The Eco-Homestead

Environmental-friendly homes find affordability.

STORY BY ANN MUDER | PHOTOS BY BOB GREENSPAN AND BRAD FEINKNOPF

In 1999, when Ken and Sharla Riead built their house in Blue Springs, Missouri, they wanted nothing to go to waste—not even the sun.

The Rieads, energy and environmental consultants who own **Hathmore Technologies**, built their 3,000-square-foot home to take full advantage of natural light and heating. An overhang in front of the greenhouse keeps the room cool in the summer but is designed to allow the sun to come through the clear glass to provide heat in the wintertime when the sun travels a sharper angle. On cooler days, they leave the sliding glass door to the greenhouse open so it can help heat the rest of the home. The sun follows them from room to room throughout the day, so they rarely have to turn on a light until it gets dark.

Their home, a part of the annual national Sustainable Homes Tour since 2000, includes numerous other "green" features, including carpet made from recycled soda bottles; solar panels that provide about 95 percent of the domestic hot water energy; a radiant floor system made of rock and gravel underneath the house that stores heat for use in the solar storage tank; and a downstairs bar made of leftover construction materials, including a beam used in the center of the house and extra tile flooring.

In essence, their home serves as a model to teach clients what it means to be green and show how being ecological can also be economical. In addition to providing energy testing and certification to meet standards of the federally-backed **Energy Star** program, the Rieads provide green-design consultation for homes and businesses.

"From a green perspective, energy is just one piece of the

HOMES ARE ADOPTING SUSTAINABLE DESIGN ELEMENTS OF COMMERCIAL BUILDINGS, LIKE THOSE OF THE SUNSET DRIVE BUILDING (ABOVE).

energy pie," says Sharla Riead, who is also president of the **Heartland Renewable Energy Society.** "In order for something to be green, you're looking at the environmental impacts of the whole thing. Obviously, energy plays a huge part in that."

In past years, the Rieads say they performed one energy rating a month. Currently, that number has increased to about five a week. With the increase in energy prices, many builders and buyers are realizing the benefits of energy-efficient, green residences. "They're looking at the home more as a total cost, rather than just the cost of building the home in the first place," says Sharla Riead.

GREEN HOME ECONOMICS

For homeowners, construction costs for building green can vary significantly depending on their goals. The term "green" can have different meanings for different people—it might mean saving energy, using sustainable building materials, improving indoor air quality by using materials that are low VOC (volatile organic compounds), or all of the above.

BUILDING GREEN MAY COST 10 PERCENT MORE UPFRONT, BUT IT SAVES IN OTHER WAYS.

"It's hard to say how much it costs to build green, because there are so many variables," says Chris DeVolder, an architect at **360 Architecture**, who is also a member of the Kansas City chapter of the **United States Green Building Council**. "If you design it right, green design strategies are worth the costs."

For instance, when building a new house, some design elements can save operational costs without any additional construction costs, such as orienting the house in a certain way to take advantage of the sun, he says. The Rieads estimate that the sun's heat coming in the south side of their attached greenhouse saves between 15 percent and 30 percent of their annual heating bill.

Other costs may offset each other during construction. When working with one builder, Sharla and Ken Riead suggested that he change to 2x6 walls on 24-inch centers, rather than 2x4 walls on 16-inch centers so that he could get more insulation. The builder saved on the price of wood by going to a different size. That, in turn, paid for the extra insulation, says Sharla Riead. "You're making the house tighter and more efficient, you're downsizing your equipment, so you're saving the equipment costs, and you can use that extra money for the extra sealing that you're doing," she says.

Building green also can incur extra costs when the homeowner wants custom elements, says Rick Robson, principal environmental chemist at **Hallmark Cards**. He finished building his home in October 2006 with many green features, including significant use of reclaimed wood in the interior with a vaulted ceiling made of wormy chestnut that had been salvaged. A former full-time builder who specialized in energy-efficient homes in the 1980s, he estimates that people should plan to spend about seven to 10 percent more for the extra techniques that can be involved in building green. "That's where the rub comes in," he says. "Folks who are willing to step off the main line to get an energy-efficient home tend to march to a different drummer and want their own custom built [materials] and that tends to taint the data."

Still, the Rieads say that some elements of green building that were rare just years ago are becoming easier to find and more affordable. When they built their home, for example, they wanted to use a wood stain made with orange peel and walnut shell. "We wanted it to be natural," says Sharla Riead. "We couldn't find it anywhere. We had to order it from Germany, and it was very expensive. Now you can find natural wood stains here very easily."

SUSTAINABLE DESIGN INSPIRATION

Home builders wanting to go green can find inspiration in the environmental standards adopted by commercial projects. For commercial buildings, for example, buying locally is one of the points in the Leadership in Energy and Environmental Design (LEED) Green Ratings System. (For more on the development of the LEED program, see page 47.) The Johnson County Sunset Drive Office

Building, which houses several county government departments, became the first in the county to receive LEED gold certification in November 2006. The $30 million building features green elements that high-end residential developers might find attractive, such as local reclaimed wood, native landscaping and a high-quality ventilation system to improve air quality. The design also cuts utility expenses, which homeowners find attractive. Since the building opened in March, the building's utility costs have been 43 percent less than the other county building, says Neal Angrisano, deputy director of the county facilities department. He says the costs to achieve gold status are now comparative to what it would have cost without building green.

"If you're building with only the mindset of building as cheaply as you can, it's a higher cost," he says. "Unless you get really exotic, most of the things termed building green really have a small cost impact."

However, construction costs may be more expensive for builders who aren't experienced in building green, says Jean Dodd, a project manager for the **U.S. General Service Administration** and co-chair of the Committee on the Environment of the **American Institute of Architects**. The GSA is aiming for all new construction to receive at least a silver rating from LEED. While many maintain that you can build LEED-certified buildings for no additional cost, Dodd says, part of

THE JOHNSON COUNTY SUNSET DRIVE OFFICE BUILDING WAS THE FIRST LEED CERTIFIED BUILDING IN THE COUNTY AND COST $30 MILLION TO BUILD.

that depends on the experience of the construction crew. For example, she says, during the construction process, nothing can go to the landfill.

"Many construction companies haven't done that before, so they charge us for it," she says. "A lot of it is about the learning curve." Dodd says when the GSA estimates their projects, they include a little extra to build green. "These days, we're setting things up with green costs in mind," she says.

FINDING A BUILDER

While an increasing number of commercial buildings in the area are being built green, residents may have limited options when looking for a builder with experience building green homes. "People are interested in that they want to build green, but finding a builder that's interested in it and finding subcontractors that understand what that means, that's the problem," says Sharla Riead.

While most home builders in the area don't build green, finding one who does is starting to become easier, says DeVolder. He and architect Jason McLennan, from **BNIM Architects**, designed a house outside of Weston with numerous green features, including solar panels and a wind turbine to generate electricity, salvaged 200-year-old wood, structurally insulated panels (SIPs), and low-chemical paints and sealants. He says when they first started the project six years ago they had a hard time finding builders who were "in tune with what we wanted to do." A couple of years after they started, they found a Parkville builder, Greg Rothers from **Rothers Design Building**, who had participated in a number of other green homes and was a "good partner for the project."

With the housing market and building trade slowing down, many builders are becoming more receptive to learning about how to build green, says Ken Riead. Because of this, he advises people to ask about the builders' willingness to learn, rather than their experience.

"You don't want to pin them down and say, 'Are you a green builder?' Because a lot of them can't answer that," he says.

INCENTIVES TO GO GREEN

Another incentive for home builders is the Energy Policy Act of 2005. Under this law, builders are eligible to receive a $2,000 tax credit for a new energy-efficient residence that saves 50 percent of energy needs for heating and cooling over the 2004 International Energy Conservation Code (IECC).

"They can receive $2,000 for almost any type of residence whether it's an apartment, a condo, a townhome, a single family home, a duplex, so it's particularly worth it if you're building a multi-family home to do it," says Ken Riead. "We're having more and more developers realizing that now. Not only can you build efficient, but now there are incentives to do it."

In addition, developers can market the building as energy efficient, which is especially profitable when in competition with other developers, says Ken Riead. For example, more people are likely to move into the building if the utilities are $40 a month as opposed to $90 a month.

Consumers also receive tax credits through the Energy Policy Act for home improvements and systems installed in 2006 and 2007. Consumers can receive up to $500 in tax credits for certain home improvements that increase energy efficiency, such as insulation and new windows. If they buy a solar energy system, they can receive 30 percent of the cost of the system, up to $2,000.

A two-kilowatt solar electric system that meets most of the needs of an energy-efficient home could cost $16,000 to $20,000 installed, according to the **U.S. Department of Energy**. While $2,000 won't completely offset the cost of the system, the tax credit along with the energy costs saved by using the system could help you to recoup your initial cost more quickly, says Ken Riead.

As builders receive financial incentives to build green, they in turn can "make homes so energy efficient that a tiny solar system could provide all that a home needs," he says. "It's going to be very possible in another few years. Builders that can't do that are going to be left behind."

Overall, the cost of building a green home doesn't have to be cost-prohibitive, as long as the consumer knows how the different systems interplay, says Ken Riead.

"If you understand the dynamics of the whole thing, there are trade-offs that can be done," he says. "If you want to buy something over here that's expensive, maybe you can do something over here that's not quite as expensive so that it evens out."

Consumers should do their research to decide their priorities and bring in all of professionals at the beginning of the project, says Sharla Riead. "Then you have a team of people who are all out there doing their homework for you," she says.

Ultimately, building green not only provides energy savings for the consumer but for those who inhabit the building for the next several decades. "Once that home is built, it's going to be there for 60, 80, 100 years," says Sharla Riead. "If you build it correctly in the first place so that it's energy efficient, then you're going to be saving green house gases and lowering the lifetime energy of that house. Every home that we've put in the ground that's not energy efficient, that's costing our future." **KCB**

HOMES WILL BE BUILT SO EFFICIENTLY THAT A TINY SOLAR SYSTEM CAN PROVIDE POWER.