

## GEOTHERMAL ENERGY

### What is Geothermal Energy?

Geothermal energy is energy obtained from the heat stored in the Earth's surface. It's clean and sustainable.

The shallow ground (upper 10 feet of the Earth) maintains a nearly constant temperature between 50° and 60°F. Like a cave, this ground temperature is warmer than the air above it in the winter and cooler than the air in the summer.

**Geothermal heat pumps can tap into this resource to heat and cool buildings.** A geothermal heat pump system consists of a heat pump, an air delivery system (ductwork), and a heat exchanger (a system of pipes buried in the shallow ground near the building). In the winter, the heat pump removes heat from the heat exchanger and pumps it into the indoor air delivery system. In the summer, the process is reversed, and the heat pump moves heat from the indoor air into the heat exchanger. The heat removed from the indoor air during the summer can also be used to provide a free source for hot water.



*Geothermal (Ground-Source) Heat Pumps: Market Status, Barriers to Adoption, and Actions to Overcome Barriers, December 2008.*

Geothermal heat pump systems consist of basically three parts: the ground heat exchanger, the heat pump unit, and the air delivery system (ductwork). The heat exchanger is a system of pipes called a loop, which is buried in the ground near the building. A fluid (usually water or a mixture of water and antifreeze) circulates through the pipes to absorb or relinquish heat within the ground.

**Geothermal heat pumps use much less energy than conventional systems**, since they draw cooling and heating from the ground. This makes them a viable option for energy efficient and LEED Buildings looking to maximize the efficiency credits from the mechanical systems.

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