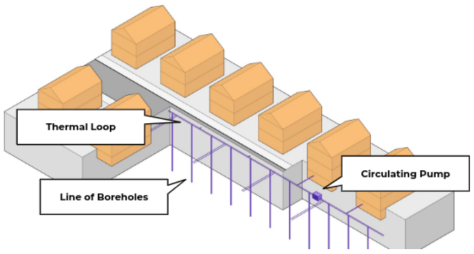
NetGeo



A NetGeo system is a street-segment system of networked ground-source heat pumps. There is a loop of pipe filled with pure water (no glycol added) running up and down the street in the gas utility's right of way, with service loops running to each building. Each has a heat pump inside their building that pulls heating or cooling thermal energy from the water in the service line, to deliver the needed temperature through that building's distribution system.

There are boreholes in the right of way of the street. The boreholes are used as needed to return the water in the delivery loop to temperature. The water is maintained in an "ambient" temperature window of approximately 40 to 90 degrees fahrenheit. This is the temperature in which heat pumps are most efficient and their life span is the longest. There is a supplemental heater and cooler on the shared loop of water as backup in case the system needs a temperature boost in unusual heating or cooling events.

NetGeo systems are designed to interconnect so they can grow over time to serve a neighborhood, municipality or territory. As the system grows, the temperature of the water is easier to balance, both synchronously and asynchronously, by using the different thermal energy sources and sinks (such as data centers, hockey rinks, supermarkets, office buildings, rivers, etc.). Thermal energy sinks and sources should be sought out actively as the system grows. There should be centralized management and optimization of the system for greatest efficiency and least cost of installation. As the system grows, fewer supplemental backup heaters and coolers are needed on the shared loops.

The system is sized for the stochastic load (i.e. the probable heating and cooling extremes of the aggregated customers, not for the simple sum of each customer's maximal heating or cooling peaks). The more customers there are and the more diverse their energy use, the less likely all the heating or cooling peak demands will occur simultaneously for any reason. For such unlikely events, a supplemental boiler or chiller can be used.

As the greater diversity of energy results in more load canceling, the installed infrastructure needed per customer decreases. The load canceling also increases efficiency, radically reducing the electric grid peak in comparison to conventional building electrification.