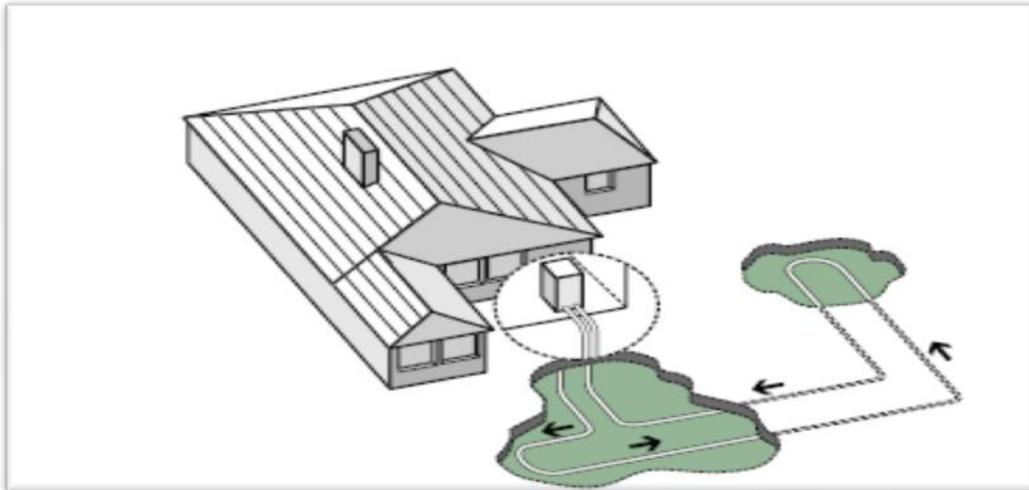


Fact Sheet 4: Ground Source Heat Pumps



Ground source heat pump (in building) with closed loop ground coil

What are they?

A ground source heat pump is a box about the size of a domestic washing machine, connected to a length of pipe buried underground.

What do they do?

They provide hot water which can be used for domestic hot water (showers etc), underfloor heating or over-sized radiators, requiring a lot less energy than a conventional electric boiler. While a conventional immersion heater will supply one unit of heat for every one unit of electricity, a heat pump will supply 3-4 units of heat for one unit of electricity.

How do they work?

They work in the same way as a refrigerator, but on a larger scale. A refrigerator moves heat from its inside to its radiator at the back using a compressor. In the same way, a ground source heat pump moves heat from under the ground to a hot water supply.

The ground is heated by the sun, and stays relatively warm even in winter.

Even when the topsoil is frozen solid, a meter or two deep will still be at a constant temperature year-round.

It is this store of heat that the ground source heat pump collects by pumping liquid through a pipe system buried in the ground. Using the same mechanism as a refrigerator, the ground source heat pump turns a large amount of slightly hot liquid into a small amount of very hot liquid. Some installations will be eligible for the Renewable Heat Incentive (RHI).

Where do they go?

The heat pump itself will go indoors, while the pipe system will be buried 2-3 meters underground. The underground pipe system will need a relatively large area in order to collect enough heat. If you don't have enough space, the pipes can be placed in a borehole 15-100m deep.

What issues need to be considered?

Ground source heat pumps require a large area in which to install the pipe loops. Excavations for these can be costly; however boreholes are much more expensive.

Heat pumps are best used in well-insulated buildings as they produce a lower temperature. Underfloor heating and larger radiators perform better than traditional existing radiator systems.

What are the planning requirements?

Most householders can carry out small extensions or additions to their homes without the need for planning permission. This is known as '**permitted development**'.

Fitting a ground source heat pump in a house or a block of flats is classed as permitted development.

Whilst planning permission is unlikely to be needed for excavations or drilling, provided the ground coil is installed under your own land, in sensitive areas such as Areas of Outstanding Natural Beauty (AONBs), planning permission may be required for the excavation works to lay the coils.

The Environment Agency should be consulted if an open loop system is planned, because water will be extracted, and returned to the ground, which will require licenses to abstract and re-inject the water.

More info

The Department of Energy and Climate Change's (DECC's) page outlining information on ground source heat pumps, with links to further information:
http://www.decc.gov.uk/en/content/cms/what_we_do/uk_supply/energy_mix/renewable/explained/microgen/gshps/gshps.aspx

The companion guide to planning policy statement 22 provides more information on the planning and development of renewable energy schemes across England:
<http://www.communities.gov.uk/publications/planningandbuilding/planningrenewable>

Please Note: National planning guidance is currently under review and the companion guide to planning policy statement 22 is referred to for information only.