



INTRODUCTION

Fuel cost, followed by appliance cost, are for most people the major factors in choosing a heating system. However, it is not always easy to make comparisons as different fuels have different calorific values and are sold in different units (tonne, litre, kWh).

The Heat Cost Calculator and Comparator (overleaf) has been developed to provide an objective method of calculating the cost, in pence per kWh, of heat from a variety of fuels at their current price and, therefore, be able to compare the costs of heating with different fuels. Examples of situations when the Heat Cost Calculator & Comparator will be of benefit include:

- > when considering switching from one fuel to another for example, changing to a renewable fuel such as wood chip or pellets;
- > for a supplier of wood fuel pellets and chips, willow or Miscanthus to determine a reasonable market price.

FACTORS TAKEN INTO CONSIDERATION

- > *The calorific value of the fuel.* This is important and every effort has been made to obtain an objective figure¹.
- > *The efficiency of the heating appliance.* Electricity is taken as being 100% efficient, whereas for all the other fuels an efficiency of 85% was used. Chip boilers may have lower efficiencies; anthracite boilers and stoves may sometimes be much lower; modern oil boilers can achieve efficiencies of up to 97%. Although gas is sold by the kilowatt hour, the appliance will not be 100% efficient hence the need for the separate column on the chart. If you know the efficiency of your appliance then multiply the fuel price by the percentage efficiency, divide by 85 then use this new price in the comparator. Conversely, having obtained a price for an alternative fuel multiply it by 85 then divide by the efficiency of the appliance.
- > *The moisture content of wood.* This Heat Cost Calculator and Comparator uses a value of 55% water content (by weight). Moisture content is highly variable; it can be even higher in fresh local spruce whilst hardwoods tend to be lower. Prior drying would be advantageous. If your wood supply has a different moisture content then use Formula 1 (below) to find the cost in pence per kWh, assuming appliance efficiency of 85%. Conversely, to find the price per tonne from pence per kWh use Formula 2.

Formula 1

$$\text{Pence / kWh} = \frac{\text{Actual } \pounds / \text{tonne}}{45.42 - 0.52M}$$

(where M is the % water by weight)

Formula 2

$$\pounds / \text{tonne} = \text{Actual p / kWh} \times (45.42 - 0.52M)$$

(where M is the % water by weight)

FACTORS NOT TAKEN INTO CONSIDERATION

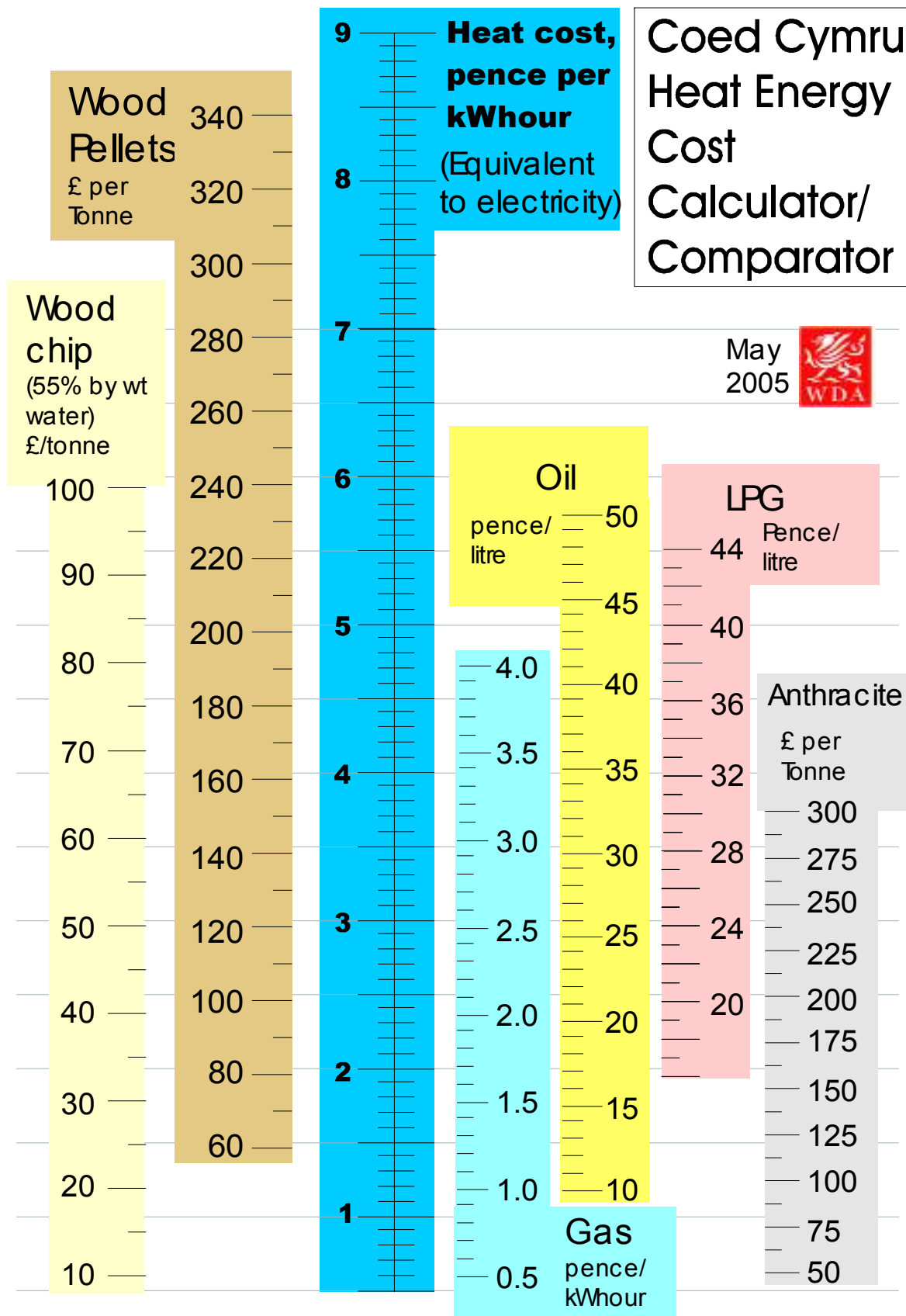
Costs of purchasing, installing or maintaining heating appliances. For some renewable fuels this can be very high.

Although every effort has been made in preparing this chart, it should be taken as a guide only. Those wishing to make financial decisions involving fuel prices are advised to obtain independent confirmation.

¹For **heating oil**, the figure used is 12.83 kWh/kg oil (UK Parliament, Select Committee on Environmental Audit Fifth Report, Annex to Appendix 1). This translates to 10.27 kWh/litre, an average based on the density provided by oil suppliers. Supporting evidence is to be found in the Department of Trade and Industry website (www.dti.gov.uk) 'Estimated average gross calorific values of fuels in 2002', The Carbon Trust (www.thecarbontrust.co.uk/foundation/0301prot.html) although it is unclear which is domestic heating oil. EnTech Energy Consultants Ltd (www.entech.co.uk/entech/ener_conv.htm) provide a slightly lower figure of 12.778 kWh per kg or 10.22kWh/litre. For **dry wood** including pellets, the figure used is 5.36 kWh/kg. This was based on information from the DTI website, cited above, The Carbon Trust, *op cit*; British Biogen; internet site techTP.com/wood; Jannesch, R. 'Changing the energy climate: clean and green grass biofuel pellets', Resource Efficient Agricultural production –Canada, see www.reap.ca For **anthracite** the figure is 9.42 kWh/kg from the DTI website *op cit*.

For **LPG** the figure is 7.4 kWh/litre from The Carbon Trust website, *op cit*.

Coed Cymru Heat Energy Cost Calculator/ Comparator



How to use the Comparator

1. Locate the price you are paying for the fuel (in pence per litre or £ per tonne) on the appropriate fuel column.
2. Move horizontally to the dark blue column and read off the heat cost in pence per kWh.
3. Continue horizontally to find the equivalent cost of a different fuel. How does this price compare with the market price of that fuel? Should you consider changing?

For further information please contact CALU – e-mail: calu@bangor.ac.uk tel: 01248 680450

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