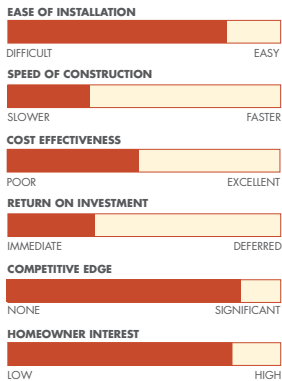


Pumping Up Efficiency: *Builder Grounds Business on Geothermal Heat Pumps*

Builder's Experience



Challenges: Learning curve; marketing the benefits.

Would he do it again? Yes

PATH Attributes:

Energy Efficiency

Builder Tips: "For somebody who doesn't know a lot—which is where I started—find yourself a good contractor that you can work with, that you feel comfortable with, and you can trust."

Builder:

David Ritchie, Owner
Chisholm Creek Development, LLC
Enid, Oklahoma

Builder Type:

Small Production Builder

The Technology:

Geothermal Heat Pumps (GHPs)

The Project:

As part of a United Methodist Retirement Community called The Commons, Chisholm Creek Development built 16 duplexes and 13 single-family homes in Enid between 2003 and 2006.

"Even with GHPs, energy-efficient HVAC, low-e windows, and R-45 cellulose insulation in the ceiling, I still came in as the low bidder."

— David Ritchie

RITCHIE'S STORY

"A commercial builder had the bid to do the entire United Methodist project," David Ritchie says. "The problem was that builder could not—with traditional commercial construction—build the duplexes at a price to fit in the overall complex's budget."

"The general contractor asked for additional bids from about half a dozen homebuilders in the Enid area. I indicated that I would like to do the first model home with geothermal. They said that was fine, but they weren't going to give me any benefit in the bidding process. Believe it or not, even with GHPs, energy-efficient HVAC, low-e windows, R-45 blown cellulose insulation in the ceiling, and R-16 in the walls, I still came in as the low bidder."

"I did this by taking a reduced profit on the model. It was a bit of a gamble, but I knew that once they experienced a couple months in the model and saw the energy bills, it would be easy to sell them on putting



The GHP manifold with circulatory pumps connect to the home's HVAC unit.

geothermal heat pumps in all of the units. As it turns out, that's exactly what happened."

"In July, August and September, the average utility bill for each side of the model duplex ran about \$80 a month. United Methodist thought that was unbelievable, since a comparable home usually runs in the \$120 to \$150 range. When they started seeing the utility bills on our model home, they went absolutely bonkers, and we built the rest of the homes with geothermal. That's also when I saw my profits."

"I had Oklahoma Gas & Electric Co. (OG&E) do a load calculation on the home



David Ritchie has been in the homebuilding business for 34 years. His housing development, Chisholm Creek, was incorporated in 1995. He currently focuses on energy-efficient, single-family homes.

Why he uses geothermal heat pumps:

"I was looking for something to differentiate my subdivision and the homes that I was building from the other builders in town. So, I sat down with the estimated costs of GHPs, and determined that I could absorb the initial costs and gain a market advantage."



In his bid to build the model home, David Ritchie included plans for an energy efficiency package, including geothermal heat pumps.

specs with and without the geothermal," Ritchie says. "OG&E said if we built the entire project with geothermal, the homeowners would save as much as \$100 per month per unit."

According to the US Environmental Protection Agency, GHPs can save homeowners 30 to 70 percent on heating and 20 to 50 percent on cooling costs over conventional systems.

The initial cost of a GHP system varies greatly with local labor rates, lot geology and size, and the type of system installed. On average, a builder could expect to pay between \$4,000 and \$11,000 more for a 3-ton GHP system than for an air source heat pump system. Due to the investment, GHPs makes the most sense in areas where the temperatures are low in the winter and high in the summer.

"On a 2,000-square-foot house, it can cost about \$4,000 more to install a 3-ton GHP system around here, but it depends on what you're comparing it with," says Lloyd Klassen, owner of Lloyd's Heat and Air and Ritchie's long-time HVAC subcontractor. "If you're comparing to a bottom-of-the-line gas furnace and air conditioner, it might be a little bit more than that. If you're comparing it to a quality high-efficiency furnace and air conditioner, there's not a whole lot of difference in cost. The real difference, in that case, is the drilling. That runs about \$1,200 a ton of GHP capacity."

"On that size home, we'll put 2½-tons of capacity in, which is less tonnage than air-to-air systems because the efficiency of GHPs is not adversely affected by varying outdoor temperatures," says Klassen. "The geothermal system relies on 62-degree well water compared to the air unit, which has to handle 100-degree temperatures in the summer in Oklahoma. That means about a 20-percent increase in capacity over air units."

LEARNING THE ROPES

"The biggest challenge for me was just overcoming my initial skepticism. To take

a risk on a zero-profit bid takes a lot of confidence and trust in the product, and that's not always something I felt about GHPs," says Ritchie.

"It was OG&E that really got me started on GHPs in 1999. Before that, I was like every other builder around: if you'd asked me if I built energy-efficient homes, I would've said yes. And I thought I did, but in fact, I didn't really know what energy efficiency was."

"I had read about the OG&E program, and asked for some information about it. Some people from OG&E came to my office and pitched me on geothermal. I really became irritated and I almost kicked them out of the office, but then they talked me into looking at some geothermal homes around Oklahoma City. After talking to those builders and to distributors, I started to get a little more interested. Then I took a class about geothermal for HVAC technicians, where I learned that geothermal offered tremendous energy efficiencies."

"When David switched to geothermal, the quality of his homes was then recognized as being above and beyond what else was in the marketplace," says Mike Newcombe, an OG&E program development coordinator. "With the things that he's done, he's now

HOW IT WORKS

GHPs use the constant temperature of the ground or water below the earth's surface to efficiently heat and cool a home.

A GHP system consists of indoor heat pump equipment, a ground loop, and a flow center to connect the indoor and outdoor equipment. The ground loop, which is invisible after installation, allows the exchange of heat between the earth and the heat pump.

Horizontal ground loops are typically the most economical and are used in new construction with adequate space. Vertical installations (or more compact horizontal installations) have less impact on the landscape and are therefore more often used in existing buildings.

TECHNOLOGY HIGHLIGHTS

This project included the following PATH-profiled technologies:

- Geothermal Heat Pumps
- Sprayed Foam Insulation
- Windows with High Performance Glass

considered the premier builder for energy efficiency in the Enid area.”

“For somebody who doesn’t know a lot—which is where I started—I advise that you find yourself a good contractor that you can work with and that you trust completely,” Ritchie says. “Make sure the guy has some experience. My HVAC contractor has pulled me out of the fire more times than you can shake a stick at. When you first start putting GHPs in, you need somebody who’s good and who’s going to take care of you. Eventually, you get to a point where you are comfortable with geo, but it takes time.”

MAKING IT AFFORDABLE

While residential GHPs cost more upfront than other HVAC systems, more than 20 states offer incentives programs to help offset the cost if the system is part of an energy-efficient home. For example, Oklahoma allows a contractor who is the primary builder of an energy-efficient home substantially completed after December 31, 2005, to claim an income tax credit beginning in 2006. The contractor can take a tax credit for the amount of the eligible expenditures, not to exceed \$2,000 for a home that is between 20 percent and 39 percent above the 2003 International Energy Conservation Code, or \$4,000 for a home that is 40 percent or more above the code. Find incentive programs in your state through the Database of State Incentives for Renewable Energy (DSIRE).

Many local electric utilities also offer programs to promote GHPs. OG&E, for example, offers financing on energy-efficient heating and cooling equipment. The program includes quickly approved, low-interest loans that require no money down. DSIRE also provides information on utility programs.



When the clients saw substantial energy savings for the model home after the first summer, Ritchie was awarded the entire project, with every home to include GHPs.

The Partnership for Advancing Technology in Housing (PATH) brings together builders, manufacturers, researchers, government agencies, and other members of the housing industry. PATH partners work to improve the quality and affordability of new and existing homes. The program is administered by the U.S. Department of Housing and Urban Development's Office of Policy Development and Research.

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