

Conventional heating



In this section, we will talk about condensing boilers, electric heating and how to improve your central heating systems.

Gas boilers

Many buildings are heated by one or more gas boilers, often distributing heat throughout the building via a system of radiators much like a domestic central heating system. Some may use other distribution systems such as warm air distribution, usually as part of a ventilation system (which may also include cooling), or underfloor heating.

Smaller buildings may have a single package boiler, essentially a domestic boiler, where the burner, heat exchanger, flue and other elements are all supplied as a single unit or package. Larger buildings may have a bank of multiple package boilers, or they may have one or more commercial boilers, where the boiler itself, the burner, the flue, and the condensing economiser are all supplied as separate elements and fitted together on site.

The condensing economiser is a unit fitted between the boiler and the flue and is used to recover additional heat from the combustion gases before they are released, making the boiler more efficient. Modern package boilers will have this functionality built in and will be described as condensing boilers.

If you have a non-condensing boiler set-up then you can save energy and money by adding a condensing economiser or replacing your non-condensing package boiler with a condensing model.

Hot water supply

If you have a gas boiler for heating then this will often also be providing hot water for taps, showers etc. Generally, the hot water will come from a separate hot water cylinder that is heated by a coil heat exchanger fed from the boiler. If you have a package boiler then this could sometimes be a combination boiler, or combi, in which case the hot water will come straight from the boiler as and when required, with no need for a hot water cylinder.

If you do have a hot water cylinder, then it is important that this is well insulated to avoid wasting energy as the water cools down. Insulation jackets can be applied to existing hot water tanks but often the best performance will be achieved by fitting a new pre-insulated tank. If a tank already has some insulation, then you could still save more by adding further insulation. We recommend at least 80mm of fibreglass insulation jacket or 50mm of pre-sprayed polyurethane foam.

Oil and Liquefied Petroleum Gas (LPG) boilers

Oil and LPG boilers operate in the same way as gas boilers, with a similar set of options. The main differences are that the fuel needs to be stored on site, with deliveries arranged when necessary, and the fuel is typically more expensive than gas. Oil is also a significantly higher carbon fuel than mains gas and so leads to a higher carbon footprint than an equivalent gas heating system.

Oil and LPG boilers are generally only found in buildings where there is no nearby mains gas supply. If there is gas nearby then it may be possible to save some money and reduce emissions by switching from oil/LPG to mains gas, but the cost of boiler replacement can be significant so it is worth considering whether investing in a low carbon heating option would be a better long-term investment.

If you decide to stick with oil or LPG heating then the upgrade options are the same as for mains gas, but the payback will often be better as the value of the fuel saved is higher.

Electric boilers

These are not common in the UK due to the big price difference between electricity and other heating fuels. Where they do exist, the hot water produced by the boiler is usually stored in an accumulator tank – a large hot water cylinder used for space heating rather than for hot water supply. This means the boiler can be operated with a variable electricity tariff, heating the accumulator during cheaper off-peak times of day. This will help to keep operating costs down but is unlikely to make this an attractive option for space heating.

Direct electric heating

There are a number of technologies that use electricity to heat a room directly, either by heating the air in the room or by radiating energy into the room, or a mixture of both. These include:

Convection heaters – typically wall-mounted or free standing, an electric heater heats air within the unit which then rises out of slots in the top of the unit and circulates around the room.

Fan heaters – as per convection heaters, but with a fan to blow the hot air more forcibly and in a specific direction.

Radiant heaters – either wall mounted or free-standing panels that are heated electrically and so give off radiant energy that warms anything in its direct line of “sight”. The radiation given off may be entirely in the infra-red spectrum or it may include some visible light i.e. the heater will glow.

Storage heaters – wall mounted units filled with heavy bricks that are heated electrically during off-peak periods using a cheap electricity tariff. When heating is required, flaps are opened that allow heat to escape much like a convection heater. Modern high heat retention storage heaters are much better at storing heat until it is required, making them more effective and cheaper to run than older storage heaters.

Heating, ventilation and air conditioning (HVAC)

Many office buildings have a single HVAC system which provides all the ventilation, space heating and cooling needs. Air is distributed throughout the building usually in large metal ducting suspended from the ceiling or concealed within it. The air is heated centrally, often by a commercial gas boiler, but other technologies are also common. If cooling is included then there will be a chiller unit, which is a heat pump extracting heat from the ventilation air and expelling that heat to the outside air. Most heat pumps are reversible which means the same unit could be used to provide heating in the winter as well as cooling in the summer (link to Heat Pumps section).

Improvements to heating systems

Given the range of possible heating technologies, it is difficult to generalise about potential energy improvements. Most technologies will have more efficient and less efficient models, but it is important to

consider all the technical options, including switching to a different fuel, when considering whether to invest in new equipment.

It is also important to consider changes to your heating control strategy to ensure you only heat the spaces you need to heat, to the level you need to heat them, and at the times you need to heat them. This can range from providing clear instructions to staff about how to use the heating where they work, to investing in new heating controls or even a Building Energy Management System to optimise use of whatever heating system you have.

Indicative costs and savings

Costs for installing new systems vary with size and complexity, as well as with technology. A replacement package gas boiler, where no additional pipework or modifications are required, will cost around £3,500. Larger commercial boilers will cost more, depending on size, complexity and whether all the elements of the system need to be replaced.

Controls for a heating system start at around £350 for a programmer unit for a single heating zone.

Modern high heat retention storage heaters cost around £900 per heater, and fixed standard electric heaters around £400 per heater, including installation.

You will need to get multiple quotes for any heating system upgrade you are considering to get a bespoke cost for your situation.

You should also ask your installers to estimate likely running costs for any systems they are proposing. While every installer has an incentive to make their proposed solution appear attractive, comparing one supplier's estimate with another can help to guide you on which options are likely to save you the most in running costs.

How long does it take to install a commercial boiler?

A new commercial boiler can take a few days to be installed. This will depend on the size of the system, how big your building is, the number of radiators and how many installers will handle the job.

Disruption during the installation

If you are thinking of having a new system installed, then the summer months are usually the best time to have it installed because it's when you rely on your boiler the least.

During the fitting of pipework and radiations, the whole property will need to be accessed and you will have no access to heating or hot water.

Can I do this by myself?

Conventional heating technologies are not systems that you can install by yourself. You will need to talk to an installer who will assess your needs and evaluate your building before proposing which system could be right for you. [Click here](#) to learn more about this.