

Heating Systems

First-things-first

Before any decisions are made on the type and size of heating system to install, it is highly recommended that you assess the levels of insulation and draught proofing in your building. A building that is poorly insulated and draughty costs around 3-4 times more to heat than one that is well insulated and draught-proofed. As well as saving money, an insulated building will heat up more quickly, stay warm for longer, be less prone to condensation problems and stays cooler in summer. It will also cause less environmental pollution because less heating fuel will be burnt. In addition, if less heat is needed in a building, the heating system installed can be smaller and therefore less costly.

WALLS: *Insulating walls (either between wall cavities or internally/externally) will reduce heating needed by around **25%**.*

LOFTS: *If no insulation is present, installing mineral wool to the minimum building regulation thickness of 250mm (10inches) will reduce heating needed by around **20%**. Topping up existing insulation to 250mm will proportionately reduce heat loss e.g. increasing from 100mm (4inches) to 250mm will save 10%-15%.*

DRAUGHTS: *Draught-proofing doors, windows, letterboxes and suspended floors will reduce heating needed by around **10% - 15%**. The savings will be even greater if open fireplaces are blocked.*

WINDOWS: *Replacing single-glazing with double-glazing will, in a building with average-sized windows, reduce heating needed by around **5%-10%**.*

FLOORS: *Insulating under suspended floors or on top of solid floors will reduce heating needed by around **5%-10%**.*

Temperature – Fuel consumption increases by 10% for each 1°C rise. Heating a room to 24°C costs 30% more than heating it to 21°C – turn temperatures down wherever possible.

Choice of Heating Type and Fuel Type

From an environmental point of view we recommend that, wherever possible, heat be derived from a **renewable** energy source, such as geothermal or biomass (e.g. wood). For information on these systems ask for our 'Renewables' information sheets – 0800 512012. Where non-renewable fossil fuels are burned in boilers, the more efficient the boiler the lower the fuel bills and the lower the environmental impact.

Heating Systems using fossil fuels

From an economic and convenience point of view, Mains Gas is a recommended choice. However, in Cornwall, mains gas is not always an option due to the lack of supply to certain areas. Common alternatives would be solid fuel, Liquid Petroleum Gas (LPG), oil and electricity.

Electrical heating systems

If you are considering an electrical Night Storage Heater system see our 'Night Storage Heater' sheet. Alternatively see our Heat Pump sheets.

'Wet' central heating systems

Modern systems are 'fully pumped' i.e. water (and rust inhibitor) is pumped through radiators and hot-water tank (if one is fitted). Older systems may be 'semi-pumped' where the hot water is only pumped to the radiators, or 'gravity fed', where there is no pump at all.

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Boilers

Boilers more than 15 years old are likely to be operating at efficiencies of 60-65%. This means that for every £1 spent on fuel only 60-65p is being used to heat your home and 35-40p is wasted on hot air and partly burnt fuel going out of the flue. Boilers over 25 years old may be as low as 50% efficient. Modern condensing boilers are more than 90% efficient. As with most household appliances, boilers are given 'energy ratings'. 'A'-rated boilers are the most efficient and it is recommended that these be installed wherever possible. Gas-fired boilers installed after 1 April 2005, and oil-fired boilers installed after 1 April 2007, must be condensing boilers, whether they are replacements or new installations. This is a requirement of the Building Regulations for England & Wales, Part L1 (Conservation of Fuel and Power). In exceptional circumstances it is permissible to install a non-condensing boiler instead of a condensing boiler, provided that an assessment of the property by a competent person confirms that the additional cost of installing a condensing boiler is exceptionally high. The assessor must identify the *lowest additional cost* for an installation anywhere in the building, irrespective of the boiler position chosen by the owner. When the boiler is fitted, whether it is a condensing or non-condensing boiler, it need not be in the position shown on the assessment form. (*For web addresses for boiler efficiencies see "More information" below*).

'Regular' boiler or 'Combi' boiler?

A 'Regular' boiler heats water for radiators and for a hot water storage tank.

A 'Combi' boiler heats water for the radiators but domestic hot water is provided instantaneously when the hot water tap is turned on. This means that no hot water storage tank is needed and therefore no heat losses from storing hot water. This also results in reduced installation costs and frees up space for other purposes. The main disadvantage is that the supply of hot water, for running a bath, for example, is slower

than from a storage tank, especially if another hot water tap is turned on at the same time. Also, there is not the possibility of having an immersion heater back up.

A good rule of thumb for choice of boiler type is family size and/or lifestyle. For large families or families with a high hot water usage a 'regular' boiler would be most suitable and efficient. Conversely, for low hot water users a 'Combi' is more practical and efficient.

Condensing boilers

Condensing boilers have a very large, rust-resistant, heat exchanger, which recovers much of the heat from the flue gasses. Because of their extra efficiency, the additional cost of the large heat exchanger can be recovered in 2 to 4 years through lower fuel costs. There are condensing regular boilers and condensing 'combi' boilers using mains gas, LPG or oil. Because the flue gasses are cooler (*typically about 60°C, as compared with 160°C for a non-condensing boiler*) there is normally a 'vapour plume' to be seen from the flue pipe. This is in no way harmful, but boiler siting should be closely considered to avoid proximity to windows and doors.

When fitting a new central heating system with a condensing boiler it is advisable to size the radiators to allow a return water temperature to the boiler of about 40° C, so that the boiler operates in fully condensing mode, to maximise efficiency. It should be noted, however, that a condensing boiler is ALWAYS more efficient than a non-condensing boiler even if it is not operating in condensing mode.

Hot water storage tanks

Older storage tanks do not have fitted insulation and therefore require a 'jacket'. Modern tanks come with sprayed-on foam insulation. When buying a new tank, a 'high performance' model is recommended i.e. one that is very well insulated. A cylinder thermostat is recommended and should be set at 60°C. A hotter temperature may lead to scalding and a lower one may not kill

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Legionnaire disease bacteria. It is also important that the pipes between the boiler and hot water tank are insulated. The programmer/timer should allow the water heating to be switched on and off at specified times independently of the radiator system.

Central Heating Controls

For fully pumped systems the control system should provide:

- Time and temperature control to both the heating and hot water circuits
- Thermostatic radiator valves (TRVs) on each radiator except in the room having a room thermostat. This allows individual-room temperature control.
- A room thermostat to provide temperature control. (*Usually sited in lounge or hall*).
- A full, standard or mini programmer to provide time control, i.e. causes the heating system to start-up and shutdown when you want it to.

Open Fires and Flame-effect Fires

Open fireplaces with chimneys (including gas flame-effect fires), may be attractive, but are the driving force behind draughts in a property. Draughts typically account for total building heat-losses of around 15% and these losses may be considerably higher where open chimneys/flues are present. As the chimney constantly removes air from a building it can significantly reduce the effect of any other heating being used. An open fire/gas flame-effect fire also only uses around 28% of the fuel burned to heat the room it is in. A further 10% is absorbed by the chimney structure but over 60% of the heat is needlessly sent into the atmosphere. Also, when a fire is first lit, the rush of flames and air up the chimney actually lowers the room air temperature (possibly for several hours) from what it would have been had the fire not been lit. When the fire does start to warm the room, the room temperature often fluctuates from excessively hot to not hot enough.

If a central heating system or storage radiators are installed, open chimneys should be blocked off in order to heat the home efficiently and effectively. If a 'real fire' is desired, it is highly recommended that some form of enclosed solid fuel heater be installed i.e. a log burner or a room heater with glass-fronted doors. These heaters are usually around twice as efficient at heating a room as an open fire so you should expect to use only half the fuel for the same heat. They are also more controllable and burn for longer. But one of their main advantages is that only a small amount of air is used for combustion and when the fire is not in use all air-flow can be completely shut off.

If you do burn solid fuel, wood is the least environmentally damaging in that the carbon dioxide released was only recently captured from the atmosphere by the tree as it grew and is being offset by new growth i.e. it is carbon neutral. Coal and coal-based fuels e.g. anthracite, coalite, furnicite, coke etc emit vast quantities of carbon dioxide when burned (as well as a large variety of toxic gases) and we highly recommend that their use be avoided wherever possible. If you do use coal-based fuels, using an enclosed burner will only produce half as much pollution (and cost half as much to run) as an open fire.

AGA/Rayburn – type cooking ranges

Ranges are often used to provide space and water heating as well as for cooking. Because old oil-fired ranges tend to be left continuously lit, they are high fuel users. Even a fairly new oil-fired range may burn around twice as much fuel as a condensing boiler driving a full central heating system. Like all boilers, the efficiency of the burner/boiler decreases with age and therefore their fuel consumption also increases. Cooking usually accounts for less than 5% of fuel use – ordinary gas/LPG and electric cookers are more efficient. See: <http://www.aga-rayburn.co.uk/> and <http://www.rayburn-web.co.uk/>

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Building Regulations and benchmarking

From April 2002, the Building Regulations (Part L1) changed in some important ways.

Existing homes now come under the Building Regulations' remit because of the need to cut carbon dioxide emissions. They require householders to install more energy efficient options when replacing central heating boilers and controls, as well as hot water cylinders.

Proof of compliance

If you are having central heating work carried out in your home, you can ensure the work is in compliance with the new regulations by asking for a '**Benchmark Log Book**'. Installation work must be carried out by a suitably qualified engineer who will provide the certificate when the

boiler is commissioned. The Government defines a suitably qualified engineer as:

- A CORGI registered installer for gas installations
- An OFTEC registered technician for oil installations
- A HETAS registered installer for solid fuel systems

Servicing should be carried out at least once per year.

Grants

The Government-funded 'Warm Front' grant provides the possibility of a grant to cover the cost of a central heating system for home-owners and private tenants in receipt of certain entitlements – i.e. benefits or tax credits. For more information, or an entitlements check, call your local Energy Efficiency Advice Centre on **0800 512012**.

SUMMARY OF HEATING SYSTEM AND FUEL TYPES.

| Fuel Type | Types of system | Advantages | Disadvantages |
|------------------------|--|--|---|
| Mains Gas | Floor mounted boiler Wall mounted boiler Regular boiler 'Combi' boiler Back boiler Condensing boilers Balanced-flue fires Aga/Rayburn | No fuel storage required Easy to control Low cost 'Clean', No ash Wide choice of supplier No need to order High efficiency when used with condensing boiler | Not available everywhere Does emit the greenhouse gas – carbon dioxide (but less than oil, electricity, LPG and coal). Low efficiency if used with range or old boiler |
| LPG | As above | Relatively 'clean' in that there are few particulates and not nitrous or sulphurous emissions. High efficiency when used with condensing boiler | Needs storage vessel – either bottles or tank Limited choice of supplier Expensive Needs to be ordered Emits carbon dioxide Low efficiency if used with range or old boiler |
| Oil | As above | Oil price can fluctuate considerably High efficiency when used with a condensing boiler | Some nitrogenous and sulphurous gas emissions Storage tank required Good choice of supplier Emits carbon dioxide Low efficiency if used with range or old boiler |
| Solid Fuel | Open fire with back boiler Closed room-heater with back boiler Free-standing manually or hopper-fed boiler Aga/Rayburn | Closed room-heaters are the most efficient | Open fire very inefficient and no control Fuel storage required Ash and carbon dioxide produced Low efficiency if used with range or old boiler |
| Electricity (off peak) | Night storage heaters See our separate sheet number 10 - ' <i>Night storage heaters</i> ' | Uses off-peak cheap electricity No flue needed 'Clean' at point of use No fuel store required Lower capital outlay than wet central heating systems Low maintenance | High carbon dioxide emissions due to transmission losses and type of fuel burned in most power stations. May require supplementary heating in evenings Higher daytime tariffs 'Green' electricity is available – see information sheet 1 - ' <i>Green electricity</i> '. |
| Electricity (on-peak) | Panel radiators, oil-filled radiators, fan heaters, radiant fires, quartz-halogen heaters, under-floor/ceiling heating. | Off-peak electricity is cheap No flue needed 'Clean' at point of use No fuel store required Lower capital outlay than wet central heating systems Low maintenance | High carbon dioxide emissions due to transmission losses and type of fuel burned in most power stations. High cost of peak-rate electricity makes this the most expensive way to continuously heat a building. 'Green' electricity is available – see above |

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More Information

Gas leaks - call 0800 111 999

- Boiler efficiencies: www.sedbuk.com
www.boilers.org.uk or call 0845 727 7200
- Boiler comparison prices: www.discountedheating.co.uk or
www.inspiredheating.co.uk
- Central heating controls: www.heatingcontrols.org.uk
- Central heating advice: www.centralheating.co.uk
- Best oil purchasing deal: www.oilbuyers.co.uk
- 'Green' electricity: www.greenprices.co.uk
www.energylinx.co.uk
- Energy efficiency: <http://www.energysavingtrust.org.uk/>
www.cep.org.uk 0800 512012
- Electricity or gas complaints: call Energywatch on 0800 88 77 77
- Energywatch advice: www.energywatch.org.uk call 08459 06 07 08

Free Publications

For more detailed information on central heating systems we advise you to obtain the following guides which are provided **FREE** of charge. Call Energy Efficiency Best Practice in Housing on **0845 120 7799** or download them from <http://www.energysavingtrust.org.uk/housingbuildings/publications/>

[Central Heating System Specifications \(CHeSS\) - Year 2005 \(CE51 / GIL59\)](#)

[Benefits of Best Practice: Heating and Insulation \(CE11\)](#)

[Domestic Condensing Boilers - 'The Benefits and the Myths' \(CE52 / GIL74\)](#)

[Domestic heating by electricity \(GPG345\)](#)

[Domestic heating by gas: boiler systems \(CE30\)](#)

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Price Comparison Services – ‘Energywatch’ oversees a voluntary code of practice for companies providing domestic electricity and gas price comparison services on the Internet. These services take away the need for you to do your sums when thinking about changing your gas or electricity company and show the savings that you can make by changing to a new supplier. Services that are signed up to the code of practice must conform to nine requirements and are tested and monitored by energywatch to ensure that they are comparing accurate and up to date prices and that they are fully independent of any gas or electricity supplier.

- [Buy.co.uk](http://buy.co.uk)
10th Floor, Portland House, Stag Place, London, SW1E 5BH
Tel: 0845 601 2856 Fax: 020 7233 5933
- www.energylinx.co.uk
Energylinx Limited, PO Box 15046, Dunblane, FK15 0YP
Tel: 0800 849 7077
- <http://energy.moneyexpert.com/>
Blay’s House, Churchfield Road, Chalfont St Peter, Bucks SL9 9EW
Tel: 01753 880482
- www.saveonyourbills.co.uk
1907 Maryhill Road, Glasgow, G20 0BY
Tel: 0845 331 2034
- www.energyhelpline.com
Suite 330, 30 Grt. Guildford St., London, SE1 0HS.
Tel: 0800 279 45 46
- www.theenergystore.com
Customer Support: 14 Marchwood Crescent, London W5 2DZ
Tel: 0845 330 7247
- www.ukpower.co.uk
Customer Support: UK Power Ltd, Barclays Venture Centre, University of Warwick
Science Park, Coventry CV4 7EZ
Tel: 0800 093 2447
- www.unravelit.com
Customer Support: Studio 9, 27a Pembridge Villas, London W11 3EP
Tel: 0800 781 9693
- www.uswitch.com
Customer Support: PO Box 33208, London SW1E 5WL
Tel: 0800 093 0607 Fax: 020 7233 5944
- Green electricity - <http://www.greenprices.com/uk/pricesbox.asp>

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| INSTALLERS OPERATING IN CORNWALL | | | |
|---|---------------------|--|---------------------------------|
| Company | Type of work | Areas covered | Contact details |
| Steve Pearce Tregony Truro | Heating | | 01872 530579 07785538105 |
| Billingtons Ltd Penzance | Heating | | 01736 740673 07850709661 |
| S Curtis & Son Bude | Heating | PL15; PL29 - 35 EX22;EX23 | 01288 352420 |
| W Rowe Plumbing & Heating Services, Camborne | Heating | TR1-TR27;PL10- PL15;PL17;PL18;PL22- PL35;EX22;EX23 | 01209 315496 |
| V F D Bray Ltd Redruth | Heating | TR1; TR2; TR3; TR4; TR5; TR12; TR14; TR15; TR16 | 01209 861155 |
| Mike Couldry Heating Ltd Falmouth | Heating | TR1-TR20;TR26;TR27; PL24-PL26 | 01326 311440 |
| Blue Flame, Falmouth | Heating | TR1-TR27;PL10- PL15;PL17;PL18;PL22- PL35;EX22;EX23 | 01326 378122 |
| Steve Peters Plumbing & Heating Engineers, Hayle | Heating | TR1; TR3-TR6; TR10- TR20; TR26-TR27 | 01736 756760 |
| Warmstar, Heating Services, Redruth | Heating | All TR; PI 24 - 26 | 01209 315556 |
| Heath & Arnold Ltd, Redruth | Heating | All TR | 01209 213886 |
| Bodmin Plumbing and Allied Services | Heating | All TR & PL | 01208 73894 |
| Glow-Warm Heating Services, Camborne | Heating | All TR & PL | 01209 713358 |
| Ian Mill Heating and Plumbing Services. Bude | Heating | EX: 21, 22, 23 & 38. PL: 15, 27, 31, 32, 34 & 35 | 01288 356109 07774 892587 |
| Dennis Annear Truro | Heating | | 01872 279464 07860779533 |
| Pete Chapman Truro | Heating | | 01872 263102 |
| DBS Plumbing Grampound Road Truro | Heating | | 01726 883535 |

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