

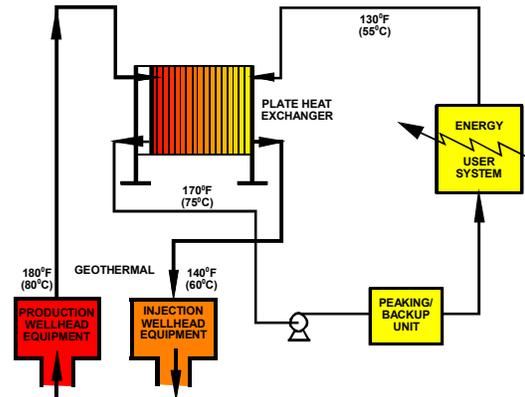


## Geothermal Heat Pumps and Direct Heating Uses

~ from the Geothermal Energy Association, [www.geo-energy.org](http://www.geo-energy.org) ~

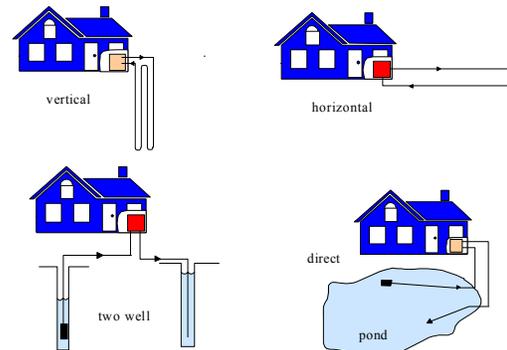
**Heating Uses:** Geothermal heat is used directly, without involving a power plant or a heat pump, for a variety of applications such as space heating and cooling, food preparation, hot spring bathing and spas (balneology), agriculture, aquaculture, greenhouses, and industrial processes. Uses for heating and bathing are traced back to ancient Roman times. Currently, geothermal is used for direct heating purposes at sites across the United States. U.S. installed capacity of direct use systems totals 470 MW or enough to heat 40,000 average-sized houses. (Image at right: Typical Direct Use Geothermal Heating System Configuration)

A few examples of geothermal direct use applications today are at the Idaho Capitol Building in Boise, <http://idptv.state.id.us/buildingbig/buildings/idcapital.html>; Burgett Geothermal Greenhouses in Cotton City, New Mexico; <http://geoheat.oit.edu/directuse/all/dug0144.htm>; and Roosevelt Warm Springs Institute for Rehab in Warm Springs, Georgia, <http://www.rooseveltrehab.org/index.php>.



**Geothermal Heat Pumps (GHPs):** Geothermal heat pumps take advantage of the Earth's relatively constant temperature at depths of about 10 ft to 300 ft. GHPs can be used almost everywhere in the world, as they do not share the requirements of fractured rock and water as are needed for a conventional geothermal reservoir. GHPs circulate water or other liquids through pipes buried in a continuous loop, either horizontally or vertically, under a landscaped area, parking lot, or any number of areas around the building. The Environmental Protection Agency considers them to be one of the most efficient heating and cooling systems available.

To supply heat, the system pulls heat from the Earth through the loop and distributes it through a conventional duct system. For cooling, the process is reversed; the system extracts heat from the building and moves it back into the earth loop. It can also direct the heat to a hot water tank, providing another advantage — free hot water. GHPs reduce electricity use 30–60% compared with traditional heating and cooling systems, because the electricity which powers them is used only to collect, concentrate, and deliver heat, not to produce it. (Image at right: Geothermal Heat Pump Diagram)



**For more information, visit:**

**The International Ground Source Heat Pump Association:** <http://www.igshpa.okstate.edu>

• Local to national information about geothermal heat pumps, including directory of businesses. You can search for heat pump designers, installers and dealers in your area.

**The Geothermal Heat Pump Consortium:** <http://www.geoexchange.org>

• Geothermal Heat Pump industry information and events. Check out the fact sheets and brochures under their publications tab.

**Geo-Center of the Oregon Institute of Technology:** <http://geoheat.oit.edu>

• US DOE funded information center on geothermal energy, particularly unique site for information on geothermal "direct uses" such as greenhouses and building heating. You can click on their interactive map to see geothermal projects in your state.