Bioenergy for planet, people and profit

Fire away with domestic wood-fuelled heating systems!

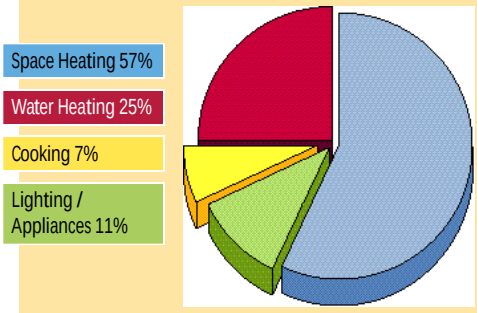
Introduction

Wood is a clean, renewable energy source and is one of the oldest forms of fuel. The use of wood as a fuel source declined over the past 200 years with the increase in the use of fossil fuels such as oil, coal and gas. But today, wood fuel is making a comeback because wood fuel heating systems are now available which provide the same level of comfort, convenience and reliability as oil or gas boiler systems.

Why use wood as a fuel?

Using wood fuel has a number of important benefits but the main ones relate to the environment and sustainability.

- Wood is renewable. It is formed in 3 to 70 years compared to thousands or millions of years for fossil fuels coal,oil and gas and so is a sustainable fuel choice.
- Heating our houses and water accounts for over 80% of energy use in our homes, so greener heating choices make a big contribution to sustainability.



Domestic Sector

Breakdown of energy consumption by end use in EU residential buildings (Thermie ATLAS project report, 1997).

- Modern wood fuel systems have a high degree of controllability, require limited re-fuelling and produce minimal amounts of ash, bringing a high degree of convenience to the wood fuel choice.
- Using wood as a fuel does not contribute to net greenhouse gas emissions because trees remove carbon dioxide from the atmosphere as they grow. (See IrBEA's leaflet on Climate Change for more detail).
- Sustainable forestry, where for every tree felled one is planted or where trees are coppiced, makes a positive environmental contribution.
- Using indigenous wood fuel reduces the amount of other fuel that we have to import into the country and therefore increases our self-sufficiency.
- Wood fuel industries create long term jobs, many of which will be in rural communities currently suffering social and economic decline.

IRISH BIOENERGY ASSOCIATION

Table 1 Wood fuel versus coal and peat

Fuel source	Energy value (GJ/tonne)	Ash content	CO_2 emissions (kg CO_2)/tonne	Years to form
Firewood	13.5	1 - 3%	0*	3 - 70
Peat	18.5	2 - 15%	104	Thousands
Coal	28.3	5 - 50%	86	15 - 400 Million

*Practically zero net emissions as wood is carbon neutral

Source: Irish Energy Centre, Renewable Energy Information Office

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What is wood fuel?

Size and shape

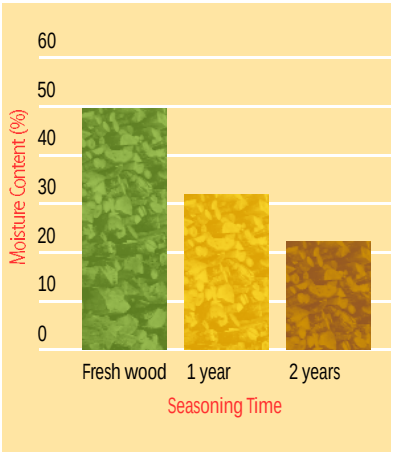
Logs and sticks are the most familiar form of wood fuel, but are not the only choice. Systems have been developed to use wood fuel in a variety of forms:

WOODCHIPS
chopped using a wood chipper (typically 25mm square)
WOOD PELLETS
high density pellets produced from sawdust or ground-up wood (10-30mm in length and 5-15mm in diameter).
WOOD BRIQUETTES
larger versions of wood pellets, similar in dimensions as firewood.
FIREWOOD
logs (up to 100cm long and 15cm thick)

Quality

FIREWOOD
Wood by its very nature is a variable material. There is no set standard for firewood in Ireland at present but the most important points to remember are the moisture content and the type of wood.

Moisture content (m.c.): It is vital that firewood is seasoned for at least one year (two years is preferable).A freshly felled tree can be made up of over 50% water. Reducing the moisture content means energy isn't wasted evaporating water in the fire. You can either purchase pre-seasoned wood or else season it yourself, but remember that seasoned wood must be kept dry.



Tree type: Equal weights of wood from different kinds of trees (at the same moisture content) contain the same amount of fuel. However, trees differ in density. Oak is denser than pine, which means that a pine log contains less fuel than an oak log of the same size and moisture content. Also, some trees produce much drier wood than others. Freshly felled ash produces very dry wood, 33% moisture content, compared to fresh poplar which can be up to 60% moisture content. As a result ash can be burnt with little seasoning while the poplar would need to be stored for at least a year.

WOODCHIPS,PELLETS AND BRIQUETTES
Although there are no major suppliers of these types of wood fuel in Ireland at present, there are international standards which should be met to ensure good quality and efficiency. These standards relate to size, shape, moisture content, ash content etc. All of these will effect the efficiency of the heating system.

For a guide to these standards, contact the Irish Bioenergy Association (IrBEA) or see www.finbioenergy.fi/bioenergy_in_finland

Wood briquettes

Sourcing wood fuel

Fire wood may be freely available in your area,but please ensure that you are using it sustainably and that a new tree is planted for each tree used as fuel,or that the trees are managed as coppice.

Alternatively, wood fuel can generally be purchased from your local fuel merchant. In most regions there are a number of suppliers who gather fire wood from local forests.

How to use wood as a fuel

Storage

FIREWOOD

This is best stored under cover in an airy place, which allows for steady drying of the wood. Typical places would be a lean-to at the side of a building or an outhouse. Wood left uncovered will dry quickly in the sun but will regain moisture in wetter conditions.

WOODCHIPS, PELLETS

These need to be protected from rain and frost to prevent deterioration and loss of quality.

Burning wood fuel

Wood burns best when it has plenty of air circulating around it.

FIREWOOD

In stoves or open fires it is best to let the wood burn freely until it is reduced to charcoal, then reduce the air flow and 'damp' the fire down. The charcoal will then burn well like this for many hours. By simply filling a fire with logs and 'damping' it down straight away you generate lots of smoke and tar, which wastes fuel, causes pollution and results in soot build up in the chimney.

WOODCHIPS, PELLETS

Systems that use these forms of wood fuel burn them quickly in a small, efficient fire. These systems work in the same manner as oil or gas boilers. The only labour input required is topping up of the fuel store and ash removal and even these can be automated.

How much wood fuel do you need?

The wood fuel requirement for a typical family home with 150m^2 (1600 sq. feet) floor space and a 12 kilowatt (kW) heating requirement is approximately 300kg per week during the heating season, which is about 50 logs of firewood per week. This will vary depending on many factors - the size of the house, how long you want the house heated, how hot you want it, the type of wood that you use and the heating system.

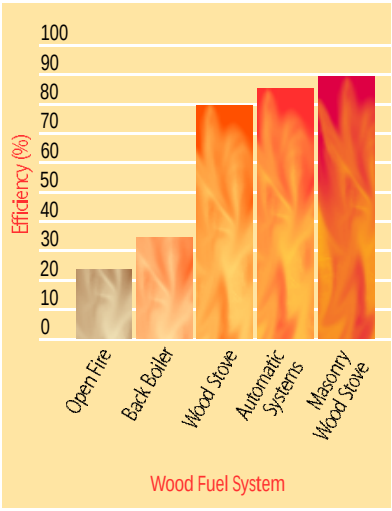
Choosing a wood fuel system

The wood fuel heating system that you use will vary depending on the size of the house, the wood fuel available and storage space.

Stoves and fireplaces: Logs can, of course, be burned in place of coal and turf in traditional fireplaces. Far greater economy and efficiency are achieved if a modern closed fireplace or stove is installed. A wide range of high efficiency fireplaces, stoves and ranges are now available from traditional to hi-tech. Dedicated automatic log burning boiler systems are also available for larger buildings.

All of these types of system can be used to provide hot water heating and room heating through radiators or warm air circulation.

Automatic systems: Wood chips and wood pellets lend themselves to being used in automated systems as they are uniform in shape and can be handled by conveyors. This means that wood fuel can match oil or gas in terms of convenience to the user.



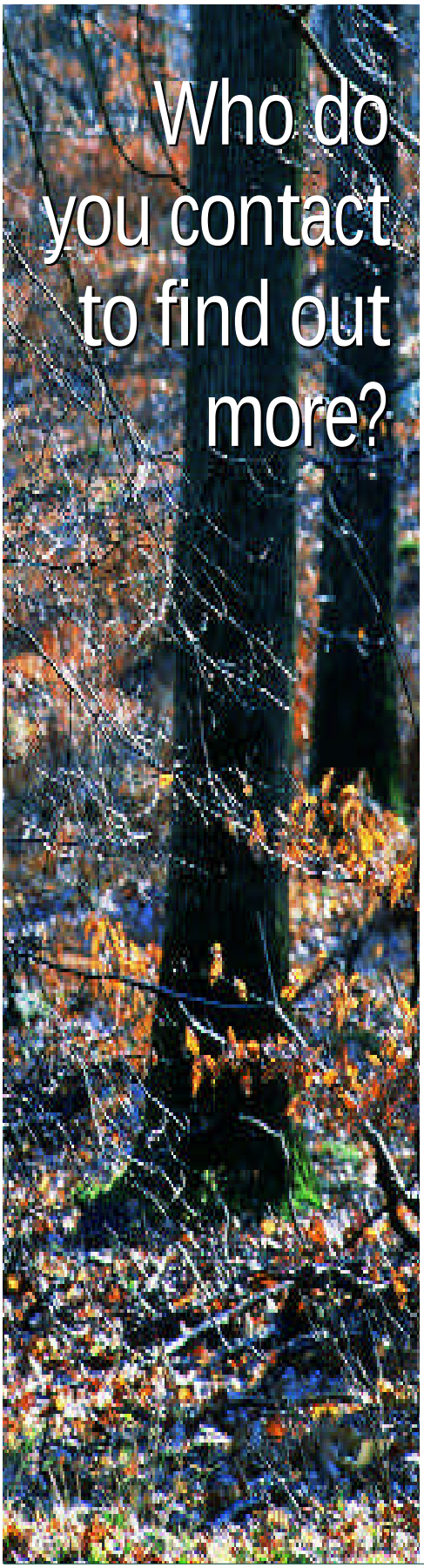
Heat Storage

Including a boiler in your wood fuel system means that you can store surplus heat as hot water. A back boiler will increase the efficiency of a traditional fireplace, while some stoves can provide heating for domestic hot water and several radiators. Masonry wood stoves store the heat in their stone structures.

Wood fuel heating is ideal in combination with solar heating systems. The solar collector provides sufficient hot water during the summer, while in the winter its storage tank can be used to store the water heated by your wood fuel system.

How much do wood fuel systems cost?

The purchase costs of wood fuelled systems range from under £300 for a manually-fed log-burning enclosed wood stove, to several thousand pounds for automatically-fed wood-chip or pellet systems.



Who do you contact to find out more?

So fire away with wood!

The use of wood as a fuel is becoming more and more popular with an increasing awareness of its major environmental benefits. A wood system to suit your needs is available – so why not make good use of wood as a reliable, comfortable and clean fuel? Fire away with wood!

For more information on wood fuel and wood fuelled heating systems, contact the Irish Bioenergy Association,the Renewable Energy Office (N.I.) or the Irish Energy Centre, Renewable Energy Information Office.

The Irish Bioenergy Association

The Irish Bioenergy Association (IrBEA) was launched in May 1999. It has been formed to promote the bioenergy industry and to develop this potentially important sector in the Republic of Ireland and Northern Ireland.

The aim of the Association is to promote biomass as an environmentally, economically and socially sustainable indigenous energy resource and also promote its non-energy related benefits.

The organisation is a self-governing association of voluntary members and is affiliated to Aebiom, the European Biomass Association, which has member associations from nineteen other European countries.

This leaflet was produced to promote the use of wood, a clean, renewable fuel source, one of the many sources of bioenergy. The leaflet was produced with the support of the EU Altener II programme, Aebiom, the Renewable Energy Office (N.I.) and the Irish Energy Centre,Renewable Energy Information Office. Please do not hesitate to contact IrBEA if you would like to know more about bioenergy.

For further information

Information on bioenergy:
Irish Bioenergy Association,
Thurles, Co. Tipperary.
Tel:0504 28105 • Fax:0504 28111
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Aebiom (European Biomass Association),
Web: http://www.ecop.ucl.ac.be/aebiom/

Information on renewable energy:
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Enniskillen, Co. Fermanagh, BT74 7DF.
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Irish Energy Centre,
Renewable Energy Information Office,
Shinagh House, Bandon, Co. Cork.
Tel:023 42193 • Fax:023 41304
Email: renewables@reio.ie
Web: http://www.irish-energy.ie/reio.htm

To contact your local Energy Agency:
Association of Irish Energy Agencies,
c/o City of Dublin Energy Management Agency (CODEMA), Paradigm House,
Dundrum Office Park, Dublin 14.
Tel:01 296 4072 • Fax:01 296 2484
Email: codema@iol.ie

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