

# Geothermal

The science and technology of geothermal has been developing for over a century and has made some very significant progression in some parts of the world like Iceland and the Philippines, where between 15-20% of electrical production is from geothermal. On the smaller scale, geothermal heat pump utilizes the fact that the top several meters of earth has a consistent year round temperature between 10-16°C. Through a series of installed piping in the ground that act as a heat exchanger, the consistent temperature of the earth can be used to supplement cooling of a building in the winter and the heating in the winter.

Fig 1.  
Schematic representation of geothermal system (Geothermal Heat Pumps a World Overview, 2004)

When designing a geothermal system for residential or small commercial use, heat transfer between the ground and the hardware chosen must be optimized to ensure highest efficiency. With the relative temperature difference of the ground and the circulating cooling/heating fluid not that high, a proper design is and look at the complete building environment is needed to ensure a successful installation. Although with geothermal heat pump systems are free fuel, the improved efficiency of a system and integration with the building can help lower the initial installation costs.

Internat Energy Solutions Canada (IESC) is understanding and interested in the momentum that this form of renewable energy is being shown for small scale projects in Ontario. As a result, IESC is actively working with local industry to look at ways to continue and increase its successful use.

Fig 2. Heating and Colling Cycles (Oklahoma State University)