



Ground Source Heat Pumps

Ground source heat pumps systems which extract heat energy from the ground or groundwater offer exceptionally high levels of efficiency, achieving significant reductions in CO2 emissions and energy bills.

There are a number of ways in which heat can be extracted and we are able to offer a full range of products and services, to ensure that you get the best solution for the location, building requirements and budget. These include both open loop and closed loop systems, with the option of extracting heat from either the ground or a water source. Along with our trusted partner Skanska, we have pioneered the installation of Energy Piles in the UK.

GI Energy is at the forefront of geothermal system design and with more than 1,500 ground source heating and cooling systems installed in the UK, we are able to offer expert system design. Our in-house geotechnical, Drilling & Groundworks division provides a full design and installation service, including the incorporation of geothermal pipes into the structural piles of new build properties.

Benefits

The main benefits of Ground Source Heat Pumps can be summarised as follows:

1. They save money. A Ground Source Heat Pump system can help to achieve significant fuel cost savings compared to gas boilers, direct electric heating systems, oil boilers and other renewable energy systems, such as biomass boilers.
2. They generate income. The Government has introduced the Renewable Heat Incentive (RHI) for owners of heat pumps. Commercial building owners have benefitted from the subsidy from September 2011, although the tariffs applied to ground source systems have been low to this point, a review of the scheme is currently underway with a significant increase in tariff expected early in 2013. In parallel with this review a consultation on a residential building scheme is on-going with a scheme expected to start in mid-2013. This will be particularly relevant to Housing Associations who can use this additional income to pay for the installation, fund the system via an ESCO arrangement or simply to benefit their tenants.
3. They are an eco-friendly alternative to oil, gas and LPG. Although they require electricity to operate, the output generated is around 3 to 6 times the power input (known as the CoP or Co-efficient of Performance)
 - To secure the Renewable Heat Incentive you must have a heating COP > 2.9
 - GI Energy designed systems are expected to achieve COP's as follows:
 - Heating only around 3.8
 - Heating and Cooling system - Heating around 4.8
 - Heating and Cooling system - Cooling around 5.8

They don't require any fuel storage space, unlike oil and LPG which require large storage tanks, and biomass boilers which require wood/pellet storage. There is also the peace of mind that there is no need to store large volumes of combustible fuel on the premises. They do not require flueing as there are no harmful emissions.

Low maintenance. The basic mechanism is similar to a refrigerator, with few moving parts and few things that can go wrong. The most costly part in the unit is the compressor and you have the option to extend your warranty if you would like the reassurance that all parts and labour are covered in the longer term.

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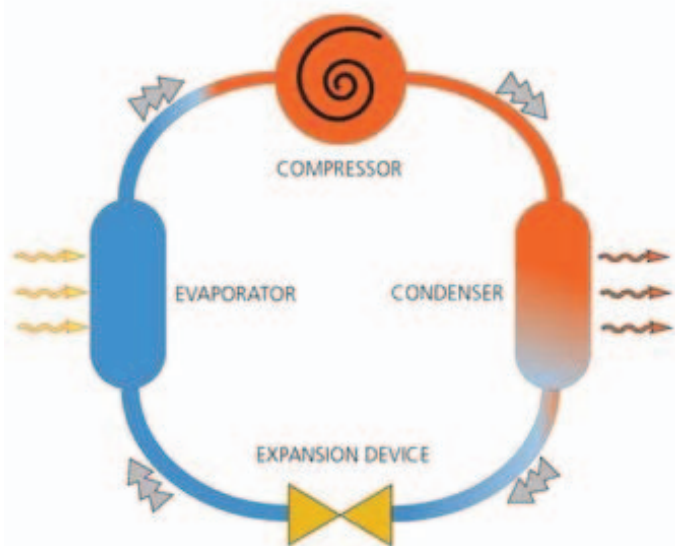
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How they work

Heat Pumps operate in a similar way to a refrigerator - they move heat from a cold place to a hot place. A compressor, condenser, expansion valve and evaporator are used to change the state of refrigerant from a liquid to hot gas and from a gas to cold liquid.

The main stages of the process are as follows:

1. Liquid refrigerant passes through the heat exchanger to ground loop coils at a low temperature.
2. Liquid from the ground loop enters the unit and heat is transferred from this liquid to the refrigerant. As a result, the refrigerant boils and becomes vapour.
3. The vapour is drawn into the compressor, where the pressure and therefore the temperature of the gas is increased.
4. The vapour then enters the condenser or load side heat exchanger and heat from the vapour is transferred to the water used to heat the building. As the vapour cools it condenses back to a liquid, which releases considerable latent heat to water passing through the heat exchanger.
5. The refrigerant, which is now a cold liquid at high pressure, passes through an expansion valve, which reduces the pressure so that the cold liquid can re-enter the evaporator and begin the cycle again.



In the Ground

GI Energy's specialist in-house Drilling division is at the forefront of ground loop installation and is able to undertake all aspects of ground preparation for our clients. We offer the full range of collectors and will design the system that fits best with the available land or water source, the local geology and the building requirements. The different types of collector are described below. For new build projects, energy piles can be incorporated into the building design. With the ground loop pipes incorporated into the piles the need for further drilling and groundwork is significantly reduced.



Closed vertical loop

The ideal choice when available land surface is limited. Drilling equipment is used to bore small-diameter holes from 50m to 250m deep. A single or double u-tube of pipe is grouted into the hole.



Open loops

Open loop systems utilise ground water as a direct energy source. In ideal conditions, an open loop application can be the most economical type of geothermal system. The technology also offers an extremely compact installation so it is ideal for city centres where no more than a pavement or access ramp can deliver many mega-Watts of heating and cooling

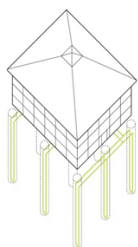
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Energy Piles™

Working in partnership with Skanska, GI Energy has pioneered and has become a strong market leader in incorporating energy systems within the foundations of buildings during construction. This system has particularly strong benefits in city centre locations where space outside the building footprint is short on non-existent.



Pond (lake) loops

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System Design

The key to achieving optimum levels of performance and efficiency lies in the design of the system as a whole, including the internal building services themselves. GI Energy has more experience in designing large scale ground source heat pumps systems than anyone in the UK. This track record coupled with the complete service we offer means you can trust GI Energy to deliver every time.

In general, the design process is carried out as follows:

Feasibility Study

Our design service begins with an initial feasibility study, We will ask you to provide the postcode of the property/development, an outline of the heating and cooling loads and site plans if they are available. Using this information, along with geological information for the location, a member of our technical team will prepare a discussion document. It will include outline installation costs, estimated carbon run costs and estimated savings. If appropriate this can also include a financial proposal for either leasing the system or for a full Energy Service Company contract.

Detailed Design

We have developed our own ground loop design technology. This bespoke software provides greater levels of accuracy and flexibility than any other in the market place. For large scale installations the detailed design will include all aspects of the external works, plant room layouts and the interface with the internal heating distribution. This is a collaborative process with your chosen building services engineer with whom we will partner to maximise the system performance in the long term. By working closely together with you project team in this way we eliminate gaps in the contract giving you the peace of mind when problems occur.

System Installation

From drilling and system headering, into the plant room and control system GI Energy offers the complete solution. Our highly trained teams of installation operatives are managed by experienced project managers and are backed up by our central logistics functions.

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After Sales Service

Our fully trained maintenance and service engineers cover the whole of the UK and Spain with strong regional coverage in the US. We provide our customers with expert on-site supervision, technical diagnostics, repair services and planned maintenance capability. Field technicians, field engineers and in-house engineering support teams work closely with our clients to develop specific solutions for individual projects. Our aim is to provide our customers with a premium service and support required for maintaining high reliability and long term use of their equipment. Our services include:

- Repairs
- Bespoke service agreements
- Spare parts packages
- Equipment upgrades
- Control Software
- Supervisory and Remote Management Systems

Product Warranty

Geothermal International offers a wide range of warranty & maintenance options. Our standard warranty is for 2 years parts & labour, from the date of supply. At the end of this period, extended warranties are available, to ensure peace of mind over the lifetime of the product.

Heat pumps use similar technology to a refrigerator, so servicing and maintenance needs are minimal. However, low level maintenance to check electrical connections, clean filters, check fuses etc is recommended, to ensure that the appliance runs without problems for many years. Annual servicing and operational checks can be built into extended warranty agreements. Extended warranties also cover the equipment in case of failure of a major component, such as the compressor.

An extended 2 year warranty package typically includes:

Annual service checks to ensure the appliance continues to function correctly & efficiently

Annual parts & labour cover, in the event of any breakdown due to mechanical or electrical failure of any component in the appliance.

Bespoke maintenance and warranty packages can also be arranged.

Terms & conditions apply. Please Contact us for further details.

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