Guide to heating and controls
Orange Glow Energy design and install modern heating and hot water systems, offering the best possible levels of comfort, are easy to use and provide many years of economical and reliable use.

Our installation services include:

- State-of-the-art condensing boilers
- Hot and cold water systems
- Modern SMART multi-zone controls
- Underfloor heating and radiators
- Central heating system conversions

Upgrading the central heating system can have big financial benefits: over 80% of energy use in the average home is for heating and hot water production – so even a small increase in efficiency can have a big impact on the amount of fuel used.

“Henk (left) and Andy (right) are SO professional – they came and surveyed our heating needs and provided us with an excellent family solution to keep all members of the family happy with their heating requirements – no mean feat! I would 100% recommend them to anyone.” Clare Brooks, Google review.
Installing modern heating and hot water systems

The efficiency and performance of heating and hot water systems more than 15 years old can be significantly improved. Replacing an old boiler and controls (70% efficient) with a new, A-rated boiler and controls (90% efficient), can save £100’s per year. To further improve efficiency, we usually recommend the heating and hot water systems are converted to sealed and pressurised systems.

**Heating: converting an open-vented system to a pressurised system**

Open-vented systems have a small cistern in the loft that allows for expansion when the system gets hot, and uses gravity to top the system back up as it cools. Because it is an open cistern, oxygen can be absorbed and introduced into the heating system water, where it can cause corrosion and air locks.

The benefits of a pressurised heating system are:

- Reduces air locks and cold areas at the top of radiators – less need to bleed the radiators
- Stops dirt entering the system which can cause cold areas at the base of radiators and damage the boiler
- Reduces corrosion in radiators which, in turn, cuts down on system sludge and debris
- Takes up less space in the loft as the expansion cistern can be removed
- Reduces the risk of pipes freezing in the loft

**Hot water: converting a gravity-fed system to a pressurised system**

A gravity-fed water system has a cold water storage tank, usually in the loft, which supplies some or all of the cold water outlets in the house, and also supplies the hot water cylinder, usually in the airing cupboard. Water pressure is created by the height of the water tank above the outlets: this is normally no more than 0.1 to 0.5bar, which offers poor performance with modern showers. We generally recommend conversion to a pressurised hot and cold water system, using mains water pressure throughout the home.

The benefits of a mains-pressurised hot and cold water system are:

- High pressure water (3 bar) at all outlets, perfect for a good shower
- Equal hot and cold water pressures ensures mixer taps and thermostatic showers work correctly
- Improved drinking water hygiene – no dust, insects or animals to contaminate the loft storage tank. Drinking water is also cooler which reduces the risk of Legionella
- Creates valuable storage space in the loft
- Reduces the risk of pipes freezing in the loft
Condensing boilers

Building regulations since April 2005 state that any new or replacement gas or oil boiler must be a condensing boiler. A condensing boiler captures additional heat from the exhaust gases that would otherwise be expelled to atmosphere. This makes the boiler significantly more efficient.

- Condensing boilers are easily spotted by the “plume” emitted from their flues: this is not smoke, but water vapour and is a good indication that the boiler is running efficiently
- Condensing boilers produce a watery condensate: whilst this is mostly condensed water vapour, it is slightly acidic (caused by dissolved carbon dioxide from the exhaust gases) and must be disposed of carefully in a drain or soakaway
- Correct installation of condensate pipework to prevent it from freezing, and correct installation of the flue to ensure it doesn’t cause a nuisance, are therefore important

Orange Glow Energy carefully considers these factors during the design phase of any new boiler installation.

Orange Glow Energy recommends Viessmann boilers
- Highly efficient (Energy Efficiency Class A)
- German engineering – outstanding quality, robust, hard wearing and long lasting
- Easy to install, easy to service and good availability of spare parts
- Corrosion-resistant stainless steel heat exchanger with 10-year warranty
- 5-year warranty on the rest of the boiler, extendable to 10 years
- Simple clear controls make it easy to use
- Frost protection in case of cold weather

“Orange Glow Energy replaced our boiler, installed Evohome controls, and powerflushed the whole system. From the very thorough, detailed quotation and throughout the installation work, they were totally professional and obviously very knowledgeable. They properly protected the house where they were working and removed all the debris at the end of the job. Best of all, the gas usage has gone down by around 40% compared to last year and the radiators warm up much quicker than they used to. We would highly recommend them.” Penny Dablin, Google review.
Different types of condensing boilers

**Regular or heat-only boilers** generate heat only, and are suitable as a replacement boiler in an existing system, for larger homes, or when space is extremely limited. They rely on a separate pump and expansion vessel or cistern and are suitable for use with open vented or pressurised systems. A separate hot water cylinder (gravity-fed or pressurised) is required for hot water.

**System boilers** are like heat-only boilers except they include a pump and expansion vessel. They are suitable for use with pressurised systems only and a separate hot water cylinder (gravity-fed or pressurised) is required for hot water. These are the boilers of choice for larger households with 2 or more showers/bathrooms.

**Combination boilers** are a single unit which supplies heat to the home and delivers mains-pressure hot water on demand without the need for a hot water cylinder, storage tank, or a feed and expansion tank in the loft. These tend to be an ideal solution for smaller households with one or two bathrooms and where space is at a premium. Another advantage is that the hot and cold water are at mains water pressure so ideal for powerful showers without the need for a pump.

<table>
<thead>
<tr>
<th>Feature</th>
<th>Type of boiler</th>
<th>Heat-only</th>
<th>System</th>
<th>Combination</th>
</tr>
</thead>
<tbody>
<tr>
<td>Produces heat for heating</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Produces hot water on demand</td>
<td></td>
<td>No</td>
<td>No</td>
<td>Yes</td>
</tr>
<tr>
<td>Requires a separate hot water cylinder</td>
<td></td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Includes a circulating pump</td>
<td></td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Includes an expansion vessel</td>
<td></td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Size</td>
<td></td>
<td>Compact</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>Relative cost</td>
<td></td>
<td>£</td>
<td>££</td>
<td>££</td>
</tr>
</tbody>
</table>

“Top job by Orange Glow. Boiler replaced and moved to the attic, changed some complicated pipework to clear the area in the kitchen where the boiler used to be, and removed the water tank and cylinder. Big job, cleverly executed, not overpriced. Very reliable, clean, friendly and on time!”

Nicky van der Sande, Google review.
Improving circulation efficiency

Powerflushing radiators
All heating systems collect corrosion debris over time. This debris, and hard water scale collects in the radiators and pipes and causes the following problems:

- The system becomes inefficient as the pipes silt-up and water doesn’t flow easily
- The debris can cause the system to be noisy and knock
- Particulates in the boiler or radiator valves can prevent flow and cause breakdowns
- Radiators tend to be cool at the bottom because water doesn’t flow through the whole radiator

A good powerflush removes 85% or more of sludge and debris. We use a high velocity, reversible pump, mechanical agitation, a magnetic filter, heat, chemicals – plus a lot of experience – to dissolve and flush out corrosion debris from inside pipework and radiators.

Once the system is clean, chemicals are added to inhibit corrosion and keep the system clean.

We generally recommend a heating system is powerflushed when the boiler is replaced and/or if one or more radiators fail to get properly warm. Over 80% of boiler breakdowns are caused by dirty system water and a new boiler warranty may even be invalidated if the system water is found to be dirty. A new A-rated boiler installed in a dirty heating system reduces in efficiency in just 6 days.

Powerflushing underfloor heating
Microbial slime is often found in underfloor heating pipes where it proliferates at the lower temperatures found at the end of pipework loops. This can eventually lead to a degradation of performance or even a complete blockage.

Underfloor heating requires special expertise when installing or powerflushing. In particular:

- Each individual pipework loop needs to be thoroughly flushed to remove sludge and slime
- Each loop needs to be thoroughly vented to expel any air
- A chemical biocide needs to be added to kill existing microbial growth and prevent new growth

Orange Glow Energy have significant expertise with all types of underfloor heating systems, both current and older systems.
Once a system is clean it is important to keep it clean and air-free. Radiator corrosion can still occur, but fortunately, the resulting rust is magnetic and can be captured by a magnetic sludge filter.

What is a magnetic sludge filter?
A magnetic sludge filter uses a powerful magnet to collect radiator corrosion debris as the system water passes through it. A system that has been correctly dosed with chemical corrosion inhibitor should have no corrosion, but if the inhibitor is diluted over time (for example, if the system is regularly topped-up with water) then corrosion can re-occur. Also, any debris left after a powerflush (especially in inaccessible places) can dislodge and enter the system water. A magnetic sludge filter helps collect this debris, and is usually cleaned once a year as part of the annual boiler service.

A good quality filter will also remove non-magnetic particles such as aluminium, brass and copper swarf and other dirt particles.

What is an automatic de-aerator?
Air in the heating system is almost as damaging as corrosion debris. Venting the radiators will remove the bulk of air but won’t have any effect on the tiny bubbles that are created when water is heated. De-aerators work by separating and removing micro-bubbles from the system water as it passes through.

The advantages of removing air:
- Reduced risk of radiator corrosion
- Reduced risk of air-locks, which can completely prevent radiators from working
- A quieter system, less gurgling noises
- Better transference of heat in the boiler means warmer, more efficient radiators
- Overall energy savings due to increased efficiency

“First class service and top quality work. After a number of bad experiences with other plumbers, Orange Glow have restored my faith in the industry.”
Gary Wilcox,
Google review.
Control systems

Heating and hot water account for over 80% of domestic energy use: installing – and using – a good control system can significantly improve energy efficiency. The minimum control system recommended for any heating system consists of a timer/programmer, a room thermostat and thermostatic radiator valves:

The **timer/programmer** is used to set the overall on/off times for the heating and hot water system. Simple “timers” run on a repeating daily programme, while more sophisticated “programmers” allow different on/off times on different days of the week to be programmed. The timer or programmer is usually hard wired and installed in the airing cupboard or under the boiler.

The **room thermostat** monitors the temperature of the room where it is located. Providing the timer or programmer is calling for heat, the room thermostat will then control the temperature. Simple room thermostats, with a rotary dial, provide basic control, ± 2°C. More sophisticated, digital, room thermostats, provide fine control, ±0.5°C. Simple room thermostats are usually hard wired and digital room thermostats can be hard wired or wireless (battery operated). They are usually installed in the hall.

A **programmable room thermostat** combines a programmer and thermostat in a single, convenient digital device. This allows different temperatures to be set at different times of the day and on different days of the week. They can be hard wired or wireless and are usually installed in the hall. The latest programmable thermostats can even be controlled using an iOS or Android device.

**Thermostatic radiator valves** (TRVs) are fitted to radiators and work by automatically opening or closing, depending on the air temperature they sense. Thermostatic radiator valves need to be manually adjusted in order to change the temperature of a room. They are not calibrated and usually work on a scale of 1 to 6. If a valve is likely to be covered by furniture, curtains or radiator boxing, we recommend a remote sensor so the valve can more accurately sense the room temperature.

“Top quality service from highly professional individuals who understood our requirements and delivered a high quality solution at a reasonable price. Have already recommended them to friends and family.” Darryl Bannan, Google review.
For ultimate control of the heating and hot water, we recommend **advanced multi-zone SMART controls**.

The downside of standard control systems is they only monitor and control the temperature in one location, namely where the thermostat is installed. Occasionally, it is possible to control the temperature in two or more “zones”, but this usually involves a lot of additional plumbing and is rarely practicable.

Multi-zone controls offer the ability to set the times and temperatures of the heating in individual rooms (“zones”). Rooms that don’t warm up – or are too hot – will be a thing of the past. Each individual room can be accurately controlled at its required temperature, irrespective of any other room in the house. Radiators are fitted with a SMART valve which measures the room temperature and then opens or closes according to the programming from a central touch-pad controller, or from an iOS/Android smart phone or tablet. This enables fine control of the heating:

- In different rooms/ zones
- At different times of the day, and
- On different days of the week
- Plus hot water control can also be included

This level of control ensures maximum comfort and can reduce energy use between 20% and 40% compared to a home using a single programmable thermostat.

Multi-zone controls are especially valuable for:

- Larger homes
- Homes with complex layouts
- Homes with different patterns of use for the various rooms e.g. working from home, children at University, etc.
- Older homes which have been refurbished with modern extensions and have differing insulation levels

Multi-zone controls are suitable for nearly all homes and nearly all types of heating system, including “wet” underfloor heating systems. Orange Glow Energy are Honeywell Recognised Installers and Honeywell EvoHome Specialist Installers with many years’ experience in designing and installing multi-zone control systems.

“Henk and Andy performed a major upgrade to our heating system, first installing the Honeywell EvoHome zoned heating solution, and later replacing our boiler and servicing our unvented hot water cylinder. All the work was completed to an excellent standard and in less than the estimated time. These guys are more than just plumbing and heating engineers (...) they know the technology inside out.”

Paul Howard, Google review.
Water softening

Hard water contains naturally dissolved minerals such as calcium and magnesium. These are important micronutrients for overall health; however, when hard water is heated or evaporates, the dissolved minerals are deposited leaving a hard limescale residue.

This limescale residue results in:

- Spots and encrustations on taps, sinks, basins and baths
- Shower heads become blocked and inefficient
- Deposits collect in kettles, irons and coffee makers
- Most importantly, deposits build up out of sight in hot water cylinders, shower valves, washing machines and boilers, invariably leading to costly repairs

Many options are available for reducing the effects of limescale, including salt-based water softeners, in-line filters and reverse osmosis systems. Most commonly, Orange Glow Energy recommends the Aquatiere Pureau 3 H+ salt-free water conditioner. This works by altering the limescale minerals so they remain in suspension and do not form deposits on the inside of pipes and fittings, rather they are flushed through the system.

This results in:

- Excellent quality drinking water at all outlets within the home
- Water retains the calcium and magnesium minerals which are beneficial for health
- Limescale build-up inside plumbing systems is virtually eliminated, and is noticeably reduced on external surfaces such as taps and kettles
- Unlike traditional salt-based softeners, there is no need for power, a separate drain, a separate drinking water tap, or a heating system bypass

“Two years ago, I asked Henk and Andy to install an entire central heating system in my property. They were brilliant from start to finish. They have serviced the boiler yearly since. They have given faultless customer service over the last two years. I would highly recommend them to anybody thinking about any plumbing job, big or small. Highly professional, reliable, and great value for money.”

Chris E.
Google review.

<table>
<thead>
<tr>
<th>%age of wasted energy</th>
<th>12%</th>
<th>25%</th>
<th>38%</th>
<th>55%</th>
<th>70%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thickness of limescale (mm)</td>
<td>1.5</td>
<td>3.0</td>
<td>6.0</td>
<td>9.5</td>
<td>12.5</td>
</tr>
</tbody>
</table>
Other products and services

**Underfloor heating.** Underfloor heating is the most comfortable form of heating, 5% to 10% more economical to run than radiator heating and maximises the wall space available for furniture or cabinets. Underfloor heating is ideal in a new-build project.

**Designer and colour radiators.** It is no longer necessary for radiators to be plain white and ribbed. We can install many different types and styles, including smooth panel radiators, column radiators and designer radiators with curved edges and high quality detailing. Plus, most radiators can be supplied in a wide range of RAL colours or metallic colours to complement any room décor.

**Accumulators.** In areas of poor water flow, it is not always possible or economical to increase the size of the incoming cold water main. Installing a pressurised cold water storage cylinder (an accumulator) can be a cost effective and easy solution. If the incoming water pressure is also poor, an additional pump can boost the pressure too.

**Refurbishments and upgrades.** Many older heating systems can benefit enormously from a series of selected upgrades. Orange Glow Energy will discuss a client’s heating and hot water requirements, diagnose any existing system problems and then recommend a package of upgrades to ensure the system delivers the right level of comfort, economy and reliability.
Established in 2010, we are passionate about what we do and how we do it

We believe we are a new kind of business by being customer focused, listening to our clients’ needs and giving expert, up-to-date advice. We use only good quality, branded materials, and take great care in the design and installation work to ensure it is fit for purpose, but also that it complies with the relevant Building Regulations and manufacturer’s recommendations. We liaise closely with clients in helping them to use - and get the best from - their heating system, and we respect our clients’ homes.

For most installations, we provide a detailed proposal that covers the work we propose to do and the materials we propose to use – often with links so clients can make independent enquiries. At the end of the work, we clean up and remove all rubbish.

We separate waste for recycling where possible and we register all boiler installations with Gas Safe Register or OFTEC.

Finally, at the end of each project, we provide our “Orange Binder” with all documentation and contact details – an invaluable resource when service or repair work is required, or when the home is sold to a new owner.

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