

Geothermal Options

Most types of heating units can be adapted

BY MONICA M. WALK
 Special to The Reporter

A variety of geothermal heating units now available for homeowners and businesses offers a number of options to consumers.

Sean Steffes, owner of Advanced Custom Geothermal LLC in St. Cloud and Kiel, says almost any type of original heating unit—hot water, forced air—can be adapted to geothermal.

In-floor radiant heating also can be geothermal powered.

Rick McCutchin of Alernate Energys Inc. of Wrightstown points out that high-temperature hot

water baseboard heat is not a match for geother-

mal conversion, which generally goes no higher than 140 degrees.

Tom Schuppe's new geothermal heating unit and water heater fit where the old furnace and water heater were housed. He and his wife Karen Lindberg-Schuppe converted their home along the East Shore of Lake Winnebago to geothermal heating in December and January. Installation can be done year-round, and temporary adaptations can be done if a conventional furnace dies in winter.

Geothermal heating and cooling is made possible by tapping into the average 50-degree ground temperature that exists year-round. The heating and cooling applications are made possible through equipment and underground lines that help extract, focus and distribute heating or cooling.

Geothermal heat is collected via one of several variations on a theme. (See related story.) Today, most of these systems feature a closed "loop" of buried specialized piping or tubing, through which a pressurized mix of water and environmentally friendly glycol or methanol circulates and absorbs heat from the ground.

When the mixture reaches the home, the heat exchanger of a geothermal heat pump compresses the mix to a higher pressure and temperature and sends warmed air into the house according to the thermostat setting.

In hot weather, the process is reversed and the home is cooled. Water for the home can also be heated and stored via the heat



SUBMITTED PHOTO
 A workman from Advanced Custom Geothermal LLC, located in St. Cloud and Kiel, operates heavy equipment for installation of a geothermal heating and cooling system at the home of Tom Schuppe and his wife, Karen Lindberg-Schuppe, along the East Shore of Lake Winnebago.

pump and compressor.

"It's a very simple technology," McCutchin said, likening the process to refrigeration. "And it lasts many years."

Initially, Schuppe planned to have Advanced Custom Geothermal install a shallow trench-style heat collection system that would bury a 400-foot-long heat collection loop around the home. When faced with the prospect of losing numerous trees on the wooded property, he opted for the more expensive vertical closed loop system. A well-drilling rig created five holes, each 150 feet deep, in a non-wooded area closer to the home.

Spring-fed pond

A spring-fed pond on their rural Fond du Lac property influenced the geothermal system choice of John Morris and Paisley Harris.

McCutchin installed their closed-loop pond system in the summer of 2009. Geothermal coils sit in the bottom of the pond, and a four-foot-deep trench contains the closed loop and connects the home to the pond source.

Removal of the old heating system and installation of the geothermal took less than a week.

Built in 1978, the Morris-Harris home already was energy efficient

and heated by a unique combination of a wood-burning furnace and an oil furnace, complemented by fireplaces, when they purchased it eight years ago.

Concerns about the safety of the 30-year-old wood-burning furnace and knowing that the oil furnace was only 50-percent efficient sparked their interest in replacing the units with geothermal heat produced by their own property. They also received a 30 percent tax credit.

"We burned seven gallons of oil on cold days and it was about \$3 a gallon, so that was \$21 a day," recalled Morris, who teaches environmental science as a faculty member in the math and natural science division at Marian University and brings his classes into his home when teaching about energy systems.

"Now it costs about \$7 a day in electricity to run the geothermal, so we save \$14 a day on cold days," he said.

Freelance writer Monica M. Walk was raised in a Wisconsin family dedicated to the building trades. Her father was interested in alternate energy and built an earth-sheltered home. Have a Home topic you'd like covered? Email walkthetalkcommunications@gmail.com

Know your geothermal system options

Special to The Reporter

According to the U.S. Department of Energy, there are four basic types of geothermal ground loop systems available for

residential installation.

The first three types feature a closed loop, in which the heating/cooling fluid is continuously circulated through spe-

cialized tubing or piping in the ground and into the home and back. The fourth option listed is an open-loop system.

■ Horizontal closed loop system — The most cost efficient, it requires enough land to dig trenches at least four feet deep, beneath the frost line and up to several hundred feet long to hold the circulation pipes.

■ Vertical closed loop system — Used for larger buildings and where there is not enough land to accommodate horizontal trenches. Holes (the number depends on the size of the building) are drilled 100 to 400 feet deep. Pipes connected with a U-bend at the bottom of these "wells" create a closed loop that is connected to a horizontal pipe feeding

into the building and the heating system. The holes around the pipes generally are filled with a grout that improves heat transfer. This is the most expensive system.

■ Pond/Lake closed loop system — Pipe is run underground from the building to the water and coiled in circles at the pond bottom, which must be at least eight feet deep to avoid freezing.

■ The open loop system uses water from a well or body of water as the fluid circulating through the geothermal system. Once it has circulated, the water is returned to the ground. This system requires an adequate supply of suitable water from a clean source and adherence to groundwater discharge regulations.

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