GEOTHERMAL DRIVEN PILES

Geothermal piles offer a sustainable low-cost method of heating and cooling houses, offices, or commercial and industrial buildings. Carbon footprint savings are made on new developments helping clients meet legislation on sustainable development.

**BASIC TECHNIQUE**

Driven Precast Geothermal Piles are a simple variation on standard concrete piles driven into a bearing stratum in the same way as conventional driven piles. Within the ground only the top 8m of soils are affected by climate-related temperature fluctuations. Below this point, soils remain at a constant temperature which is usually about 12°C.

Closed ground source heat loops use the temperature constant to either heat up cold water or cool down hot water by pumping a liquid solution through the pipes in contact with soils at depth. At the surface a heat exchanger is used to amplify the temperature difference similar to the workings of a fridge. The heat exchanger then uses the temperature differences to either heat or cool a building via standard central heating.

**WHERE CAN THEY BE USED?**

Driven Geothermal Piles generally obtain the best results from locations where soft or loose soils are present to great depth and where the groundwater table is high.

**INSTALLATION**

BBGE will provide and install co-axial piping and manifold connection to the head of each pile leaving infrastructure connection to the main contractor. Geothermal piles cause the least disturbance to the substructure works when they are non-load bearing and installed in land around the structure such as below car parks or landscaped areas. Load-bearing energy piles require integration with the construction sequence and careful design of ground-temperature balance.

If required, a design and installation service for pipeworks and heat exchange systems can be provided in JV with a geothermal design and installation contractor.

Loops can be incorporated within driven Steel Tube piles as well as driven precast concrete piles.
ASSESSING HEAT ENERGY FOR YOUR BUILDING

Most energy pile installations will achieve at least 30 watts of heating and cooling energy per metre depth of soils. One kilowatt of energy (one 33m deep precast pile) is enough to heat and cool a well insulated 4m by 4m room. A typical two storey office arrangement for twenty people, if constructed to modern insulation standards, would typically require around 50kW of energy from a ground source loop.

RETURN ON INVESTMENT

We estimate on projects where piling is required to support the building anyway and where conditions are suitable that the extra cost of the geothermal installation can be recouped within 5-10 years.

MEASURING HEAT CAPACITY OF YOUR SITE

A standard Thermal Response Test can be carried out on a geothermal pile installation and a calculation made relative to the heating or cooling energy available measured in W/m/K. The test is carried out using a self contained portable unit towed behind a 4x4 vehicle.

A properly conducted test will take 3 to 4 hours to set up and then 3 to 4 days to complete. Analysis of the results and reporting will take a further three weeks. This information helps optimise the geothermal pile design.

CONTACT US

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