

DATE *Aug 2008*

**GROUND SOURCE**

PROJECT *Large Closed-Loop Design*

**HEATING & COOLING**

SUBJECT *Ground Source Heating and Cooling*

**CLOSED LOOP**



**Design and modelling of 125kW horizontal Closed-Loop installation:**

Carbon Zero Consulting (CZC) was contracted to provide an assessment of viability, and subsequently to develop a design, for a large horizontal closed-loop ground-source heating scheme for a new build care home in the south-east. This technology has the potential to provide renewable heating at a fraction of the cost of traditional gas or oil alternatives.

In general, horizontal closed loop systems are installed for domestic schemes of the order of 10kW or less. In this case, a large area of grassland was available and so horizontal trenches were chosen on the basis of cost.

An assessment of near-surface geology was the first step including the digging of trial pits to assess soil properties.

Seasonal heating data was obtained from the architect and main contractor to develop the design and commence system modelling. The data required included the monthly heating base-load, peak heat load by month and duration of peak load on the coldest day

The information was used to simulate the performance of the ground loops using a software-assisted design program.

**Field work; Assessment of soil properties and supervision of installation**

‘Slinky’ and straight-pipe options were evaluated. A detailed document was provided detailing the number, length, depth and separation of trenches and the length and coil diameter of each slinky pipe.

It was concluded that over 30 trenches each containing over 200m of slinky pipe would be required to provide sufficient ground-source for the given heating load and heat pump characteristics.

On-site supervision and advice was provided by Carbon Zero Consulting during the installation phase.

