Low Carbon Technology Guide

Ground source heat pump

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SP Energy Networks

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1. What is it?

A ground source heat pump is a low carbon heating device. It uses electricity to transfer heat from the ground 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 the ground to your home.

The heat pump works by pumping a mixture of water and antifreeze through loops of pipe buried in your garden or outdoor space. When this liquid runs through the loop, it absorbs the heat from the ground and then returns to the heat pump, where the temperature of the liquid is increased until it is warm enough to provide heating for your house. The heat from the liquid is then used to heat up the water circulating in the central heating system in your home.

2. What should be considered before installation?

2.1 HOME ENERGY EFFICIENCY

Heat pumps usually work best 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 installing a heat pump. You may also need to change your radiators or install underfloor heating if you do not have it already.

2.2 GROUND LOOP

The ground loop is the loop of pipe that has to be buried in your garden or outdoor space and absorbs heat from the ground. The ground loop can either be buried in horizontal trenches or a vertical borehole. Horizontal trenches are typically dug 2 meters below ground level and usually need to be around 30-40 metres long, depending on the size and energy requirements of your property. Digging the trenches would typically require the use of heavy machinery, and therefore, the outdoor space must be accessible from the road entrance.

If the outdoor space is limited, it might be possible to drill vertical boreholes, which could be about 20 cm wide and 15-200 meters deep. This is usually the more expensive option than digging horizontal trenches and often requires a specialist ground (thermogeological) survey. Drilling boreholes always requires heavy machinery, and therefore your outdoor space must also be accessible from the road.

If you do not have space for either the trenches or a borehole, you could consider an air source heat pump instead.

2.3 INSIDE THE HOUSE

The indoor heat pump unit, which contains key components, is usually about the same size as an American style fridge (120 cm x 60 cm x 60 cm), and therefore, you must find the space in your house to install it. It could be installed inside your house or in the basement or an outbuilding if you have one.

3. How much does it cost?

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

- Whether you live in a new building or an older property.
- The brand, model and size of the heat pump chosen.
- The size and the heat requirements of the property.
- How difficult it is to access your outdoor space and whether you need horizontal trenches or a vertical borehole to lay the ground loop.
- 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.

According to the Energy Saving Trust, typical costs are around £28,000 if your ground loop is buried in trenches and could be around £57,000 if you need to dig a borehole. 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?

Ground source heat pumps are costly to install but require very little maintenance (although annual inspections are recommended). According to the Ground Source Heat Pump Association, you can expect the heat pump unit to last at least 20 years, while the ground loop could last over 100 years in the right conditions.

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 are considering a ground source heat pump for your property, you could be eligible for a £7,500 discount under the Boiler Upgrade Scheme.

6.2 HOME ENERGY SCOTLAND LOAN AND GRANT

If you live in Scotland and are considering a ground source heat pump for your property, you could be eligible for a Home Energy Scotland grant of £7,500 (£9,000 for households qualifying for the rural uplift) plus an optional interest-free loan of up to £7,500.

6.3 ADDITIONAL FUNDING INFORMATION

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

England and Wales: UK Government

Scotland: Home Energy Scotland

7. Useful websites

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

Energy Saving Trust

Ground Source Heat Pump Association

GreenMatch

Please note that the information provided in this guide is subject to frequent changes. Readers are strongly advised to verify the information through the links provided above or consult other reliable sources before making any decisions.