

Zero energy, zero carbon

Carl Ramsey is building one of the country's most sustainable homes in Bellemont.

By **ABIGAIL GRIPMAN**

Sun Staff Reporter

At first glance, there's nothing remarkable about the house under construction in the corner of a wide meadow in Bellemont. It looks like a nice house, on a nice piece of property with a fabulous view.

But its unassuming exterior belies a remarkable home that sits lightly upon the earth. Carl Ramsey's home will be the first in Arizona (and only the fourth in the country) to earn the LEED platinum rating for environmental sustainability. To achieve that rating, his house must meet a long list of requirements, including reliance renewable energy (solar and wind) and building on an existing residential lot (the house is on a 100-year-old homestead).

Ramsey's interest in green building



Josh Biggs/Arizona Daily Sun

ARCHITECTURAL & ENVIRONMENTAL ASSOCIATES PRESIDENT Carl Ramsey stands next to a heavy wall in his home used to absorb and release energy from windows in the house.

is nothing new. He began his career as an architect and builder 35 years ago constructing passive solar homes. He is

the owner of Architectural and Environmental Associates, a Flagstaff firm specializing in sustainable construction.

So when it came time for him to build a house for himself and his wife, Holly, he knew what he wanted. The next step was to find out what was possible.

"We are definitely building the home as a model for what can be done and it certainly is a personal conviction of mine as an architect/builder," Ramsey said.

He and his team came up with a plan to build a house of uber sustainability while maintaining high aesthetic standards. The ingenious home will have all the modern conveniences, but with no corresponding water or electric bills.

LESS COSTLY IN LONG RUN

It is costing about 5 percent more than a similar home of traditional construction. Ramsey said the four bedroom, 2,700 square-foot house will cost \$220 a square foot compared to about \$200 a square foot for a traditionally built home.

The savings in utilities will help offset the extra expense over time.

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"Limited case studies, and also research and life-cycle costs on green sustainable home construction show the payback is 25 to 40 percent a year," Ramsey said. "Plus, you have a home that is more durable and requires less maintenance and also the home has a higher resale value and is in demand by buyers."

In addition, Ramsey is taking advantage of solar and wind tax credits and utility company rebates to the tune of \$24,600. Other tax credits and rebates for using graywater, energy efficient design and energy efficient construction will total about \$12,000.

The project began with the purchase of 10 acres of former farmland in Bellemont. The house was planned so that the long sides face south and north, allowing maximum passive solar heat gain and to get the best results from photovoltaic solar systems. And while passive solar is a common-sense, low-tech method of energy conservation, Ramsey's design integrated a high-tech computer modeling system to engineer the precise balance of south facing windows and interior thermal mass in order

to retain the desired temperature levels within the house.

HIGH- AND LOW-TECH

The integration of high- and low-tech continues throughout the project. All of the home's water needs will be supplied by harvesting rainwater. Waste products will be processed using UV light. Graywater will be used for onsite irrigation. The garage is detached from the home to improve air quality in the house.

Radiant floor heating and hot water will be supplied through a solar thermal system. "Cooling tower" strategies will be used whereby clerestory windows will automatically open to allow hot air to escape and cool air to enter. Automated controls will monitor the home's temperature and humidity levels and make adjustments to maintain desired levels of both.

The home's exterior walls are made of Structural Insulated Panels. The SIPs were made in Phoenix and pre-cut to Ramsey's specifications. Once delivered to the building site, it took Ramsey and his team about two weeks to put them together.

The home's floors will be made from tiles made from recycled materials and cork. The walls will feature clay paint. The counters will be concrete with fly-

ash mixed in. And the cabinets will be made using beetle-kill pine with low-or no-VOC finishes.

Ramsey is proud of what he and his company are building in Bellemont.

"One of the items I am proudest of is that we are a 'zero energy' and 'zero carbon' home. In other words we produce more energy than we use and by doing so contribute to less carbon in our atmosphere. We will collect far more rainwater than we need for our use and will help recharge the aquifer and green our piece of nature with the rest."

What has been the most frustrating part of the project?

"The lack of local available green building materials," Ramsey said. "Also, we are a dark skies city and county. However try and buy a dark skylight fixture in Flagstaff. If there are some, I sure could not find them."

Still, at the end of the day, his outlook is optimistic.

"I see that this represents a lot of opportunities for jobs and Flagstaff's future as a leader in fighting pollution and global warming and helping save our natural resources."

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GLOSSARY

LEED: The U.S. Green Building Council's green rating system. LEED stands for Leadership in Energy and Environmental Design. The platinum rating is the highest LEED category. (usgbc.org)

VOC: Volatile Organic Compounds. VOC's are emitted as gases from certain paint and finish products. VOCs have been linked to air pollution and illness.

SIPS: Structural Insulated Panels. A sandwich of foam between two boards made of waste material.

Passive solar: These technologies convert sunlight into usable heat, cause air movement for ventilation or cooling, or store heat for future use, without the assistance of other energy sources. — Wikipedia

Graywater: All household wastewater except toilet wastes and food wastes from garbage grinders.

Photovoltaic: PV is a solar power technology that uses solar cells or solar photovoltaic arrays to convert sunlight directly into electricity. — Wikipedia

Fly ash: The powdery residue that is a byproduct of coal-burning power plants.