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Couple build zero-energy home in Chesterfield County

By Holly Prestidge | TIMES-DISPATCH STAFF WRITER

A zero-energy home is one that produces as much energy as its uses, therefore canceling out monthly heating and cooling bills.

The running joke around Randy Thomas and Diane Lewis' old Hanover County neighborhood was that the couple must have been from Vermont or Minnesota -- anywhere cold.

That rationale would help explain why they installed solar panels, south-facing windows to catch the sunlight and warmth, and extra thick walls with added insulation in their home when it was built in the early 1990s.

If just a few environmentally friendly elements were enough to make people talk, just think what their new neighbors will say.

Thomas and Lewis, along with Mark Waring, vice president of Richmond-based Bain-Waring Builders, are building a home in Chesterfield County that's so energy-efficient it's among the first to be certified as such in Virginia.

Thomas and Lewis are building a zero-energy home, one that produces as much energy as its uses, therefore canceling out monthly heating and cooling bills. Through the use of solar panels, geothermal heating and cooling systems, a tightly sealed shell, energy-saving appliances -- not to mention turning off lights when they leave a room -- they're looking forward to living in a home that's not only cheaper for them, but better for the environment.

The timing, Thomas said, was just right for them to build.

"The technology has finally gotten to the point where you can reasonably do this kind of a home without a whole lot of extra work," he said this month as he walked through what will soon be his new home. The house is approximately 2,900 square feet. From their front yard they can see the horses of nearby Keswick Farms.

"The materials are there, the technology is out there [and] the prices are coming down," Thomas said,

citing federal rebates and state grant money for solar panels and geothermal systems that cut their costs for those items by one-third.

On top of that, "if I don't have to pay utility bills for the rest of my life, that really lightens the load," he said.

Thomas and Lewis knew what they wanted, though finding information on zero-energy homes wasn't easy. For that reason he started a blog so others could learn from their experiences.

"When I did Internet searches to try to get some guidance, there's just nothing there," he said. "I had to go through hundreds of entries before I'd find little nuggets that were actually helpful."

They also needed a builder. Lewis and Waring knew each other from an eco-brokerage conference a few years earlier.

"We started talking about the kind of house we were looking to build, [and] I could see his eyes start to light up," Thomas said. "The light bulb went on there. It really was a nice partnership."

Every decision -- from the type of paint to sorting through options for energy-efficient windows and appliances -- was done within the larger scope of how it would affect the home's efficiency, Thomas said.

Their new home is tightly sealed and well-insulated. It sits on a conditioned crawl space, meaning that the underbelly of the home is insulated exactly as the house itself, right down to the ground. There's no insulation in the floor joists, and the air is blown into the crawl space so that it's always the same temperature and humidity as inside the house.

Most homes built nowadays refresh air every one to two hours, but this home will do it every seven hours, Waring said. And while most homes leak air from ducts all over the house, at a national average of about 28 percent, this home's ductwork is so tight that a fraction of that -- about 2.5 percent -- leaks out, he said.

Combine that with a geothermal heat pump, which uses the ground as its heating and cooling source, energy-efficient windows, ceiling fans and appliances, LED and compact fluorescent lighting, and solar panels on the garage roof, and you've got a home that doesn't rely on carbon-based energy sources.

"Energy is going to be finite, whether it's going to be in 20 years or 50," Thomas said.

Before they move in, the house will undergo a series of tests to show how "green" it is and to check the energy efficiency of the home's design.

EarthCraft Virginia is the organization that pressure-tests air systems, ductwork and more and then certifies homes at three levels, with the highest being the platinum level, which is what Thomas and Lewis are striving for.

High-performance homes, as EarthCraft Executive Director KC McGurren called Thomas and Lewis' home, are "very rare, particularly with new construction."

She said there are only two EarthCraft Platinum-certified homes in Virginia. While the average Earthcraft home is about 28 percent more efficient than traditional homes built today, McGurren said

Thomas and Lewis' home could be as high as 75 percent to 80 percent more efficient than a standard home.

Thomas said he's been asked how long it'll take for him to recoup the extra money he's spent to make his home energy efficient. He said his energy-efficient options are no different from someone who turns a two-car garage into a three-car garage, or adds on a game room.

"Does anybody go back and say how many years before that extra garage pays off, or your pool-table room?" he said. "If it's important to you, how is it any different?"

Waring echoed Thomas' thoughts, using irrigation as the example.

"People always want to put that \$5,000 in sod and irrigation," he said. But they could put that extra money into their home "and all of a sudden it's 40 percent more efficient."

"And the grass dies every year," Waring added.

Lewis said there's a misconception that energy-efficient homes are much more expensive than standard homes. Waring said constructing a tight shell and duct system at this home has added about \$3 to \$5 per square foot. He said as homeowners add elements such as geothermal systems and solar panels, the costs can go up, though rebates and grants help with those expenses.

Thomas and Lewis are scheduled to move into their house next week.

"We're getting of the age where you think about being creative . . . [and want] to pay something forward," Thomas said. "This is an opportunity to try and do that."

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