

# Utility Ground Loop Service Model Transforms Geothermal Heating and Cooling Costs



White Paper



Published By:



Sponsored By:





## Utility Ground Loop Service Model Transforms Geothermal Costs



*One of the barriers to wider adoption of geothermal heating and cooling has been the cost of ground loops.*

While geothermal heating and cooling has been growing in popularity, one of the barriers to wider adoption has been the additional cost of the ground loop.

Geothermal heating and cooling, also known as GeoExchange, is a heating and cooling technology that surpasses most traditional and alternative systems by simply moving heat from its source to another area.

In the heating mode, a geothermal or ground-source heat pump extracts energy from the earth—typically using a buried water loop—and moves it indoors. In the summer, the heat pump moves heat from indoors into the relatively cool earth, via the water loop. The result in both seasons is that less energy is needed than with conventional air-to-air heat pumps, natural gas, or oil heating systems. There are two major components to a geothermal system: the heat pump and air-duct portion, and the in-ground water loop well system.

The ground loop may represent an additional approximately 30 percent to 40 percent additional cost compared to a traditional HVAC system.

Overall, geothermal heat pump systems can save 30 to 50 percent in heating and cooling costs. But the initial costs for installing the geothermal ground loop have been a stumbling block the industry has struggled with for years. The U.S. federal tax credits are designed to offset this to some extent, but it still requires investment by the homeowner or home developer.

However, a new approach to financing the ground loops has made it easier for new communities to adopt geothermal heating and cooling.

Third-party or utility ownership models now offer ground loop systems as a utility, similar to natural gas or electric service. A utility company installs and maintains the ground loop – either individual loops for each home, or a community loop serving many homes. The homeowners own the geothermal heat pump inside the home. The utility charges the customers a monthly fee or a usage charge based on a BTU meter reading.

### Ground Loop Utility Examples

There are several examples of the utility approach to geothermal installations. For example, the Plumas-Sierra Rural Electric Cooperative in Portola, California offers a program of 15-year, nontransferable, interest free loan for GHP installations.

The monthly payment is added to the customer's monthly electric bill. The amount of the loan is based upon the size of the ground loop installed. By 2014, the utility had installed more than 450 systems under the program.



# Utility Ground Loop Service Model Transforms Geothermal Costs

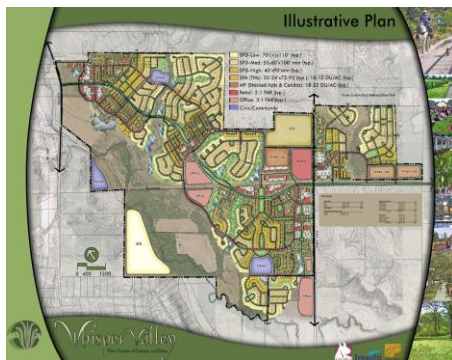
Under the Plumas-Sierra program, the monthly payments for a 4-ton system are \$29.90 for a horizontal loop and \$83.33 for a vertical bore field. <sup>1</sup>

Plumas-Sierra estimates a consumer will save \$2,000 in annual heating energy costs when he or she installs GHP instead of using propane for heating.

Orca Energy, a third-party service provider, has launched a third-party utility loop program for developers, homebuilders, and new home buyers.

Orca Energy provides design, installation, and maintenance services for the ground heat exchanger at no expense. Orca Energy serves the homeowner as a separate utility provider for the thermal energy provided by the geothermal heat pump system.

Orca Energy will charge the homeowner a one-time connection fee and then bill a monthly utility charge (MUC) consisting of a capacity charge and a variable monthly energy charge. These charges are indexed to the consumer price index (CPI). The MUC is designed to be set at or below actual space heating and cooling and hot water energy costs as compared to a conventional HVAC system. This provides the homeowner with stable and predictable energy costs over time without having to provide the upfront capital for the ground loop.



**Homes in the Whisper Valley Community will be equipped with geothermal heat pumps.**

In Austin, Texas, the Whisper Valley Community is working with EcoSmart Solutions in a new 7,500 home master-planned net zero community that will be equipped with geothermal heat pumps, hot water systems, and Energy Star appliances.

Whisper Valley homeowners will incur no upfront costs for the geothermal system, as the ground loop infrastructure is pre-installed throughout the community. Homeowners will receive an extended warranty and no maintenance costs for the first three years. Their energy costs will be fixed at approximately \$175 a month.

## Advantages for Community Loops

There are a number of advantages for the utility approach for the geothermal ground loop system that make it an effective option for home owners and developers, according to Mark Sullivan, Bosch Thermotechnology national account manager.

### *Transparent Energy Costs*

Electric and gas rates can vary with market prices and utility costs. With



## Utility Ground Loop Service Model Transforms Geothermal Costs

---

geothermal utility loops, homeowners know what their loop costs will be over a period of time. Typically there is an inflation cost factor that will rise over the period of the agreement.

"It provides some peace of mind to the homeowner to know that their heating costs will be stable over a long period of time," Sullivan said.

### *Energy Efficiency*

Typically homes that are built in a geothermal loop utility community also have other energy-efficiency measures, such as insulation, air sealing, water heaters and solar power. These homes may meet standards from the Energy Star or Zero Energy Ready programs or other certifications. A geothermal HVAC system is part of an overall home design aimed at energy efficiency, comfort and durability.

"The lower costs of geothermal pays dividends from the first day in the home, and the geothermal unit will last longer than a conventional HVAC unit and it will operate for less money and offer more comfort," Sullivan said.

---

<sup>1</sup> California Energy Commission, Efficiency Division, Building Standards Office. 2013. *Geothermal Heat Pump and Ground Loop Technologies*. California Energy Commission. Publication Number: CEC-400-2014-019.