



IRISH HISTORIC HOUSES ASSOCIATION

REPRESENTING PRIVATE OWNERS

Introduction to Energy and Heating for Historic Houses

TONY TRAILL

ELEMENT CONSULTANTS LTD





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Introduction

Energy

What is it?

Pricing, Volume, Automation

Energy Sources - Renewables

Heating

Heat Distribution

Hot Water

Controls



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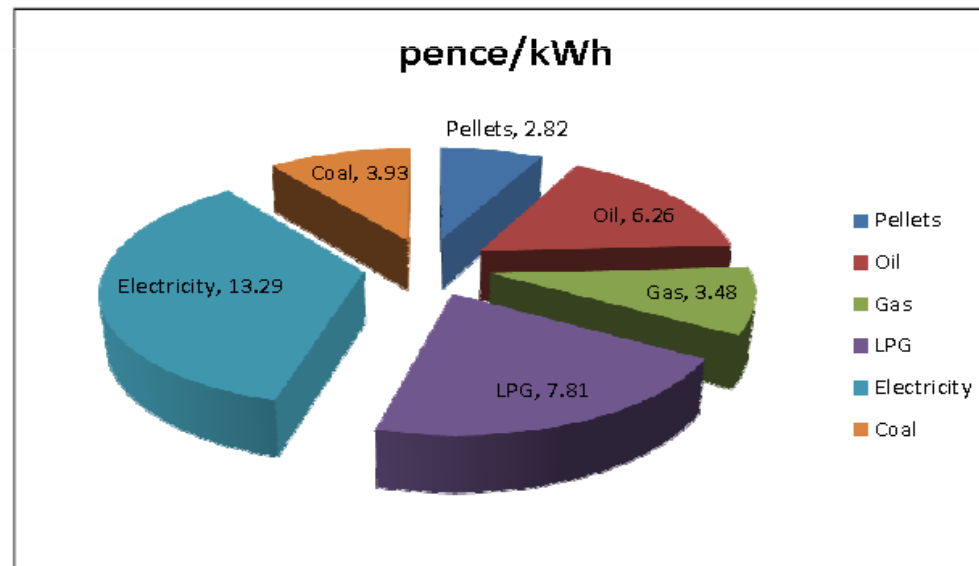
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Energy – Units, Fuels & Price

Energy can be measured in kilowatt hours

1 unit electricity = 1 kilowatt hour

1 litre of oil = 10.5 kilowatt hours

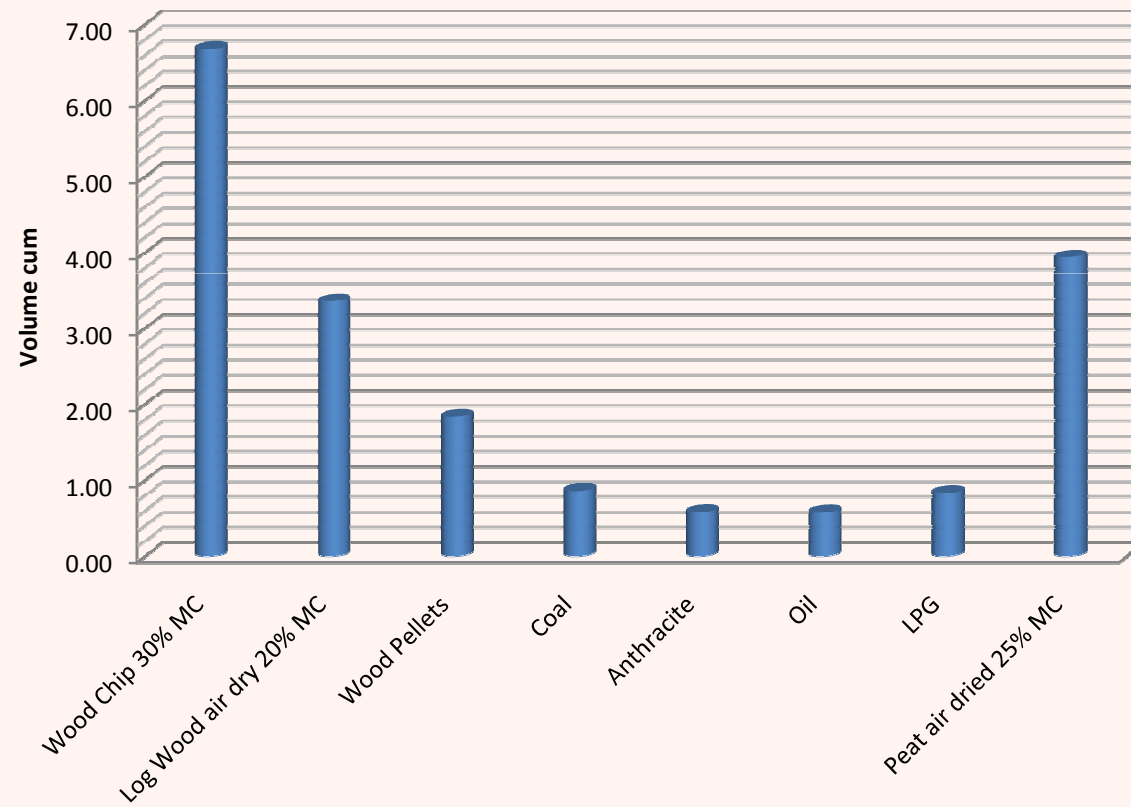




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Energy- Volume

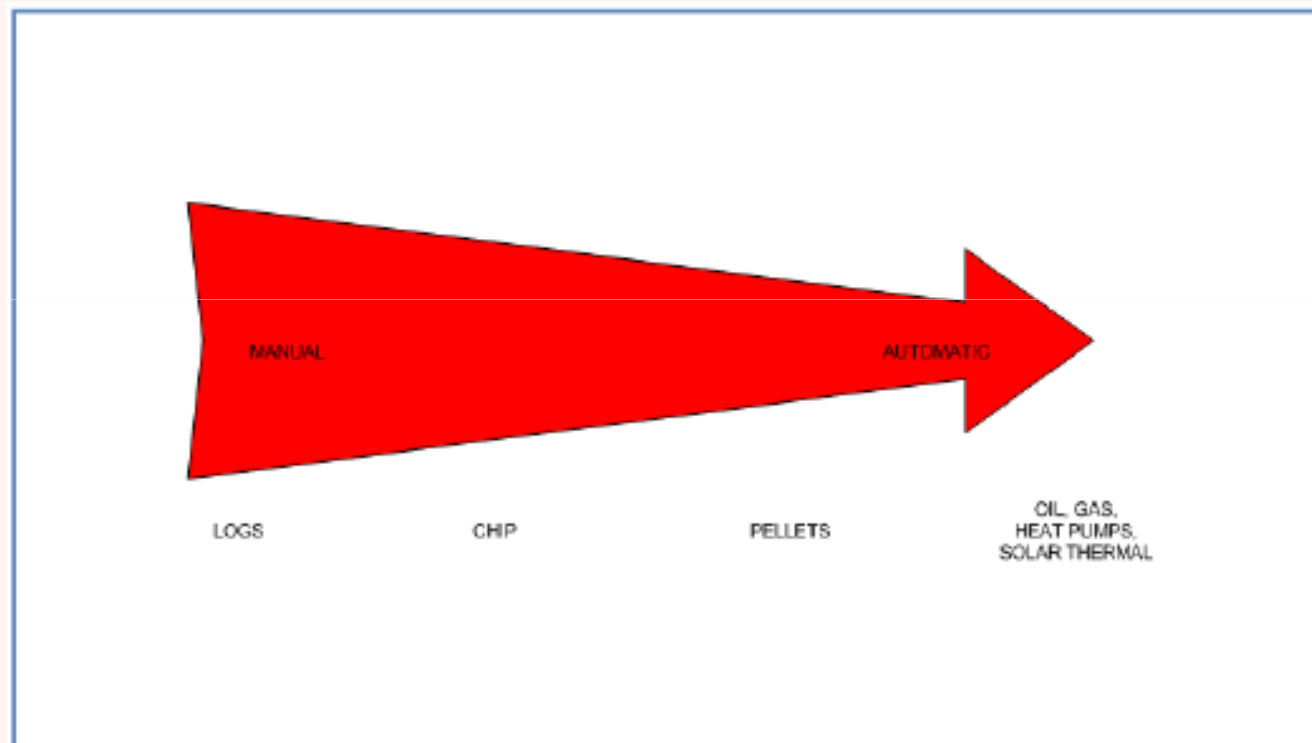




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Energy- Automation





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Alternative Energy Sources

1. Heat

- Biomass – Logs/ Wood Pellets / Wood Chip
- Solar Thermal – Solar Hot Water
- Heat Pumps – GSHP, ASHP, WSHP

2. Power

- Wind
- Hydro
- Solar PV

3. CHP – Combined Heat & Power





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Heat – Biomass – Log Boilers





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Heat – Biomass – Wood Chip Boilers





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Heat – Biomass – Wood Pellet Boilers/Stoves



lement



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House Hot Water or combined heat
Evacuated tubes
Orientation
Back up heat source

Swimming Pool Water Heating
Evacuated tubes
Calculate predicted output

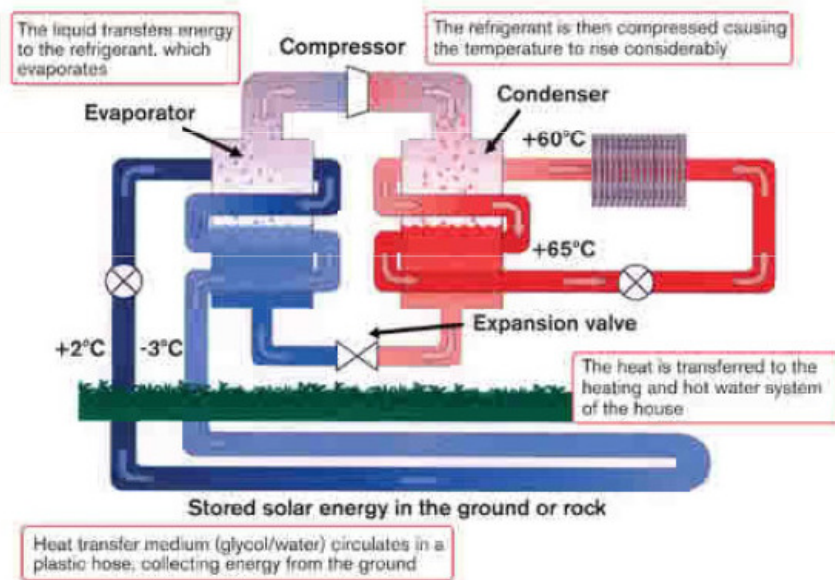




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Heat – Heat Pump – Ground Source





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Heat – Heat Pump – Air Source

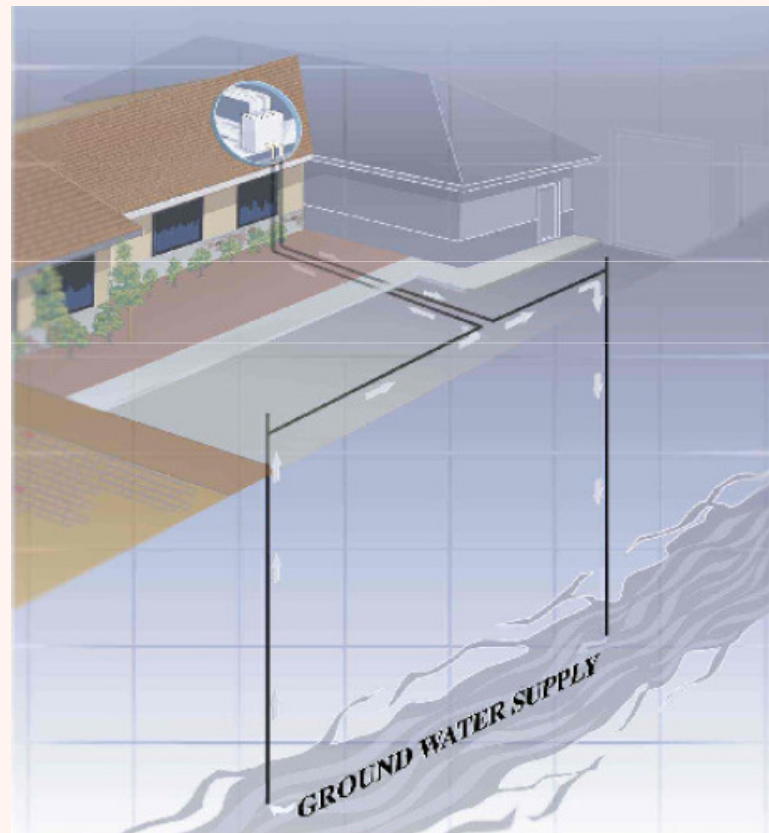




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Heat – Heat Pump – Water Source





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Power - Wind





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Power - Hydro





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Power – Solar Photovoltaic (PV)





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Heating - Recap

1. Insulate
2. Control heat production and distribution.
3. Minimise heat required
 - Timing
 - Zoning
 - Temperature Control

Timers, Valves, Thermostats, Switches





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Heating - Needs

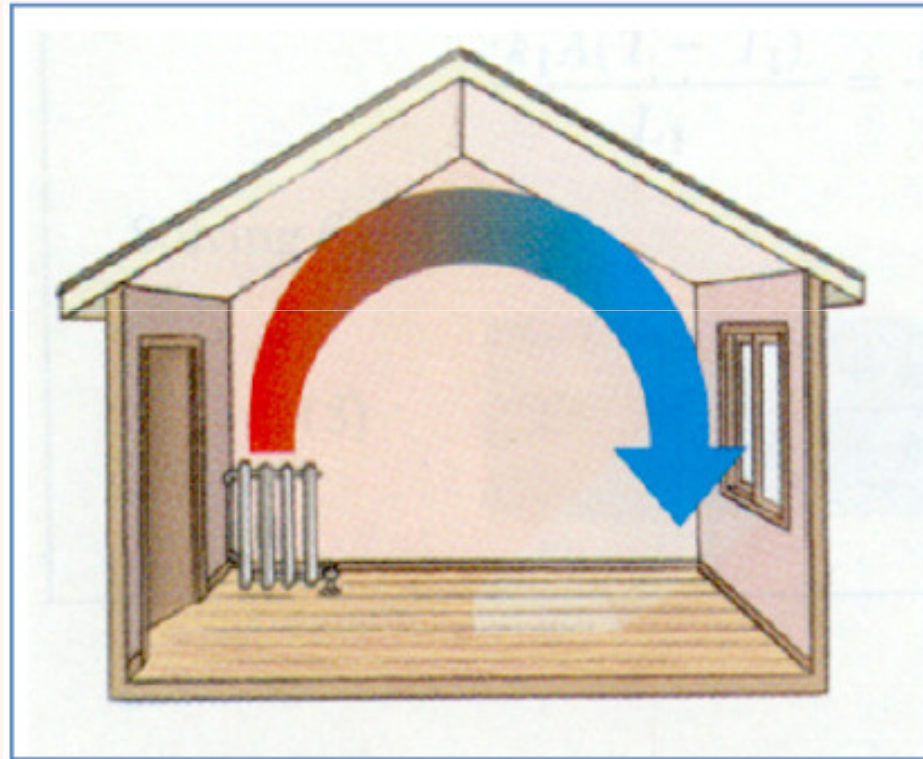
1. Space Heating
2. Hot Water (DHW)
3. Low temperature .v. High temperature
4. Distribution Systems
 - Radiant – UFH
 - Convected – Radiators
 - Forced Air – Fan Coils
5. Controls



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Space Heating - Distribution



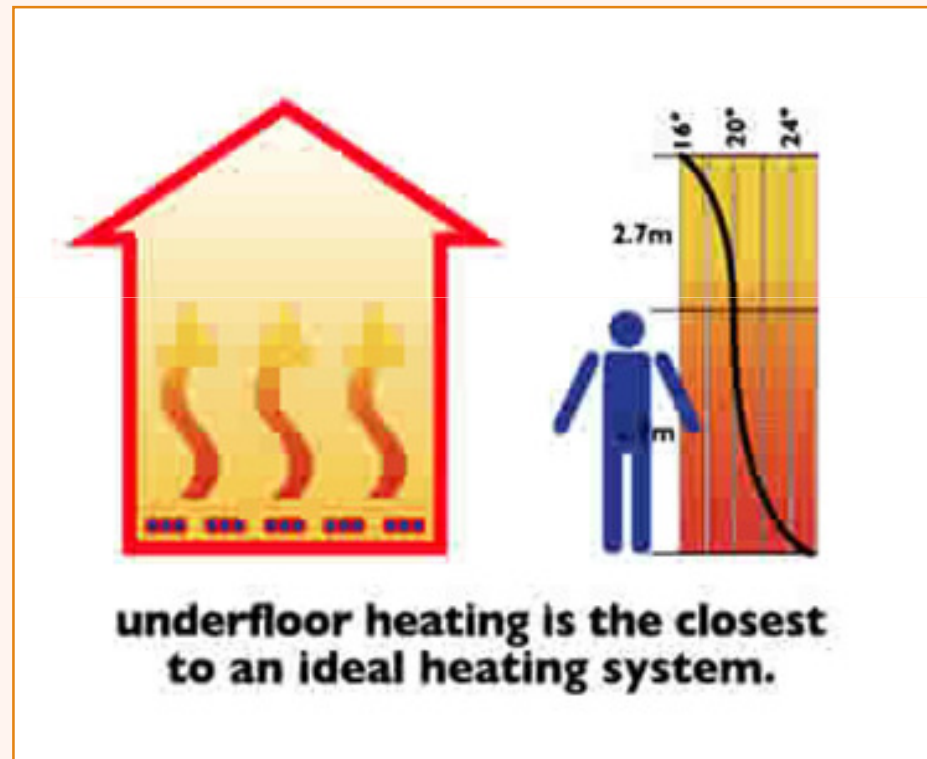
Convected Heat – High Temperature



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Space Heating - Distribution



Radiant Heat – Low Temperature



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Hot Water Heating (DHW) - Load

1. DHW is high demand / short time
2. More bathrooms = more load/ shorter time
3. More storage or greater power input
4. Most renewable sources cannot modulate output
5. Often the best solution includes fossil fuel
6. Time and temperature control

Ballinderry Park



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Heating - Controls

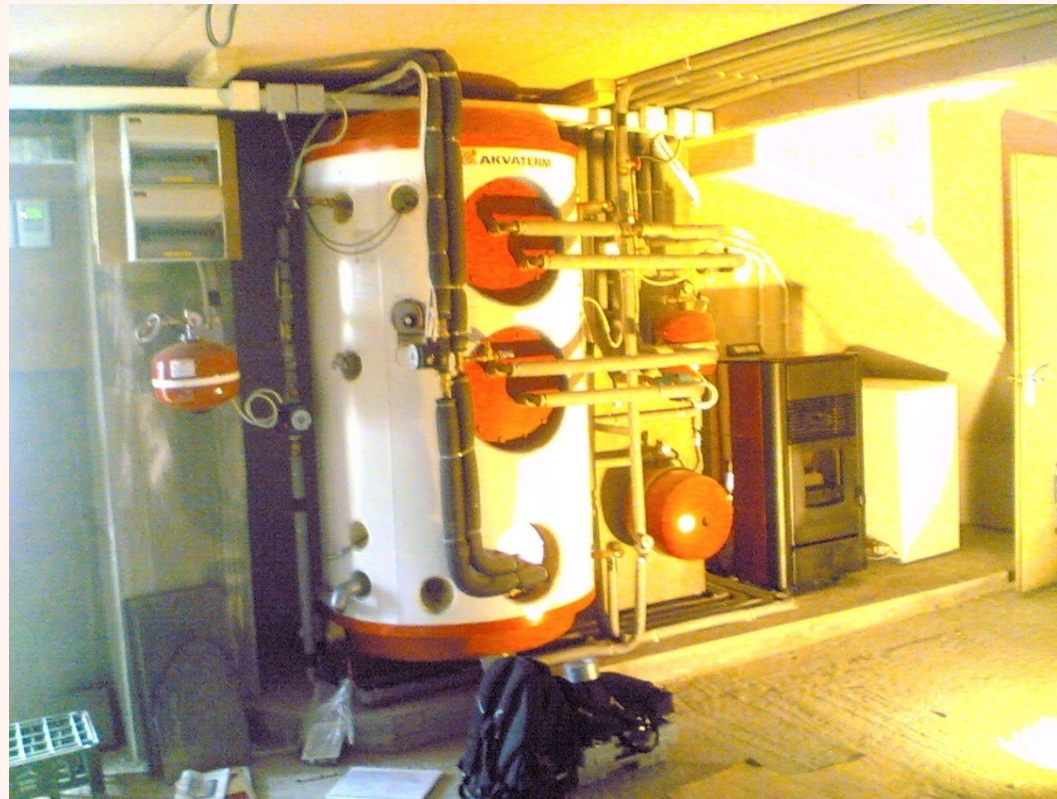
1. Zoning – Space & DHW
2. Timing
3. Temperature - design temperatures
 - Room Thermostats
 - Cylinder Thermostats
 - Thermostatic Radiator Valves
4. Boiler Interlock



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Summary





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