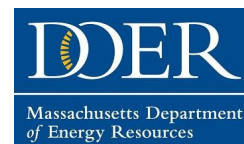


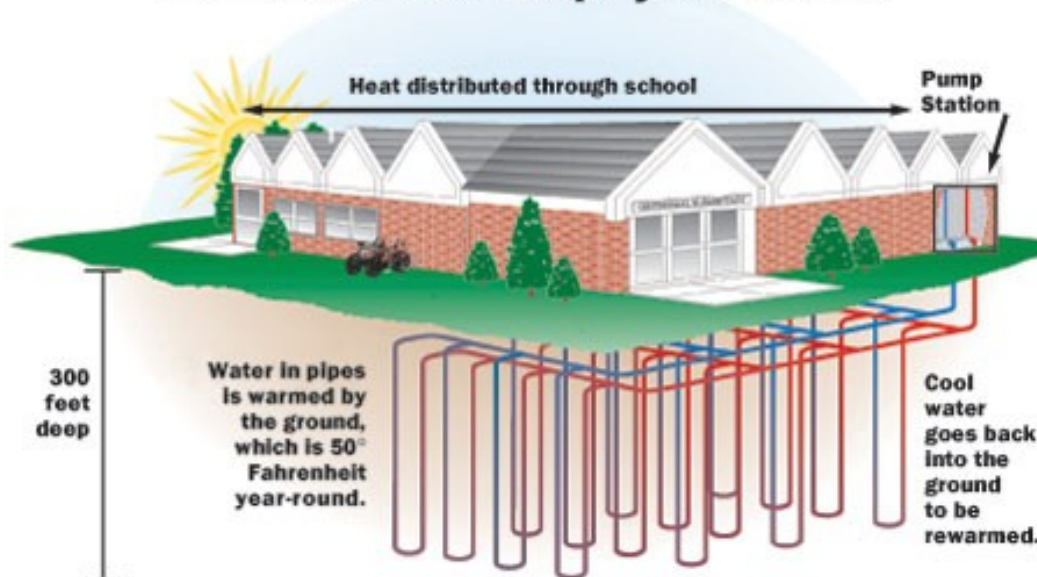
Save energy and money with a

# Geothermal Ground-Source Heat Pump



Ground source heat pumps (GHPs) use the constant temperature that exists just below the ground or in a body of water to transfer heating or cooling energy to a building. This is accomplished by transferring heat or cold from below the ground via underground piping that contains a refrigerant to a building's heating system.

## How Geothermal Loop Systems Work



Just like any heat pump, geothermal and water-source heat pumps are able to heat, cool, and, if so equipped, supply the house with hot water. Some models of geothermal systems are available with two-speed compressors and variable fans for more comfort and energy savings. Relative to air-source heat pumps, they are quieter, last longer, need little maintenance, and do not depend on the temperature of the outside air. System life is estimated at 25 years for the inside components and 50+ years for the ground loop.

**There are approximately 50,000 geothermal heat pumps installed in the United States each year.**

## Economics of Geothermal Heat Pumps

Although the purchase and installation cost of a GHP system is often higher than that of other heating and cooling systems, properly sized and installed GHPs deliver more energy per unit consumed than conventional systems. For further savings, GHPs are equipped with a device called a "desuperheater" that can heat household water. In the summer cooling period, the heat that is taken from the house is used to heat the water for free. In the winter, water heating costs are reduced by about half. Depending on factors such as climate, soil conditions, the system features you choose, and available financing and incentives, you may recoup your initial investment through lower utility bills in two to ten years.

There are also **financial incentives available** to lower the up-front cost for Massachusetts commercial and residential customers through a grant program at the Mass Clean Energy Center beginning Fall 2013.