

Heat pumps are a hot (and cool) item in Utah

By Steven Oberbeck
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Geothermal: A bit more expensive at first, the deceptively efficient systems pay off in the long run

Condominium developer Richard Gordon was skeptical when his design team first suggested drilling a low-temperature geothermal well in downtown Salt Lake City to heat and cool his Westgate Lofts project.

Yet when he finally understood how such systems work, Gordon eagerly scratched off the natural gas furnaces and air conditioners from the project's blueprints and rushed out to secure the permits to tap into the water table 300 feet beneath the city's streets.

"It was like, 'Wow, we absolutely have to do this,' " Gordon said. "It might cost a little more up-front, but the long-term savings [for the condominium owners] will be tremendous."

As a result, when residents of the Westgate Lofts begin moving into their new condos later this year they won't have to worry too much about the rising cost of energy. Compared with the cost of using natural gas and electricity, they should be paying anywhere from 25 percent to 75 percent less to heat and cool their homes.

Mother Earth will do most of the work.

"These systems are incredibly efficient with low operating costs," said John Lund, executive director of the Go-Heat Center at the Oregon Institute of Technology. "They're widely used in the Midwest and the East, but haven't yet caught on in any big way out here in the West."

Still, there are some notable exceptions in Utah.

The Church of Jesus Christ of Latter-day Saints' high-rise headquarters building is heated and cooled by a low-temperature geothermal system, as is Murray High School. The Canyon View High School in Cedar City, built in 2000, also uses such a system.

"I'm always amazed at the simplicity of the system's design," said Canyon Principal Steve Burton. "And the science behind it is pretty easy to understand, as well."

Also known as a ground-source heat pump system, low-temperature geothermal units operate by continuously circulating water through a system of pipes and bore holes drilled deep into the earth. Murray High's unit, for example, uses 350 such bore holes under the school's parking lot.

In the winter, water is brought up from deep beneath the surface where the temperature remains constant year round. A heat pump extracts warmth from the liquid to warm the air. The cold water then is returned to the earth.

During the summer, the system is reversed. Heat is extracted from the inside air and injected into the water before it is pumped back underground.

One of Utah's leading experts on geexchange technology, Cary Smith of Sound Geothermal Corp., said the state's base of installed systems is growing, with more than 35 schools, dozens of commercial buildings and more than 1,000 homes using the technology.

"The thing is, there are not a lot of people out advertising ground-source heat pump systems. A lot of the interest is driven by word of mouth," he said. "And for whatever reason, there's a hot bed of installations now going on in the St. George area and Duchesne County."

For Utah homeowners who might be interested in switching from natural gas to a low-temperature geothermal system, the cost is less than double what they would have to pay to install a new natural gas furnace and air conditioning system.

The cost of the equipment inside the home would be about the same. The difference in the cost comes from having to get into the ground. "For homeowners it will take about seven to eight years to recover the cost of the initial installation," Smith said.

The economics for large commercial buildings are even better, he said.

A study of the system installed at the Canyon View High School by the Geo-Heat Center in Oregon found it was more than \$700,000 cheaper to put in low-temperature geothermal than a conventional boiler and chiller system.

And the cost of operating the system, even considering the use of electricity to run the pumps and blowers, is about 29 percent less, or \$58,300 a year, than the cost of operating a conventional system.

There are environmental benefits, as well.

Placing a ground-source heat pump on a 3,000-square-foot building drastically reduces carbon-dioxide production and is the equivalent of taking one automobile off the highway. And that even takes into account the carbon dioxide produced to generate the electricity needed to run the system, Smith said.

The U.S. Environmental Protection Agency has called the geexchange technology "the most energy-efficient, environmentally clean and cost-effective space-conditioning system available."

And for Utahans Joe and Emily Evans, who sold their loft months ago on Pierpont Avenue and are eager for their new condo at the Westgate Lofts to be completed, the promised new geexchange system is making it worth the wait.

"We were attracted to loft living because of how environmentally sound it is. They're not tearing down buildings but conserving them and adapting them for new uses," Joe Evans said. "So when we found out about the type of heating and cooling system that Westgate will be using, rather than impatient it made us want to hold out and not buy somewhere else."