

## Example GSHP to UFH Installation by Isoenergy Ltd

### Manifold Pit and Manifold:

The individual collector array loops are linked together by the manifold.

The manifold pit allows access to individual loops to improve the stability and reliability of the system. If any leaks should arise, the manifold allows for them to be detected easier, and repaired without affecting other loops. In addition, each port on the manifold is fitted with a flow meter, so that all the loops can be balanced.

This system is one of the ways that isoenergy differentiates itself from other installers.

### Ground Loops:

The average temperatures under the ground show less variation than those above ground, which are at the mercy of the weather.

Ground loops, or collectors, were placed at a depth of 1m and filled with a mix of water and vegetable based anti-freeze.

The liquid in the loops absorbs the energy from the ground and heats to around 12°C.

### Flow and Return Pipes:

The energy collected from the ground is transferred along larger diameter pipes to the manifold.

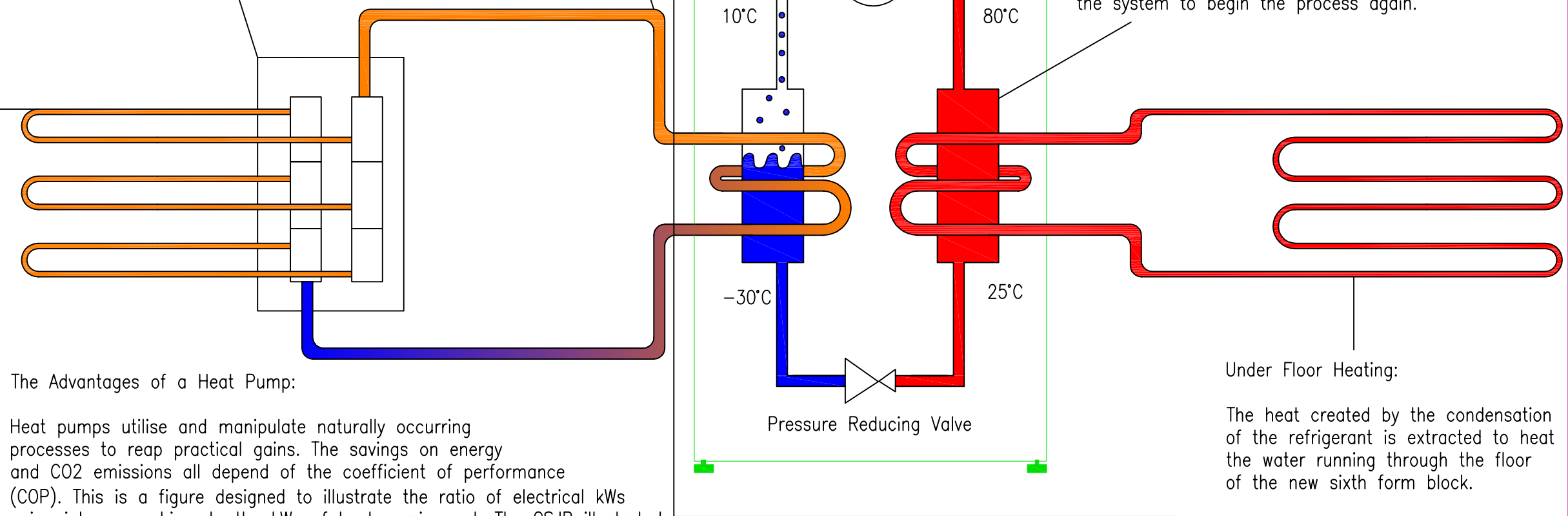
### Evaporator:

The heat pump is filled with a refrigerant that boils at -20°C. When it comes into contact with the heat from the ground, it is more than enough to boil the refrigerant and change it from a liquid to a gas.

### Condenser:

The gas at a low pressure is compressed to a much higher pressure in a scroll compressor. Utilising the combined law of gasses, the temperature of the gas increases sufficiently enough to heat the building.

As the heat is extracted, the refrigerant condenses and is passed back through the system to begin the process again.



### The Advantages of a Heat Pump:

Heat pumps utilise and manipulate naturally occurring processes to reap practical gains. The savings on energy and CO2 emissions all depend of the coefficient of performance (COP). This is a figure designed to illustrate the ratio of electrical kW's going into a machine, to the kW's of heat coming out. The GSHP illustrated can average a COP of about 4-4.5. In other words, for every kW of electricity taken to run the system, 4-4.5kW's of heat are produced. The COP generally increases in summer and decreases at the coldest parts of winter. Although the temperature under ground is more consistent, it is not completely immune to the weather at the depths suitable for Ground Source Heat Pump collectors.

### Under Floor Heating:

The heat created by the condensation of the refrigerant is extracted to heat the water running through the floor of the new sixth form block.