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| SEAI logo CMYK Jpeg  Wilton Park House, Wilton Place, Dublin 2, Ireland  **1850 376 666** |
| Comparison of Energy Costs for Domestic Fuels  Explanatory and Guidance Notes |

**Aim**

These comparison tables are designed to help householders to make reasonable comparisons between the cost performance of various fuels used in the more common types of heating system in Ireland.

**General Basis of Energy Cost Comparison Tables**

1. The tables apply to space heating only, i.e. they do not relate to the provision of hot water or cooking.

2. The annual cost of heating a dwelling depends on the fuel price, its energy content, temperature levels maintained, duration of heating, weather conditions, the level of insulation and draught sealing and the seasonal efficiency of the heating system.

3. For clarity and consistency, these tables compare heating costs on a common base of cost per useful unit of heat output to a room or space (cent per kilowatt hour or c/kWh). This is based on the assumption that the nature of the heat output from each fuel and heating system combination can be directly compared with the alternatives, despite the fact that there are some differences in comfort and control standards, and in maintenance requirements, between the systems.

**The Cost of Heat**

Fuels are purchased by a variety of measures - in modern units of kilograms and tonnes weight, litres and cubic metre volumes, or in older units such as Btu's and therms of heat. All these can be expressed in terms of the common unit of energy, the kilowatt-hour (kWh for short), so as to enable comparisons of delivered energy costs to be made. Approximate conversion factors for common domestic fuels are given below:

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| **Fuel** | **Unit Of Supply** | **Conversion Factor** |
| Electricity | 1 unit = | 1kWh |
| Heating Oil | 1 litre = | 10.5 kWh |
| LPG | 1 litre = | 7.0 kWh |
| Coal | 1 tonne = | 8,300 kWh |
| Anthracite | 1 tonne = | 8,800 kWh (avg.) |
| Coalite | 1 tonne = | 8,400 kWh |
| Peat Briquettes | 1 tonne = | 5,400 kWh |

***Delivered Energy Cost (c/kWh) =***

***Cost per Unit of Supply (€) x 100 ÷ Conversion Factor***

Delivered Energy Cost is not the final cost of useful heat, because the efficiency with which the heating system converts the fuel into useful heat must also be taken into account.

## *Cost of Useful Heat (c/kWh) = Delivered Energy Cost ÷ Efficiency*

**Standing Charges**

"Standing Charges" are levied on users of certain fuels - natural gas, LPG from bulk tanks and electricity. These relatively small charges are intended to recoup the capital costs of storage tanks, service pipes and cables, meters etc. which the fuel supplier has to provide irrespective of how little fuel you may use.

Capital costs and maintenance costs incurred by the consumer in providing storage for oil and solid fuel somewhat offset the fact that no standing charges are involved in the purchase of these fuels.

**Seasonal System Efficiency**

1. The efficiency ranges quoted in the tables are estimated seasonal system efficiencies. Seasonal system efficiency is the proportion of the (chemical) energy in the fuel which is ultimately converted into useful heat energy, averaged over a heating season (September to May). It depends on many factors, including appliance design, matching of capacity to load, installation and commissioning, heat distribution and control system, and patterns of operation and maintenance.

2. For this reason it is necessary to quote efficiency figures in terms of assumed upper and lower limits in the case of solid fuel, oil and gas systems.

3. The upper efficiency figure in each range represents an estimated seasonal heating system efficiency attainable using a well-designed, well-maintained and properly operated appliance or system. However, in certain instances it may be possible to exceed these quoted figures (see advice notes below).

4. The lower efficiency figure in each range represents an estimated lower limit for most circumstances, taking account of the many factors which can reduce efficiency relative to its upper level: heat loss due to fouling of heat transfer surfaces, excessive appliance draught, appliance standing losses, pipe-work losses and imperfect system response. In instances of poor system design, maintenance or operation, efficiencies may fall below the lower limits quoted.

5. There is a lack of fully comprehensive independent data on annual system efficiencies across the set of fuels and systems commonly available in Ireland. However, the figures quoted are adjudged to be the best available.

**Night Rate Electricity**

To avail of lower night rate electricity a second meter is required. If a second electricity meter is installed then night rate electricity can be availed of for electric storage and heat pump systems. The electricity night rates quoted in the fuel cost comparison sheets are estimates for unit consumption costs only. Actual costs may be higher due to higher standing charges for night rate electricity.

Any use outside of electrical heating systems outside of night rate hours will incur normal electricity costs, therefore it is important to consider what proportion of the space heating demand will typically be night rate and what proportion will typically be ‘top-up’ at day rate when estimating costs.

**Heat Pumps**

Heat pumps are a low temperature heat source and the Seasonal Performance Factor (SPF) quoted in the Home heating and Appliance Register (HARP) assumes low temperature systems, such as underfloor heating, are in use with the heat pumps.

If heat pumps are also being used for water heating, an additional heating system may be required to bring the water to the required temperature (usually over 60 degrees celsius).

**Advice Notes**

**Achieving Economy in Heating Costs**

1. In most circumstances, insulation and draught sealing of the dwelling should be a higher priority than choice of heating system. In a well-insulated dwelling, unit heating costs are less important, while in a poorly insulated dwelling the savings achievable by improved insulation are usually higher than those achievable through choosing an alternative heating system.

2. The range of heating appliances and automatic heating controls on the market has improved considerably in recent years. In some cases therefore, higher system efficiencies than those quoted in the tables can be achieved.

3. A variety of measures can be taken in appliance design, installation and maintenance, and in automatic controls, in order to maximise system efficiency. These include:

**General Maintenance**

1. Routine servicing of fuel burning appliances is recommended.

**Solid Fuel**

1. Reduce the loss of warm air drawn from a heated space, by installing an under-floor draught duct, a throat restrictor or a closed (sealed) front unit to an open fire back boiler appliance.
2. Daily cleaning of solid fuel boilers, particularly when burning smoky fuels, is highly recommended.

**Oil**

1. Install the boiler indoors rather than in an outdoor boilerhouse, thereby utilising heat output from the boiler and from pipe-work.
2. Install a balanced flue on an indoor unit to avoid drawing warm air from within the dwelling.

**Gas**

1. Install a low thermal capacity boiler such as a combination boiler which has separate circuits for heating radiators and producing instant hot water.
2. Install a balanced flue unit.
3. Install an advanced condensing boiler.

**Automatic Control**

1. Install automatic controls such as:
2. Good quality room thermostats or thermostatic radiator valves.
3. Programmable timer controls for space heating and hot water provision, including advanced optimum start/stop controls or optimisers.
4. Separate space heating and hot water circuits with separate timer and thermostatic controls for each.

**Insulation**

1. Ensure there is effective insulation of heat distribution pipe-work running outdoors, underground or through unheated spaces.

**Additional Notes**

1. Sustainable Energy Authority of Ireland reserves its right in the future to revise the efficiency figures upon which the costs are computed, in the light of developments in system hardware and of further research.

1. All fuel and heating system installation work should be carried out by a competent installer in accordance with the provisions of the relevant Irish Standards, British Standards and recognised Codes of Practice.

**Disclaimer**

While every effort has been made to ensure the accuracy of these statistical publications and/or reports, they are subject to revisions and changes from time to time. The Sustainable Energy Authority of Ireland is not liable for losses suffered, whether direct or consequential, arising out of any reliance on these data.  It is the responsibility of each individual or entity to independently verify such information if the intention is to use such information in any form for personal or commercial purposes.  The Sustainable Energy Authority of Ireland reserves the right to change the methodology in collecting, presenting and publishing these statistics and/or reports.

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