



Making heating systems
efficient and cost-effective:

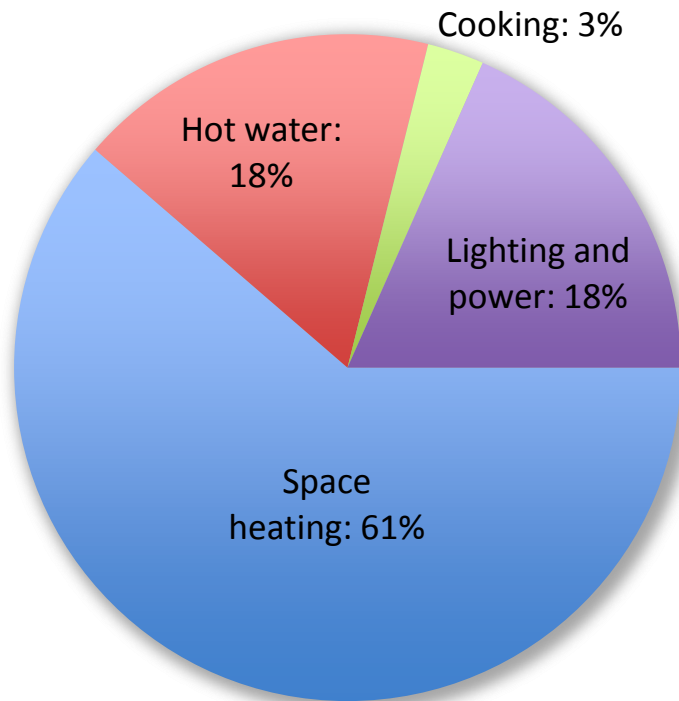
boilers, heating
controls & more ...



WHAT WE USE ENERGY FOR IN OUR HOMES

DECC *Energy Consumption in the UK, 2010*: Table 3.3

Heating building & hot water = 79% or 4/5ths of our energy use in UK homes.



AVERAGE ENERGY USE in kWh /year differs, depending on who you ask (DECC, Ofgem, BRE, etc), but:

between 16,500 and 20,000 kWh GAS and around 3,300 kWh ELECTRICITY

ANNUAL BILLS in £ & p, (inc 5% VAT)
GAS

18,000 kWh at 4 p/kWh = £756

ELECTRICITY

at 14.5 p/kWh (+5% VAT) = £502



“HEATING SYSTEM EFFICIENCY”

What does this actually MEAN? refers to several different parts

Let’s split EFFICIENCY into THREE FUNCTIONAL PARTS of a HEATING SYSTEM

CONVERSION of FUEL to HEAT

gas / heating oil into central heating boiler; heat out

TRANSFER of HEAT

through the heating system: pipes,

DISTRIBUTION of HEAT

into the building, hot water, stove etc...

EFFICIENCY LOSSES OCCUR AT ALL STAGES & ARE CUMULATIVE



“HEATING SYSTEM EFFICIENCY”

EFFICIENCY LOSSES occur at all stages ... and are CUMULATIVE

a worked example WITH a GOOD, NEW BOILER

CONVERSION of FUEL to HEAT average space & hot water efficiencies **85%**

TRANSFER of HEAT assuming standard controls and pipe insulation **80%**

DISTRIBUTION of HEAT assuming averages **75%**

$$0.85 \times 0.8 \times 0.75 = 0.51$$

For **100 UNITS OF HEAT IN**, we can easily get **51 UNITS OF USEFUL HEAT OUT**



FOR HOUSES WITH CENTRAL HEATING BOILERS

THE BOILER IS RESPONSIBLE FOR AROUND 4/5ths of A HOME'S ENERGY USE

LOOK AT THE BOILER FIRST

CONVERSION EFFICIENCIES VARY:

Very Old FLOOR MOUNTED BOILER	45 – 60%
Not So Old WALL MOUNTED BOILER	60 – 75%
Very EFFICIENT NEW WALL MOUNTED BOILER	75 - 95%

WHAT MAKES A GOOD NEW BOILER BETTER?

more efficient combustion

“condensing” heat recovery systems

If you need a new one, GET a VERY GOOD ONE, it WILL be more cost-effective!



HOUSES WITH ELECTRIC HEATING

RUN FOR THE HILLS!



HEAT TRANSFER

CIRCULATION

A lovely new boiler needs a CLEAN ENOUGH SYSTEM - DON'T FIT one on a DIRTY OLD SYSTEM WITHOUT THOROUGH CLEANING & PROTECTION

New boilers should have PUMPED CIRCULATION ROUND SEALED CIRCUITS.

If your old pipework was VENTED &/ or GRAVITY circulated,

PAY EXTRA ATTENTION TO CLEANING THE SYSTEM

UNLESS NEW PIPEWORK THROUGHOUT: FIT A **MAGNETIC FILTER**

PIPEWORK INSULATION

Insulating pipework is simple and essential.

Not all pipework is accessible, very dependent on specific buildings and heating systems.



HEAT DISTRIBUTION

WHAT TO DO IS VERY DEPENDENT ON :

The **THERMAL EFFICIENCY OF A BUILDING** - discussed elsewhere, but needs to be considered...

... & the **TYPE & AGE OF DISTRIBUTION SYSTEM**: usually:
convection radiators: mild steel, cast iron, aluminium; or:
underfloor or wall heating

But, GENERAL RULES FOR GOOD RESULTS are to:

KEEP HEATING SYSTEM TEMPERATURES AS LOW AS POSSIBLE TO HEAT APPROPRIATE PARTS OF A BUILDING TO COMFORT LEVELS and to

AVOID HEATING UNNECESSARY HEATING OF A BUILDING



SPACE HEATING

REDUCING HEATING DISTRIBUTION TEMPERATURES:

OUTSIDE TEMPERATURE CONTROL,

aka WEATHER COMPENSATING CONTROLLER

best results are more easily achieved with a boiler manufacturer's unit

GERMANS & DUTCH do it best – because they have to...

If your boiler will accept a WEATHER COMP CONTROLLER, fitting one will be EXTREMELY GOOD VALUE, savings of 15 to 25% possible, likely to pay for itself in 1 or 2 years

If your boiler won't accept that, some means of LOAD COMPENSATION even if by MANUAL ADJUSTMENT can still yield positive results.



HOT WATER HEATING

Though less of a task, often still done woefully inefficiently.

Having an efficient boiler does not do this for you.

GENERAL RULE:

ALL BOILERS DO WATER HEATING LESS EFFICIENTLY THAN SPACE HEATING

FOR LOW OCCUPANCY &/OR WATER USE, OR VERY LIMITED SPACE:

A GOOD COMBI BOILER

FOR EVERYTHING ELSE:

A GOOD SYSTEM BOILER WITH BEST PRACTICE HOT WATER STORAGE



HOT WATER HEATING

"Here comes the Sun", Energy Saving Trust's field trial of 88 solar water heating systems also monitored some heat storage systems for over a year.

Their findings for ANNUAL HEAT LOSS FROM HOT WATER STORAGE:

BEST CASE : 230 kWh

AVERAGE LEVEL: 1150 kWh

WORST CASE: 2900 kWh

STORED HOT WATER can be THE LEAST or THE MOST EFFICIENT MEANS OF HEATING WATER. FOR BEST RESULTS FOR TWO OR MORE IN REGULAR OCCUPANCY:

BEST QUALITY STORED HOT WATER:

LOTS OF INSULATION, CORRECT TIMING



WHAT TO DO ...

GET TO KNOW YOUR SYSTEM - DON'T BE SCARED, THERE IS HELP OUT THERE

GET TO KNOW YOUR CONTROLS - SAME APPLIES

GET TO KNOW YOUR ENERGY BILLS

SAVE MONEY AND SPARE THE ATMOSPHERE = HAPPY RESULTS!