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S. Phila. rowhouse goes green

Two architects set out to make their home even more environmentally friendly. Radiant heat keeps the floors toasty, and the sun provides the hot water.

By Alan J. Heavens
Inquirer Real Estate Writer

From across Seventh Street, it looks like any other South Philadelphia rowhouse, even with the large tree that hides much of it from view.

But that's the point. When architects Paul A. Thompson and Laura A. Blau bought the place three years ago, they set out to show that a rowhouse could become "green" without anyone noticing the differences until they were pointed out.

By green, Thompson and Blau mean environmentally friendly - optimizing use of the sun, improving indoor air quality, making wise use of natural resources, creating a high-performance and moisture-resistant house, and using the land responsibly.

Typically, it isn't easy to incorporate green design into a renovation project - you're often working with existing materials and building footprints that cannot readily accommodate the changes such design requires.

But that's not the case with the plain-vanilla Philadelphia rowhouse.

"You are already working with what is, by design, an efficient structure," said Thompson. "Being in the middle of the block, we can take advantage of the warmth from the houses on either side."

Even the tree, which came with the house, plays a role in the green design.

"It's in a perfect position. It's deciduous, shading the windows from the sun in the summer, and [allowing] the sun's rays to heat the floors a little bit during the winter," he said.

The sun's warmth, combined with radiant heating on all three floors, "means that we walk around in our socks all the time."

In addition, much of the hot water the family uses is produced by solar collectors on the roof. In winter, some of the excess hot water feeds into a heat exchanger and then into the gas hot-water heater that supplies the radiant system.

Thompson and Blau, principals in the firm BluPath Design Inc., were living at 17th and Pine Streets in 2003 when they decided to spend $150,000 for the three-story, 100-year-old-plus building a few yards from the convergence of Seventh and Carpenter Streets with Passyunk Avenue.

"This neighborhood had a lot to offer us," Thompson said. "One was convenience, since we don't own a car. In fact, if you look at the PhillyCarShare Web site, that's us in the picture - Charter Members 1 and 2.

"It's just a short walk to the Italian Market, and we can pretty much get all of our groceries there," he said. "This morning, I walked my son to day care and picked up fresh broccoli for dinner on the way home."

Blau and Thompson's part of the neighborhood is home to a growing Vietnamese community, which also was a draw for them: Their 4-year-old son, Nandor Van Duc Thompson, is from Vietnam.

In the past, their building housed a business on the first floor and apartments on the two upper floors, which meant that it had to be gutted.

Still, the interior retains the signature floor plan of a rowhouse. Walk in the front door, and you can see through the living room and kitchen to the back garden wall.

Thompson and Blau kept the commercial facade, but replaced the windows with energy-efficient units - including "the largest window Marvin makes," he said.

The couple insulated, replaced stairs, and reworked existing spaces. But they limited their expansion of the footprint of the house to what is, in effect, a three-story, steel-framed glass wall in the left corner of the rear wall.

The change enhances both passive solar heating and the source of natural light in the winter. The first-floor glass wall opens the kitchen to a postage stamp-size garden, which remains a work in progress.

"There was a peach tree that was infested by a borer, and we took it down," Thompson said. "We are putting in wood pallets to raise the floor of the garden, and are expanding the number of plants."

Water for the garden comes from a raised collection tank that is fed by both rainwater and air-conditioner condensation from the roof unit.

"We've looked into a solar alternative to standard air conditioning, but found that the systems would overwhelm a 1,680-square-foot house," Thompson said. "The trade-off in energy savings comes in solar hot water and the radiant floor heating in the winter."

On all three stories, flooring either is Indian slate or cherry harvested from Central Pennsylvania.

Maple will show big gaps when it's dry in the winter, but cherry flooring is ideal for radiant heating. Indian slate works just fine with passive solar heat in the winter.

So far, Blau and Thompson have spent about $250,000 on their house, with the radiant floor heating and solar hot water two of the most expensive additions.

The solar-heating system cost $11,300 and includes the solar hot-water heater and a gas-fired backup in the basement. The two solar collectors on the roof - there's a frame for a third - are composed of a series of glass tubes with a coating that absorbs solar energy well, but that inhibits radiative heat loss.

Air is removed from the space between the glass tubes and some metal tubes to form a vacuum, which eliminates conductive and convective heat loss.

It's an indirect-circulation system, which pumps a mixture of glycol and water antifreeze through collectors. Heat exchangers transfer the heat from the fluid to the drinkable water stored in the tanks.

If the glycol gets too hot, the additional heat is returned to radiators on the roof and expelled. Thompson and Blau coated their rubber roof with a white elastomeric substance that reflects sunlight and thus keeps the roof cooler, and the radiated extra heat is deflected as well.

"In the winter, any extra heated water from the solar heater is fed through a heat exchanger to the gas-fired hot-water heater that supplies the radiant system," he said.

That hot-water heater is the primary source for the radiant flooring's heat, which is zoned for each floor. Instead of the 180 degrees needed for a boiler to supply radiators, 110 degrees is all that's needed to make Thompson, Blau and their son comfortable in colder weather.

That system cost $11,600 for all three floors. To accommodate the weight of the "lightweight" mixture of gypsum and concrete into which the plastic piping for the system is embedded, the joists on the top two floors had to be reinforced.

The "gypcrete" added $2,000 to the total cost of the system, and created a small public-relations problem for Thompson and Blau.

"When we decided to renovate the house and install the solar collectors, we went to all the neighbors and got each one of them to sign off on the project," Thompson said.

"But a day before the radiant system was installed, the contractor told us that the gypcrete had to be mixed in the street and then pumped into the house, which means that we had to get a city permit to have the street closed for a day."

That meant rerouting a SEPTA bus.

"The job was delayed for a week till I got the permit," he said.

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