

## Builders say going modular is good way to go green

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BOSTON - It took six days for builders to put together a modular classroom with wood panels and walls of windows on a concrete plaza in Boston this week.

But the temporary classroom — built in pieces at a factory, then transported and finished at the Boston Convention & Exhibition Center — has little in common with the aesthetically deadening modular buildings of lore. Its 40 windows direct sunlight inside at angles that keep the building cool in the summer and the heating system uses natural convection to keep people comfortable in winter.

To builder Project Frog of San Francisco, it's a demonstration of how modular construction can be used to construct green buildings cheaper, faster and better.

"I think it's a huge and neglected part of green building," said Mark Miller, the company's chief executive officer.

More people are already paying attention to green modular buildings. The National Homebuilders Association of America released its green standards for modular homes this month.

But building modular has real limitations, not the least of which is the perception of being cheap and ugly. Miller avoids using the word "modular" because the connotations are so bad.

Art Breitenstein of All-American Homes, which like Project Frog had an exhibit at the Greenbuild International Conference and Expo in Boston this week, says he's accustomed to seeing the "little wrinkle in the nose" when potential customers find out his company's solar homes are pre-made.

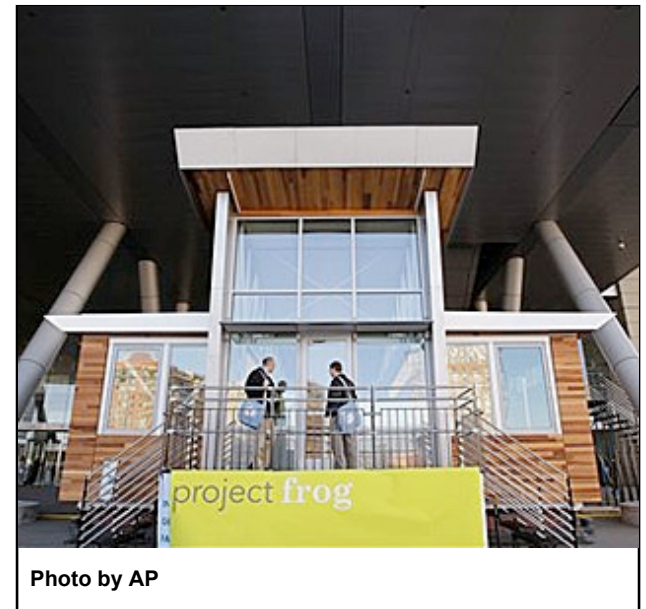
Americans generally remain skeptical about the quality of buildings that pass them on the highway. In the past, modular structures have been inferior because the builders focused more on ease of construction and less on the people inside, Miller said.

But proponents of modular building say such thinking is outdated. They take pains to differentiate modular buildings from manufactured portable buildings, such as trailer homes.

Breitenstein compares modular building techniques to how a high-performance car is made. Each piece of the home can be specially designed and fitted, using materials produced with the least environmental impact for maximum energy efficiency and health.

Each component — the kitchen, the wiring — can be tested for quality in a factory away from the wind and rain that can plague a job site, he said.

A building can be constructed on site in a matter of weeks, avoiding the months of heavy emissions from trucks and equipment at traditional outdoor jobs. Breitenstein said his company's five factories waste almost no material.



All American Homes, in a partnership with Solar Village Homes, this month began offering six models of modular solar homes, with a 2,400-square-foot model the most expensive at about \$350,000.

Mark Kostovny of Solar Village said the costly work to design a house with the most environmentally friendly materials and features — such as overhangs that keep the sun out in the summer or floors that absorb heat in the winter — wouldn't be affordable to the average person without the modular approach, which saves money by standardizing designs, materials and the manufacturing.

"The goal here was ... to create a green home that appealed to the masses, to the everyday middle-tier crowd that can't afford a million-and-a-half-dollar house of green products," Kostovny said.

Project Frog also uses modular building to offer affordable enviro-friendliness — Miller says its buildings are 25 percent cheaper than traditional construction, though more expensive than normal modular buildings.

That standardization can be a drawback, though, because most people want to custom build, said Carlos Martin of the National Homebuilders Association.

"By definition, modular has to be a set number of options," he said.

Modular housing also is limited by relatively few modular building producers, difficulties transporting the sections to some tightly packed areas and the nature of the housing market, in which most people remodel existing homes, rather than build new ones.

Martin also said the biggest obstacle for modular builders is the same one afflicting all builders — a collapsed housing market.

But he said green modular construction has enough benefits to survive the turmoil.

"I can almost guarantee you that at the end of this, green building will still be around, and will probably be kicking up even more, and modular will still be around and be kicking up even more," he said.

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