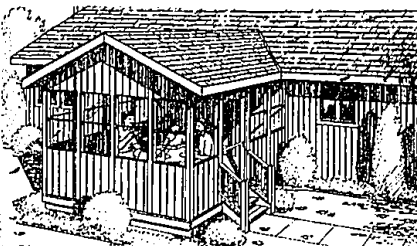


The Weekly Do-It-Yourselfer



3-season porch

Additional living space can enhance both the value and the comfort of your home. This lovely three-season porch has an optional 6/12-pitch gable or hip roof design. It can attach to the side or roof of your home. If size is a main concern, the screened porch is available in six sizes, ranging from as small as 8'x12' to as large as 12'x16'. A side door and stair plans are included in the package. Two complete sets of the plans are included: one for you or

your builder and one for the building department. Plans include clearly labeled, detailed drawings along with full framing instructions. Illustrations are drawn three dimensionally with full elevations and cross sectional diagrams. Step-by-step comprehensive instructions are included to aid you in construction. A full materials list will make your trip to a local lumberyard for building materials another easy step toward the completion of your new project.

BY THE ASSOCIATED PRESS

A geothermal heat pump takes advantage of the fairly constant temperature below ground — about 38 degrees in northern Michigan to 80 degrees in the southern California desert.

Water (sometimes with antifreeze) flows from the pump through piping into a pond, well

or trench at least 7 feet below ground, then back into the pump. In winter, the water is warmed as it travels through the loop, heating the building.

The water circulates around copper pipes in the pump, warming the refrigerant inside from 20 degrees to 40 degrees and converting it from liquid to gas. The water goes back through the

loop to be reheated by the earth. Next, the pump compresses the refrigerant, raising its temperature to about 170 degrees. The refrigerant cools to about 140 degrees as heat is drawn off for hot water for showers and dishes.

The refrigerant then heats air to about 100 degrees; the air, circulated with a fan, heats the

building. The refrigerant cools further and expands, turning back into a liquid, before beginning a new cycle.

In summer, the refrigerant travels in the opposite direction. The earth cools the water in the loop, pulling heat from the house. The pump still captures heat for domestic hot water.

Strengths of geothermal pumps

■ Typical installation costs for a 2,000-square-foot home, including duct work:

■ Natural gas furnace, electric central air conditioning: \$4,331.

■ Oil, propane or electric furnace, electric central a/c: \$4,000-\$5,000.

■ Air-source heat pump: \$4,430.

■ Geothermal heat pump with open loop in groundwater well: \$8,873.

■ Geothermal heat pump with closed loop in trench: \$8,136-\$8,997.

■ Annual cost of heating a 1,200-square-foot, energy-efficient home to 70 degrees in Manchester, N.H., where the winter low is minus 15 degrees:

■ Electric baseboard heat at about 7 cents per kilowatt hour: \$452.

■ Propane heat at \$1 per gallon: \$389.

■ Natural gas heat at 70 cents per therm: \$261.

■ Oil heat at 80 cents per gallon: \$226.

■ Geothermal heat pump at about 7 cents per kwh: \$165.

Comparing the advantages of heat sources

Ground vs. air:

Geothermal or ground-source heat pumps exploit the difference between the temperature of the earth 7 feet or more below the surface and a refrigerant in the pump. Air-source heat pumps exploit the difference between the air temperature outside a

building and the refrigerant.

Air-source heat pumps cost about the same to install in a home as conventional furnaces, while geothermal heat pumps may cost twice as much. However, air-source heat pumps cost 23-44 percent more to operate. Air-source pumps are of limited

ed use in Michigan winters.

Electric vs. gas: Heat pumps can be powered by electricity or natural gas, and both kinds of utilities sometimes subsidize installations.

Closed vs. open loop: Some geothermal heat pumps circulate water through closed

loops of plastic pipe. Others use open-loop systems that typically draw groundwater in from one well and discharge it into another.

Where wells are drilled through bedrock, a single well can be used. Open loop systems need high quality water to minimize corrosion.

Where you can learn more about geothermal heating

For more information about geothermal heating and cooling contact the following agencies:

■ The Geothermal Health Pump Consortium Inc. Phone: 202-508-5500. Internet address: <http://www.ghepc.org>

■ The Geo-Heat Center at the Oregon Institute of Technology.

Phone: 541-885-1750. E-mail address: geohat@oit.edu

■ International Ground Source Heat Pump Association. Phone: 800-626-4747. Internet address: <http://www.igshpa.okstate.edu>

■ National Rural Electric Cooperative Association. Phone:

703-907-5500. Internet address: <http://www.nreca.org>

■ U.S. Department of Energy.

Office of Geothermal Technologies. Internet address: <http://www.eren.doe.gov/geothermal>

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