



STAFF PHOTO/JACK HALEY

Brett Pevear, left, and Pete Frank, employees of Bristol contractor Eagle Mountain, roll out the looped tubing used in geothermal heating. Fluid in the tubes picks up heat from the earth and flows into a heat pump that amplifies the heat enough to warm a home.

## Going green, going cheap

*Geothermal heating technology can lower your utility bills and the amount of carbon dioxide your home sends into the atmosphere.*

By PHILIP ANSELMO

Messenger Post Staff

**B**ruce Coates wanted to go green when he chose a heating system for his new home on South Hill Road in Bristol in 2002.

Lloyd Wilson of Palmyra wanted to save serious money on heat for his backyard shop.

Both hired a Bristol company to install a geothermal heating system, which draws heat from the ground. Though expensive to set up, the system costs far less than conventional furnaces to run.

Wilson has saved more than \$1,000 this winter by dropping propane, which like most fuels, has become much more expensive in the past five years. Propane in western New York averaged \$2.19 per gallon last week, up 79 percent from \$1.23 in March 2002, according to the state Energy Research and Development Authority.

Heating oil is worse. The authority's records show the average price for heating oil was \$2.38 per gallon last week, up 103 percent from \$1.18 in March 2002. Natural gas is up 43 percent in the last five years, to \$15.57 per 1,000 cubic feet.

Coates, meanwhile, has peace of mind.

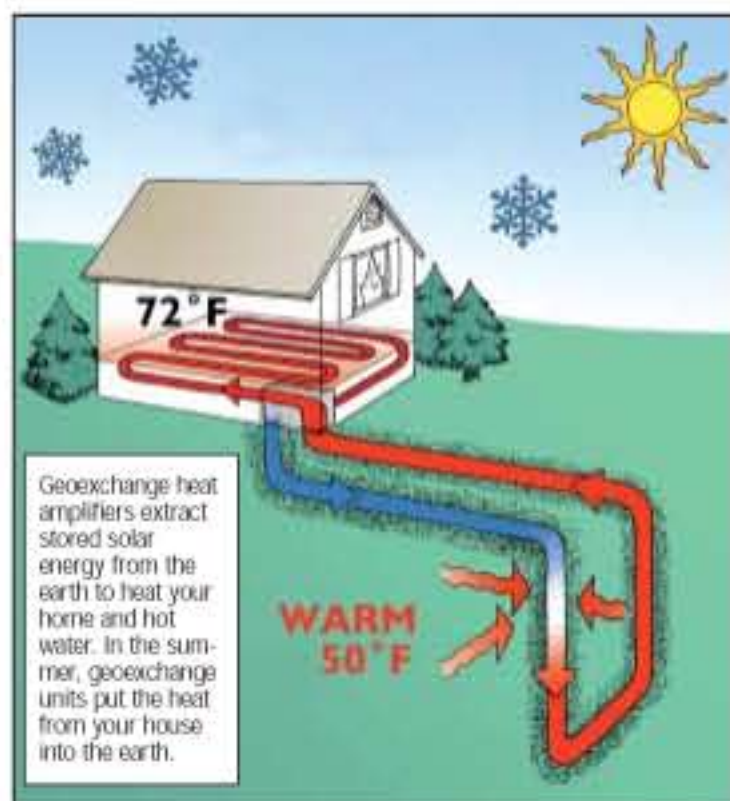
"I like the idea of not burning any fuel at all," said Coates. "There's no oil backup, no natural gas. It functions purely on what it pulls out of the ground."

How does it work?

The two main components are plastic tubing and a heat pump. First, a 700-foot-long coil of inch-thick plastic tube is filled with an environmentally friendly antifreeze and buried either at the bottom of a pond or about 6 feet

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Source: Eagle Mountain

underground.

At that depth, the earth stays at about 50 degrees year-round. The antifreeze absorbs about four degrees of that heat and flows into the home to a heat pump. The heat pump acts in much the same way as a compressor in a refrigerator — only in reverse. It amplifies that four degrees into 160 degrees.

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The heat pump requires electricity, of course. Wilson traded his \$1,500 seasonal propane bill in the winter for a \$200 increase in his electric bill.

"Geothermal is what in engineering terms is called an elegant solution. It avoids a lot of fossil fuel use and produces as little CO<sub>2</sub> impact in the environment as anything," referring to the carbon dioxide given off when fossil fuels — oil, coal, gas — are burned.

"In the past two years, there has been a tremendous push for geothermal energy," said Mark Tolbert, director of business development at Eagle Mountain, the Bristol company that installed Wilson's and Coates' geothermal heating systems.

Tolbert retrofit his own home with a combination geothermal and radiant system. He replaced his \$300 average monthly heating bills with \$100 electric bills.

Many who switch to geothermal energy, he added, also opt for radiant heating, which does not require vents or blowers.

In fact, radiant heating does not warm the air at all.

Water-filled tubes installed in or under the floor run through a conventional boiler or a geothermal system that

heats the water to anywhere between 80 and 140 degrees. Then, the heated water circulates throughout the home.

"Radiant heat is caused by a warm surface giving up its heat to a cooler surface," explained Tolbert. "In other words, it doesn't heat the air. It heats the objects in the room. The floor heats the couch, the table, the dog, the people and the walls, which in their turn radiate the heat from themselves to other objects in the room."

As a result, there is little or no convection, which means that the heat remains closer to the objects nearest to the source and cools off as one travels further away, similar to the way the sun heats the planets. Thus, the heat is not trapped at the ceilings.

"Operating costs for radiant heating can be about 40 percent less than forced-air systems, although you will find that people who make the switch to radiant heat typically do so because of a concern with comfort rather than savings," Tolbert said. "With radiant heating, because there is no air movement, there are no cooling breezes and the dust does not freely circulate, which helps eliminate dryness and allergies."

Low energy bills, comfort, peace of mind — alas, it all comes with hefty startup

costs.

The initial investment for a geothermal system with heat pump and radiant heating, similar to what Wilson required for his 2,000-square-foot shop, could cost anywhere from \$9,000 to \$13,000, according to Tolbert.

That breaks down as follows:

- The materials required for radiant heating (tubing, fasteners, insulation, etc.) run from about \$2 to \$4 per square foot, or \$4,000 to \$8,000 to cover 2,000 square feet.

- A complete geothermal system with heat pump costs \$5,000. If you wanted to skip the geothermal and use propane or other fuel, a typical high-efficiency boiler system averages \$3,000, Tolbert said.

A traditional oil furnace used to run a forced-air heating system would cost between \$6,000 and \$7,000, plus an extra \$1,000 installation cost for hot water, Tolbert said. The cost would jump about \$1,500 for a high-efficiency system.

"In the past, geothermal was much more expensive than it is now," said Tolbert. "Our business has really been driven not only by that drop and the simultaneous rising cost of traditional fuels but very much because of people's greater environmental awareness."