

# How to implement decentralised hot water systems

Large, centralised hot water systems can waste energy and money when there's little demand for hot water or because heat is being lost from long pipe runs.

Installing individual heaters where the hot water is actually needed means you won't need to use large boiler plants when demand is low.

## The business case

Take the example of a hand-washing sink in a manufacturing unit. The sink is used for only 250 hours a year and hot water from the main gas boiler has to run along 15m of uninsulated pipe. Installing a 3kW electric heater that gives instant hot water to the sink could save around £145 a year.

This is based on heat losses from the pipe of around 7,392kWh a year and a gas price of 2.5 p/kWh. The new heater would cost around £90 a year to run, with electricity at 9p/kWh, whereas the existing gas system would be around £204, including the cost of heat loss.

A 3kW water heater would be around £500 to buy and install, so you'd recoup the cost in just over four years.

## The technology

There are two main types of decentralised hot water systems. Storage systems provide high hot water flow rates and are useful for multiple sinks, for example, whereas instant hot water systems with no water storage are ideal for smaller areas where demand for hot water is low or irregular. Both can run on electricity or gas.

## Storage systems

Water heaters with storage can be vented or unvented. Unvented water heaters need a high-pressure relief valve that can discharge water to a safe location. These are used in most decentralised hot water systems. Vented devices don't need a relief valve, but unvented systems have the advantage of providing hot water at mains pressure to standard taps.

Storage systems should ideally have a time control so that water is only heated when needed.

**Figure 1** A water heater with storage



### Instant systems

Instant systems don't store water. Cold water is taken straight from the mains and it's heated as it passes through the unit. The energy they use is roughly proportionate to how much hot water you use. The unit can be left for long periods without fear of bacteria building up.

Choosing units with water saving outlets, such as aerating taps, can save you even more energy when the water is used directly for hand washing.

### Applications

Decentralised hot water systems are generally used in summer only, so that large boiler plant can be switched off. You might also use them year-round if energy is being wasted due to heat loss from a long pipe run from a central boiler.

The following table suggests the best system depending on how you use the hot water.

**Figure 2** An instant hot water heater



Application	Heater with storage	Instant water heater
Hand basin used regularly	Suitable – with a timer	Suitable
Hand basin used infrequently	Not suitable – energy will be used when no hot water is needed	Suitable
Multiple hand basins in washrooms	Suitable	Suitable – there are models designed for multiple outlets
More hot water demand, such as to a dishwasher	Suitable	Less suitable because of flow rate

Considerations	Comments
Fuel	Do you have a gas supply or only electricity?
Space available	Some options won't work in small spaces.
Location	Under sink, over sink, wall-mounted, freestanding? The unit needs to be close to the point of use.
Flow rate and volume needed.	This is based on the use of your building. Most manufacturers will guide you about the right size.
Hot water storage or instant heating	See Applications.
Single or multiple points to be supplied	Multiple points must be close together. Deadlegs need to be kept to a minimum as defined by building regulations and heater byelaws.
Vented or unvented	If unvented, you need to identify a safe spot for discharge from the high-pressure relief valve. Check the manufacturer's literature. Vented devices don't need this.
Electrical work	Consult an electrician to check the local distribution board has capacity.
Controls	Are timer switches required or will the unit be in use 24 hours?

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## Specification checklist

The table on page 2 outlines the points to discuss with your supplier when choosing water heaters.

## Commissioning procedure

Commissioning should be carried out by a reputable heating contractor, who should check the following.

- Temperature settings – overheating the water will waste energy. However, storage systems need to store water above 60°C to minimise the risk of bacteria forming. However, the water should not be delivered so hot that it could cause scalding.
- Time controls for storage systems – the heater should be off when the premises aren't being used.
- Flow rate – if this is controllable, it should be set to the lowest level you can manage with.

## Common problems

- Limescale can be a problem in hard water areas. Specifying scale-resistant elements will help prolong the life and improve the efficiency of the system. You'll also need to descale regularly based on the local water hardness. The manufacturer's guidelines will recommend how often. You could also consider water softening.
- The unit will be damaged if allowed to freeze. Lag any exposed pipes and drain the unit if freezing is a risk.

## Finding a supplier

Gas powered hot water boilers, suitable for decentralised systems, come under the Government's Enhanced Capital Allowances scheme. You can see a list of ECA approved hot water boilers at <http://etl.decc.gov.uk/etl>

You'll find electric water heater manufacturers on the web, or you could contact a local electrical or plumbing wholesaler. Ask for references to check that a product has worked well in similar situations to yours.

Decentralised hot water systems should always be fitted by a reputable heating contractor. You may already know of a good contractor; if not, try contacting a recognised trade association.

### The Heating and Ventilating Contractors' Association (HVCA)

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