

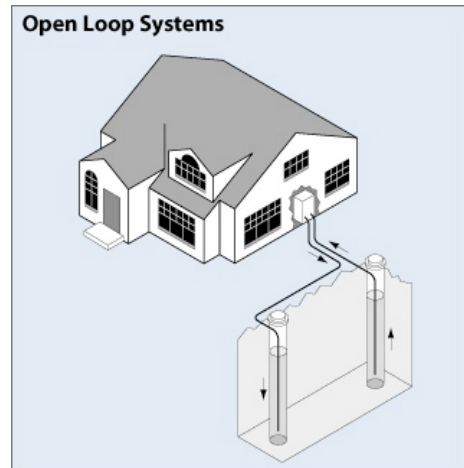


Renewable Energy Vermont

Geothermal Factsheet: *Reliable, renewable heat from the earth*

What is Geothermal Heating?

Geothermal heating is a technology that relies on the temperature difference between the earth and the outside air to produce essentially free heat and cooling for homes and other buildings. The earth has a stable (55 degrees Fahrenheit) temperature because its surface absorbs and stores energy from the sun, while deep in the planet the earth's molten core is hotter than the outside of the sun. People have taken advantage of this natural resource for hundreds of years— steam baths and hot springs heated by the earth have been in use since the Paleolithic era.



Well water in a “open loop” system is first warmed by the earth, then flows into the house’s geothermal heating system. Cold water flows back outside to be re-heated.

How Do You Get Heat From the Earth?

The modern geothermal heating and cooling system relies on the stable temperature of the earth, or of groundwater in a well dug deep in the earth, along with an electric heat pump. First, water is pumped through tubes buried in the ground, or out of the well (like in the “open loop” system to the left). In the winter time the temperature of the earth or the groundwater in a well is always warmer than outside, and well above freezing— the heat pump “extracts” this heat from the water to distribute throughout the building, and the now-cooled water is returned to the earth to be re-warmed. The system is reversed in the summer, with the heat pump drawing hot air out of the building, and sending warmed water into the earth to be chilled.

Where is Geothermal Heating Produced and Consumed?

Because geothermal heating uses the earth’s temperature, the technology can be used anywhere there is ample earth or groundwater available. Europe has many of these systems on residential, commercial, and

municipal scales. In the United States, geothermal heating is relatively new and has yet to become widespread. In the North East, Vermont in particular, where the winters are long and cold, geothermal holds much potential.



Worker adjusting the heat pump component of a geothermal heating system

Did You know?

According to the U.S. Environmental Protection Agency (EPA), geothermal heat pumps are the most energy efficient, environmentally clean, and cost effective systems for temperature control.

Want to Find Out More About Geothermal?

We've got more information, links and resources at <http://www.revermont.org/main/technology/geothermal/>

What Are the Benefits of Geothermal?

Compared to fossil fuel based sources of heating, geothermal provides a low-emissions solution. The heat pump runs on electricity, so depending how it is powered (whether or not you get your electricity from a renewable source, like, solar, wind, hydro, biomass, or biogas) geothermal systems produce no climate-warming carbon dioxide. Geothermal heating is a localized form of heating which decreases our dependence on volatile foreign countries. Best of all, the systems are very durable, low-maintenance, and once installed, provide an estimated (based on current heating expenses) 30-70 percent savings in heating costs over conventional systems.



Tubes carrying water in a "closed loop" system ready to be buried in the earth. Water warmed by the earth flows into the house's geothermal heating system, cold water flows back outside to be re-heated.