating excess pollution and, if you live in a smoke control area, that the fuel has been authorised for use in such areas. Mineral fuels in this category include petroleum coke. Biomass fuels are many and varied, for example agricultural and animal wastes.

Burning such waste, including waste wood, in a solid fuel appliance can produce very high emissions of pollutants, potentially affecting the health of your own household and that of your neighbours. Wood is often treated and burning this can release highly toxic chemicals into the air. This can include heavy metals and toxic organic compounds.

There are other forms of solid fuel, but these are not commonly used in the UK. One, certainly used in the Republic of Ireland, is peat and another, intermediate between coal and peat, is lignite. This is widely used in Eastern Europe.

Solid fuel appliances

The simplest type of solid fuel appliance is an open fireplace; however, these are not very energy efficient as much heat is lost up the flue. Closed appliances, such as room heaters and wood burning stoves, are usually much more efficient.

Solid fuel can also be used in cookers, and in more complex systems such as gravity fed boilers that can provide heating and hot water for an entire house

Emissions to air

About 85% of UK households use natural gas for home heating, making it a useful benchmark for environmental impact. Using coal and other mineral solid fuels for home heating will usually result in higher emissions of both local air pollutants (such as particles and sulphur dioxide) and carbon dioxide (a greenhouse gas) than an equivalent natural gas fired system. Therefore, coal fired heating will normally have a higher environmental impact than gas appliances.

With wood fuel the picture is not so clear. Wood has often been described as a "carbon neutral" fuel, as the emissions of carbon dioxide emitted into the atmosphere when the wood is burned are, in theory, matched by the amount of carbon dioxide the wood absorbed when it was growing. There are, however, other emissions of carbon dioxide associated with forestry practice as well as the transport and manufacture of wood fuels. However, on balance, wood fuels will probably have somewhat lower "lifecycle" emissions of carbon dioxide than natural gas.

In contrast, emissions of local air pollution from a modern wood fuelled appliance are almost always higher than those of an equivalent gas fired appliance. Emissions from an older appliance are likely to be higher still. The environmentally friendly choice therefore, in a large part, really depends upon where you live.

If you live in a rural area where the air is relatively clean and gas or electric supplies limited or non-existent a wood fuelled system may be the only viable option, whilst if you live in an urban area with poor air quality a gas-fired system will probably be the best choice environmentally so far as the immediate environment is concerned.

There are, however, other considerations with using wood as a fuel. First of all, it is essential that the wood to be burned has been properly dried and seasoned and that it has not been treated with any preservative or paint. Secondly, although a considerable amount of the particulate matter, especially $PM_{2.5}$, found in urban areas, and responsible for many of the adverse health effects of air pollution, is emitted locally, a considerable amount is "imported" and some of this is the result of domestic combustion in rural areas. Overall, it is estimated that 34% of $PM_{2.5}$ in the UK is emitted by domestic wood burning.

With any type of heating system, you can minimise your environmental impact by ensuring your homes is as energy efficient as possible. The Energy Saving Trust can provide advice on how to do this, and on any grants that are available.

Smoke Control Area

Local authorities can declare the whole or part of their district to be a Smoke Control Area under the Clean Air Act 1993. This means that you will be committing an offence if the fuel you are using is not an approved smokeless fuel, or your solid fuel appliance has not been tested to ensure it can burn ordinary fuels without creating smoke. Such installations known as "exempt appliances".

Exempt appliances are normally only approved to burn certain types of fuel, and it is therefore important that you only burn the correct fuel for your appliance.

Information on the location of smoke control areas, approved fuels and a list of exempt appliances is available at **https://www.gov.uk/smoke-control-area-rules** . If you are in doubt as to whether your property is in a declared Smoke Control Area, you should contact your local authority.

Minimising emissions to air

To reduce the amount of pollutants produced from burning solid fuel, make sure you maintain your appliance adequately and ensure that the fuel is clean and dry. Burning of wet fuel, such as unseasoned wood, will mean that the fuel will burn at a lower temperature and will result in higher levels of emissions, including dioxins, furans, carbon monoxide, carbon dioxide, particles, and nitrogen oxides. Burning contaminated fuel, such as painted or preserved wood, will also lead to higher emissions.

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