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'Living building' set to go

Project in Kenton aims to create all its own energy

BY TOBY VAN FLEET

Pamplin Media Group, Dec 11, 2007

It sounds like a cross between a college dorm, a California commune and the 1990s Biosphere ecosystem experiment.

In Kenton.

At the corner of North Interstate Avenue and Watts Street, a seed has been planted.

And if the conditions are just right, a year from now it will have grown into a solar-panel-topped dwelling hosting several one-bedroom apartments that include composting toilets and showers that use purified rainwater.

But instead of the traditional self-contained living units to which most of us are accustomed, renters here will share common kitchens and living spaces, and, most likely, a commitment to the environment.

"It's shared living in a more modern way," says project developer R. Peter Wilcox of Renewal Associates LLC. "It's going to take some effort to live here."

The building-to-be, currently in the design process, is one in the first



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A brainstorming session brings together (from left) Omid Nabipoor of Interface Engineering, R. Peter Wilcox of Renewal Associates, Maria Cahill of MGH Associates and Clark Brockman of SERA Architects to plan a "living building," which requires net-zero energy use.

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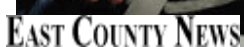
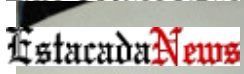
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generation of projects born out of the Living Building Challenge.

The “challenge” is a building certification that requires an unprecedented level of self-sufficiency in a building, including renewable energy and recycled water systems that completely meet the needs of the occupants in place of the traditional power and water supplies.

The certification as a living building, available to both new and existing buildings, commercial or residential, is awarded only after a year of building use, when it can be proven that the dwelling’s own systems have sustained its use.

That self-sufficiency is “absolutely a necessity,” says Jason McLennan, who wrote the standard before being hired as chief executive officer of the Cascadia Green Building Council, a regional chapter of the nonprofit known for its certifications of LEED (Leadership in Energy and Environmental Design) building standards.

Wilcox, trained as an architect and an economist, first heard about the challenge last year at the U.S. Green Building Council’s annual conference.

Energy and water are just two of the six requirements, or “petals,” of the challenge. Projects also must meet stringent guidelines for site location, indoor light and air quality, materials and even “beauty and inspiration.”

Single-petal recognition is another certification option.

Taking into account the role of buildings in global warming (about half of the carbon dioxide emitted in the U.S. is attributed to buildings), in addition to ever-increasing energy prices, and carbon taxes likely to come down the pike, McLennan says, living buildings will become models for future building.

To be clear, the challenge itself is not a competition any more than participants choose to make it one.

But the language implies the question: Can it be done?

The Kenton apartment complex, currently in the design process, will hold nine units and two shared kitchens. It will be built on the foundation of a duplex that now sits on the lot. Wilcox plans to move and sell the current building.

Net zero’s a big challenge

“The work so far has been in figuring out the energy and water equations,” says Wilcox, who is working with SERA Architects Inc. on the project.

A living building must show net-zero energy and water use for a year. Net zero means that what is consumed equals what is produced.

So net-zero energy would mean that in a year, those shiny, south-facing solar panels will have generated enough energy to provide all the power needs of the building’s occupants. This usually means sending extra power back into the grid when solar rays are abundant, and drawing from that excess when the days are short and gray.

But key to the success, of course, is a substantial reduction in the demand for power, through building techniques as well as fixtures and appliances that help lighten the load. Wilcox says that his building will be designed to be 71 percent more energy efficient than the current building code requires.

Water, however, is another matter, even in the rainy Pacific Northwest.

“That was the hard one,” says SERA’s Lisa Petterson, the project architect, who, like Wilcox, is visibly excited about the challenge. “How do you first cut down the amount you’re using?”

All apartments will have composting toilets that will require less than a gallon of water per use.

The complex will collect rainwater in a 40,000-gallon tank in the basement, and it will be purified on-site. Wilcox and Petterson estimate that each tenant will need to use less than 18 gallons of water a day to achieve the net-zero water goal.

For contrast, Lake Oswego, an area of more traditional suburban development, reported a per capita daily water use this fall of 117 gallons.

“The idea isn’t to deprive people,” Petterson says, adding that she takes five-minute showers and doesn’t feel like she’s missing anything.

But even with conservation efforts in full force, Wilcox estimates that the complex will be about 10 percent short on water.

State building codes do not allow the recycling of gray water (the wastewater, usually soapy, that goes down the drain after washing dishes, clothes, ourselves) – even for toilet flushing.

So, the designers are considering other options, including capturing some water from neighboring structures.

The gray-water issue brings into play one of the underlying goals of the challenge: to push building codes to accommodate such concepts.

Wilcox believes that the net-zero goals will be easier to reach with the Kenton design concept, which will encourage resource-sharing.

“To achieve this kind of stuff, the shared housing model is perfect,” says Wilcox, who hopes his tenants will form a community.

Numerous potential renters have expressed interest in the building, Wilcox says. At 59, Wilcox believes the lifestyle his building offers will appeal to the aging baby-boomer generation. Ideally, he says, he’d like to find groups of friends, regardless of age, who are interested in living together.

“I know there are a lot of people in Portland who will want a chance to live this way,” he says.

First, it must be designed

Right now, it’s an idea in progress, not just for Wilcox and his associates, but for more than 60 groups that have accepted the challenge since it was issued, and now are at various stages in the planning and building process.

A New York project broke ground in October, and another residential project is under way in Victoria, British Columbia.

Wilcox has set up an optimistic schedule, shooting for completion by next fall.

So, on a rainy Friday last month, a dozen people gathered to start designing a new reality in a four-hour brainstorming and sketching session.

The process, known as integrated design, includes all parties involved, from the engineers to the electricians.

“We want to make sure everybody’s at the table,” Petterson says.

Even Challenge author McLellan is sitting in.

“Before pen to paper, they’re getting input,” says Eden Brukman, research director at Cascadia, explaining that through such a process buildings usually can be built to be more efficient. “Before design happens, the building can respond,” she says.

Market change in plan, too

The next step is collecting the materials that the design dictates. But it’s not as easy as a trip to Home Depot.

For example, the challenge specifies distances that cannot be exceeded when collecting supplies, a rule that has disqualified the use of a sustainable roof liner made no closer than Texas.

“You have to dig in further than you’ve ever done before,” Petterson says.

And McLellan says that’s the point.

“When you set out a benchmark in the market, the market responds,” he says. “That becomes the ultimate test.”

Until the market catches up, costs may be prohibitive for some. Still, McLellan counters that while upfront costs may be higher, “it’s the smartest long-term investment you can make.” Net-zero energy and water, he points out, means zero utility bills.

And it is an investment. The project that Wilcox finally has settled on is the ninth option he has explored in an attempt to make the \$1.5 million undertaking economically viable.

If all goes according to plan, he says, he could make \$1,200 the first year, off the rents, which probably will start at \$625.

“I don’t care whether it turns into a cash cow,” Wilcox says, “but it needs to break even.”

The city’s Office of Sustainable Development gave him a \$139,000 grant, and he is applying for at least \$150,000 more in grants from various sources. He’s also banking on discounts from suppliers willing to subsidize a groundbreaking “green” project.

“The more successful we can make this project on all counts, the better,” says Wilcox, who envisions community involvement and interest in the progress of the project.

Petterson and Wilcox even have fantasized about informative displays along the Interstate MAX line with gauges to let Portlanders stay updated on water levels in the building’s basement tank.

How much would be collected after a multiday deluge, for example, or might the building run out in September?

“I’m all about the ripple effect,” Wilcox says. “I hope these ideas spread like wildfire.”

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