



Low Carbon Technology Guide

Water source heat pump

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1. What is it?

A water source heat pump is a low carbon heating device. It uses electricity to transfer heat from a body of water outside your home to the radiators, underfloor heating or water stored in a hot water cylinder in your house. It performs the same function as the traditional boiler, but instead of burning gas to produce heat, it uses electricity to move the heat from a body of water to your home.

Water source heat pumps are less common in the UK than ground source and air source heat pumps as they require an appropriately sized body of water, such as a lake, river, or large pond near your property. The main advantage of the water source heat pumps, however, is that if installed correctly, they tend to be the most efficient type of heat pump because heat transfers more effectively in water than in the air or ground.

There are two types of water source heat pump systems available:

- **Closed loop system** – this type of heat pump works by pumping a mixture of water and antifreeze through sealed loops of pipe submerged in the body of water outside your property. When this liquid runs through the loop, it absorbs the heat from the water and then returns to the heat pump where the temperature of the liquid is increased until it is warm enough to provide heating for the house. The heat from the liquid is then used to heat up the water circulating in the central heating system in your home. It is important to ensure that the loop is placed at a depth where the water does not freeze, as freezing of the surrounding water could damage the loop.
- **Open loop system** – with this type of heat pump, water is extracted directly from the water source (or an adjacent borehole) and moved to the heat pump unit. There the heat is extracted from the water and used to heat up the water circulating in the central heating system in your home. Once the heat is removed from the water, it is released back into another section of the water source or a different borehole. Freezing of the water is also damaging for the open loop systems, and therefore, the pump and the pipes must allow for a sufficient flow to prevent it from happening.

Overall, the open loop systems tend to be more efficient than the closed loop systems, but they are usually more expensive to install, operate and maintain.

2. What should be considered before installation?

2.1 HOME ENERGY EFFICIENCY

Heat pumps usually work most efficiently in well-insulated houses with underfloor heating, as these require less heat to maintain a constant temperature. Therefore, it is advised that your house should have, at a minimum, loft and cavity wall insulation before you consider the installation of a heat pump. You may also need to change your radiators or install underfloor heating if you do not have it already.

2.2 BODY OF WATER

Water source heat pumps require an appropriate body of water to be located adjacent to your property. The body of water must match minimum requirements in terms of volume, depth and water quality, based on the type and the size of the system that you choose. If you decide to use boreholes for your open loop system, you will need enough space and suitable ground to drill them.

2.3 INSIDE THE HOUSE

The indoor heat pump units for both types of systems, which contains key components, are usually about the same size as a large fridge, and therefore, you must find the space in your house to install them.

3. How much does it cost?

The cost of a water source heat pump installation can vary significantly, influenced by:

- Whether you live in a new building or an older property.
- Whether you purchase an open or closed loop system.
- The brand, model and size of the heat pump chosen.
- Whether you decide to drill boreholes for the open loop system.
- The size and the heat requirements of the property.
- Whether you need to make any additional changes to your property, such as replacing the radiators with the ones compatible with the heat pump or if you are installing underfloor heating.

Installation of a water source heat pump is likely to be over £10,000, and it is generally recommended to get quotes from at least three installers to get a good idea of how much the installation would cost you.

4. What is the maintenance like?

Closed loop systems do not require much maintenance and if properly maintained, the heat pump unit could last over 20 years while the heat-absorbing loop could last over 100 years under the right conditions.

On the other hand, open loop systems require more maintenance as they are prone to clogging and contain filtration systems that need to be frequently cleaned. Also, due to the large volumes of water being pumped through them, open systems are more prone to corrosion. Even if properly maintained, their expected lifetime is likely to be shorter than that of the closed loop systems.

5. How can I get it?

Heat pumps require technical knowledge to be installed properly and should only be carried out by a qualified installer.

The [Microgeneration Certification Scheme](#) (MCS) is currently the standard and quality assurance organisation for renewable heat technologies. Their website provides the most up to date list of accredited installers in the UK.

6. What funding help is available?

6.1 BOILER UPGRADE SCHEME (BUS)

If you live in England or Wales and considering a water source heat pump for your property, you could be eligible for a £6,000 discount under the [Boiler Upgrade Scheme](#).

6.2 HOME ENERGY SCOTLAND LOAN

If you live in Scotland and considering a water source heat pump for your property, you could be eligible for an interest-free [Home Energy Scotland Loan](#) of up to £10,000.

6.3 ADDITIONAL FUNDING INFORMATION

Depending on where you live, below are some organisations that can advise you on the funding options that could be available to you.

England and Wales: [Simple Energy Advice](#)

Scotland: [Home Energy Scotland](#)

7. Useful websites

For more information on the water source heat pumps, please visit the following websites:

[Energy Saving Trust - Guide on the water source heat pumps](#)

[Energy Saving Trust - Could a water source heat pump work for you?](#)