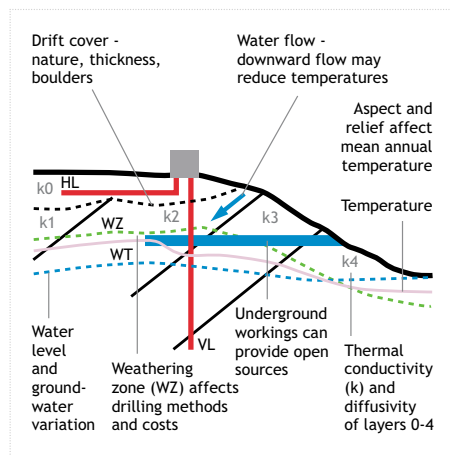


GROUND SOURCE HEAT PUMPS SITE CHARACTERISATION

LEAD ORGANISATION
British Geological Survey (BGS)
Mr Keith E Rollin
Nicker Hill, Keyworth,
Nottingham
NG12 12GG
Tel: 0115 9363100
E-mail: ker@bgs.ac.uk
www.bgs.ac.uk

COST AND DURATION
The Carbon Trust contribution towards this project is £64,709. The project started in June 2003 and is due for completion in May 2004.

PROJECT REFERENCE NUMBER
2002-8-26



Geological factors that may affect installation of Ground Source Heat Pumps (courtesy of British Geological Survey)

OBJECTIVES

The main objective of the project is to stimulate the uptake of ground source heat pumps (GSHPs) in the UK. GSHPs are well suited to space heating and cooling, and can produce significant reduction in carbon emissions.

To design a GSHP system, the tools that are currently available require the use of key site-specific parameters such as temperature and the thermal and geotechnical properties of the local area.

This project will establish an on-line service for GSHP users, installers and designers, providing them with the necessary key design parameters in order to help reduce design uncertainties.

SUMMARY

GSHPs utilise the thermal energy stored in the earth through either vertical or horizontal closed loop heat exchange systems buried in the ground. Many geological factors impact directly on site characterisation and subsequently the design and cost of the system.

The solid geology of the UK varies significantly. Furthermore there is an

extensive and variable rock head cover. The geological prognosis for a site and its anticipated rock properties influence the drilling methods and therefore system costs. Other factors important to system design include predicted subsurface temperatures and the thermal and hydrological properties of strata.

GSHP technology is well established in Sweden, Germany and North America, but has had minimal impact in the UK space heating and cooling market. Perceived barriers to uptake include geological uncertainty, concerns regarding performance and reliability, high capital costs and lack of infrastructure.

System performance concerns relate mostly to uncertainty in design input parameters, especially the temperature and thermal properties of the source. These in turn can impact on the capital cost, much of which is associated with the installation of the external loop in horizontal trenches or vertical boreholes.

The temperate UK climate means that the potential for heating in winter and cooling in summer from a ground source is less certain owing to the temperature ranges being narrower than those encountered in continental climates.

This project will develop an impartial on-line GSHP function on the BGS GeoReports Web site to make available information and data on site-specific temperatures and key geotechnical characteristics.

The information will be delivered from digital geoscience themes that have been developed from observed data held in corporate records. These data will be available to GSHP installers and designers to assist the design process, therefore reducing uncertainties. The Web site will also be used to help inform the public as to the potential benefits of this technology.

