



Heat from under the ground



The Old Repeater Station at Grindon is a small bed & breakfast run by Les Gibson. When converting the building, which has no mains water or gas supplies, he looked to use "environmentally friendly" heating options, spurred on by the high and rising cost of oil and LPG. This resulted in the decision to install a ground sourced heat pump and wood burning stove. The stove is used to back up the ground sourced heat system if needed. Many visitors are very interested in the systems in place, particularly the ground sourced heat pump. The owner is particularly pleased with the system because it has completely removed the need for an oil boiler which would have been expensive to run, and would have produced far more pollution than the heat pump.

How does it work?

Temperatures below ground are far more stable than air temperatures, and, in this case, the ground sourced heat pumps work by removing heat from water warmed by the surrounding earth. They are 300-400% efficient, using only one unit of electricity to produce three to four units of heat (a high-efficiency gas fired condensing boiler is 80 to 90% efficient), so although they cannot be classed as "renewable" (unless "green" electricity used to power them) the reduction in pollution compared to oil is considerable. The drinking and domestic water on this site comes from a borehole, which also is used for the ground sourced heat pipes. Any waste water is filtered and treated and is put down a waste water borehole.

The heat pump is an open loop source pump, which means that water drawn directly from the bore hole, which also provides the site's water supply, is used within the heat pump. The water leaves

the bore hole at around 7°C and is returned to the waste water bore hole at about 4°C. The heat pump produces water at temperatures of up to 55°C.

Installation and costs

The ground sourced heat pump is a Water Furnace E series, and was installed by Geowarmth, costing £12,000 to buy and install, while the bore hole cost £15,000 to sink. Routine maintenance work is carried out by a local engineer, Robert Ashton.

The water purification system is a Clear Flow CT35, supplied by Condor Products, and cost £15,000. The Northumberland National Park Authority's Sustainable Development Fund gave a 50% grant on these installations. At 2007 prices, to run a GSHP costs approximately 30% less than an oil fired boiler.

Environmental impact

A ground sourced heat pump will save, on average, 25-28% of CO₂ emissions, compared to heating with oil, and has roughly the same emissions as mains gas, if powered by mains electricity.

Further information

Visit the other renewable energy sites shown on the map overleaf.

Kielder Castle renewable energy exhibition is open from Easter to October.

www.tynedalerenewableenergy.org.uk
www.hadrians-wall-bedandbreakfast.co.uk
or 01434 68866
www.condorproducts.com
www.geowarmth.co.uk or 01434 674111

