Mark Noon shows off part of the I-Pad's "four-sided, insulated down coat."

Greening the suburbs

A floor-to-ceiling blueprint for making your home more energy efficient

by Kyle Lehman • photos by Cathrine L. Walters

At first glance, Missoula's 44 Ranch development looks like any American suburb, with children's bicycles in the lawns and SUVs parked in the driveways. But according to the builders of the small green home on Horn Lane, their project could be a model for future residential construction across the country.

Known as the "I-Pad" (developer Glen Moyer jokes that he plans on having a talk with Steve Jobs), this home features special green-building technologies that can be applied to new construction projects or retrofitted into existing homes to cut energy bills and increase comfort.

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>
> *—Glen Moyer, developer*

During the construction and design process, Mark Noon of Missoula's Kingdom Ventures says the team tried to stay away from what he calls the "emotional" side of green building: Things that may give the builder a rosy feeling but will need to be replaced a few years down the road.

"Most of the interior finishes are standard finishes," he says. "We just looked at energy efficiency and durability—those are the nuts and bolts of green building."

Products such as wood vinyl flooring, dry wall and a concrete porch are common construction products that Noon says allowed the team to spend more on special energy-saving technologies. He also says that once all of the construction was done, the home cost was around 3 to 5 percent higher than a comparable home, but exceeds energy regulations by about 60 percent. What's that mean? Moyer estimates that the 1,288-square foot, three-bedroom house will average $25 monthly heating bills and likens the home's small size and efficiency to a hybrid car.

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By breaking the I-Pad down into several distinct systems, from the walls and insulation to the light bulbs and appliances, builders and homeowners can glean ideas for a variety of projects both large and small.

The I-Pad's Heat Recovery Ventilator maintains a consistent climate and moisture content inside the house.

Walls

Rather than the traditional 2x6 walls used in most new construction, the I-Pad has two 2x4 walls separated by a space to retain heat. Noon calls this the "building envelope" and says it's one of the most important features of the home. Celluloid insulation is sprayed in between the two walls, bonding to studs and wires rather than bending around it and creating cold air pockets like traditional fiberglass insulation.

"We have this four-sided, insulated down coat of a house," Noon says, adding that both the attic and crawl space are sealed off to prevent heat from the living area being wasted on storage space. Noon adds that when third party inspectors checked out the home, it more than doubled the R rating mandated for energy efficiency.

Noon says homeowners can install Celluloid insulation in an existing wall for a better R rating, but unless they are planning a home from the ground up, the cost of an additional wall can be prohibitive.

Under the floor

Hidden beneath a sealed access panel in the I-Pad's floor are several features that protect the home's longevity. The details start with plastic sheeting on the floor to keep naturally occurring argon gas from leaching into the structure and prevent moisture from damaging exposed framing products. Noon says that labor-intensive foam sealing around the rim of the foundation helps prevent cold air passage into the home.

"If you roll into a crawl space on a standard built house you won't see these details," Noon says, adding that both the plastic

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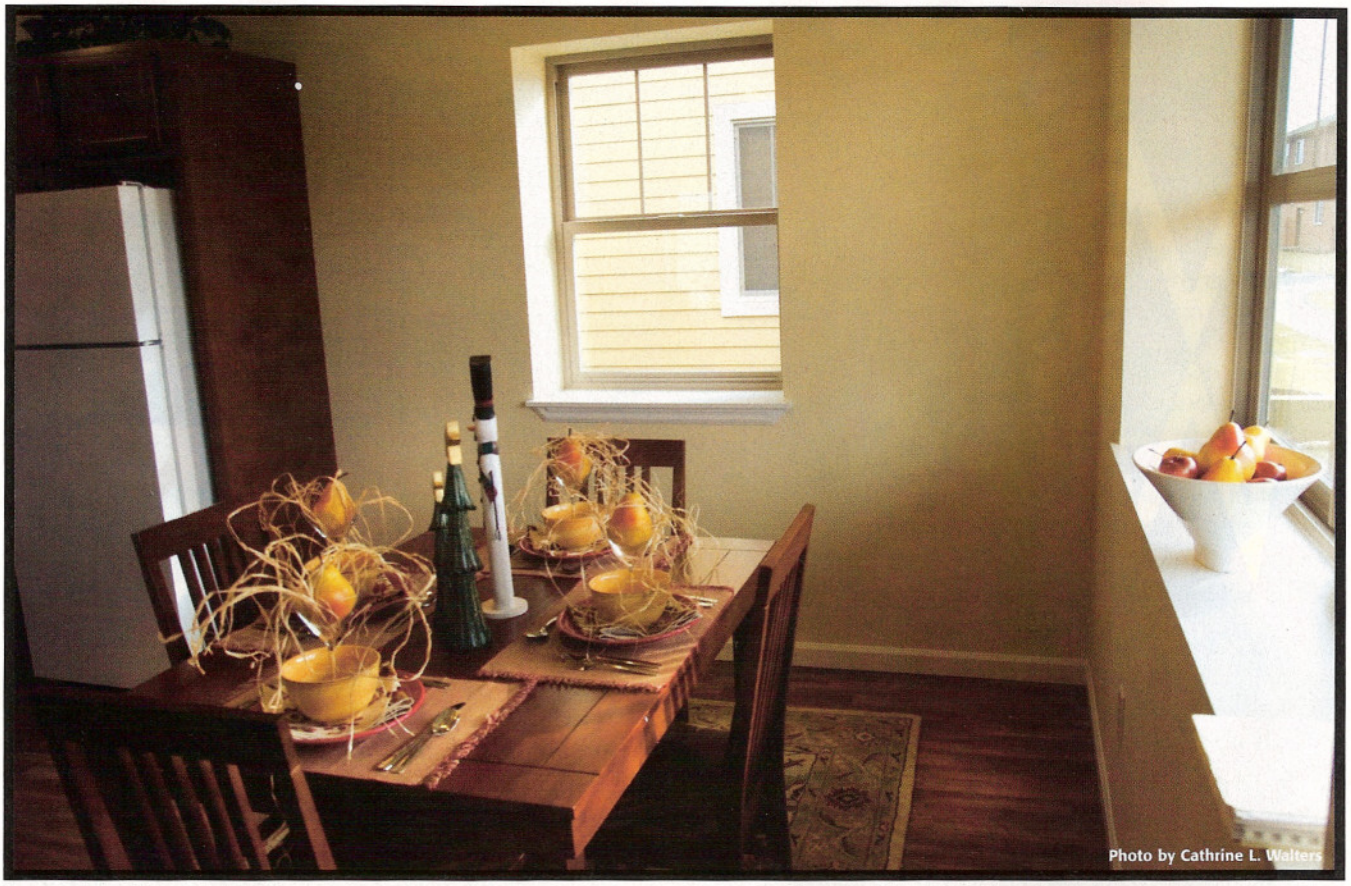

Developer Glen Moyer likens the home's modest size and efficiency to a hybrid car.

sheeting and foam insulation could be added to an older home but would require more effort than adding them during the construction process.

Air flow

Because the walls of the I-Pad are so airtight and heavily insulated, Noon says there is a risk it could become like a plastic bag, trapping steam from the shower or smoke from the kitchen inside the home. To fight this, the builders installed a Heat Recovery Ventilator (HRV), a $900 dollar system—around $3,000 installed—that maintains a consistent climate and moisture content inside the home.

"It's extracting the stale, warm and moist air from the house and bringing in fresh air," he says.

This fresh air is heated and then re-circulated into the bedrooms and living areas, keeping the interior temperature of the home consistent. Noon says that homeowners thinking about retrofitting a home with additional insulation and sealing would be well served to consider such a system.

Windows/appliances

To heat the home, the builders installed an electric fireplace with backup radiant heaters, which are more efficient and eliminate the risk of gas leaks into the home. To further energy savings the team went with Energy Star appliances and screwed in fluorescent light bulbs throughout the home. Noon says they tried to reduce the number of windows because even though they are energy efficiency rated, they cannot compete with a wall for heat retention. Adding double-paned, energy efficient windows and sealing around cracks and gaps are two ways that a homeowner can reduce their energy bill. Despite the relative ease of these retrofits, Noon warns against going overboard without installing an HRV to reduce condensation and stagnant air.

"If you do too much to a house without taking into account what you've done, you can get into problems," he says.

Overall, Noon urges homeowners to think about their house as a whole, and consider how each new addition could change the overall functionality of the home. The builders took a similar approach to this home, spending more on thick walls and insulation, but saving money by not having to install a furnace for heating. Moyer says that every inch of the house was planned out to maximize space and create a comfortable living area—and part of that extends beyond the house itself. For instance, instead of using traditional Kentucky Bluegrass for the lawn, Moyer says that they planted a Rye grass mix that uses 60 to 70 percent less water. It's this sort of attention that Moyer hopes other builders take toward their products.

"[It] has been a passion of ours for years to see the building environment change," Moyer says. "This is the future of construction, and it should have happened a long time ago."