The notable flexibility of GeoExchange systems means there are few application barriers. Whether installed in a residential or commercial setting, the GeoExchange system captures and moves the renewable energy from the earth into the geothermal Heat Pump through a geothermal Heat Exchanger — often referred to as the ground loop. The question “Do you have ...... Dirt?” simply means is there sufficient area, at the project site, to install the ground loop.

GeoExchange systems rely on the naturally stored energy in the earth to provide 70% of the energy needed to heat and cool the building. The size of the ground loop must be adequate to accomplish this important benefit. The GeoExchange system designer will determine the heating and cooling requirements of the building, specify the needed capacity of the geothermal heat pump and design the correct corresponding ground loop length. With some very large ground loop designs, a test is performed to determine the thermal conductivity of the area where the ground loop will be installed.

Pictured on the left are illustrations of two horizontal Heat Exchanger layouts. In both cases ¾” plastic piping is installed in a shallow trench, usually 6 to 8 feet deep.

Both configurations provide comparable performance. Layout selection is often a matter of personal preference for the installation contractor.

Horizontal systems do not prohibit the use of the property above them. To the contrary, Heat Exchangers are installed under lawns, farm fields and recreational areas. Because of the space requires and the equipment needed for installation, horizontal Heat Exchangers are difficult to install on heavily wooded lots.
Vertical Heat Exchangers minimize the footprint of the loop field installation. Vertical bore holes are made and two ¾" pipes, connected at the bottom with an elbow or u-bend, are placed down the bore hole. The bore hole is sealed completely, from bottom to top, with a special compound called grout. The grout insures good heat transfer between the pipes and the earth and protects underground aquifers from contamination.

Vertical loop fields are the choice for larger GeoExchange installations because considerable energy can be moved from the earth to the building, while occupying a fraction of the space needed for a comparably sized horizontal loop field. The Evansville high School, in southern Wisconsin, is heated and cooled with renewable energy from the earth, through their GeoExchange system, by virtue of its 460 bore hole vertical Heat Exchanger, installed under a small athletic field.

The greatest barrier to vertical Heat Exchangers is their high cost, relative to horizontal systems. As more water well drillers consider expansion of their business to include vertical Heat Exchanger installation, the cost of these systems will become more competitive.

If you have further questions on this GeoTech Bulletin please contact us toll-free

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