



REACHING FOR THE STARS

Boston-based architect Bill Boehm transforms a wilted 1850s home into model of modern energy-efficiency

Written by MEAGHAN O'NEILL



With homeowners increasingly concerned about the environmental impact of their property, green building is quickly shifting from novelty to norm. So when Boston-based architect Bill Boehm, principal of Boehm Architecture, purchased a multifamily residence in Cambridge with the intention of turning it into two condos, both his ethos and his wallet drove the plan for the redesign.

To date, measuring sticks for building green homes have been few. Last fall, the US Green Building Council's LEED (Leadership in Energy and Environmental Design) rating system launched its residential program. But critics contend that costly fees make it impractical for many property owners and that the point-based rating system encourages scorekeeping rather than true eco-effectiveness. "The process is all about point negotiation," says Boehm, who designed and built one of New England's first LEED-certified homes. "It's almost like a game."

For this project, his first as both architect

and developer, Boehm instead aimed for Energy Star-branded qualification which he feels is better suited to residential building.

According to Energy Star, the premium for building to its specifications is between \$2,000 and \$2,500 for a 2,400-square-foot-home. Boehm estimates that going for LEED certification would have cost several thousand dollars beyond





THE ORIGINAL 1850 GABLE-ROOFED HOUSE had been added onto over the years (TOP). Architect Bill Boehm gutted the three-unit building (MIDDLE) and transformed it into two eco-savvy condos (BOTTOM).

that in materials, project management, and paperwork. Since LEED homes must also be built to Energy Star specifications, choosing the latter was a simpler way for Boehm to build green.

The Energy Star program — a joint effort of the US Environmental Protection Agency and the Department of Energy — is already well known for its blue labels, which signify electric appliances as energy-efficient. But for an entire building to receive the stamp of approval, it must venture well beyond superior dishwashers and refrigerators. Specifically, effective insulation, high-performance windows, tight construction, and efficient heating and cooling equipment are musts.

THOUGH THEY DON'T contribute to the Energy Star rating, materials and finishes such as (ABOVE LEFT) bamboo flooring and low-VOC kitchen cabinets create a contemporary aesthetic without off-gassing toxins or depleting natural resources. A wood-burning fireplace (LEFT) serves as a supplemental source of heat.

To overhaul the boxy 1850s “wreck of a house,” as he calls it, Boehm gutted what was a three-unit building and reconfigured it into a duplex with one three-bedroom condo with 1,800 square feet and a second two-bedroom unit with 1,400 square feet.

Termites thwarted Boehm’s plan to reuse the structure’s existing frame, but he managed to salvage some of it, and then began focusing on creating a tight envelope. First, insulation was added between studs — where heat loss commonly occurs — using a dense, nontoxic steel-slag fiber. Next, he wrapped the entire building with rigid styrofoam insulation and clad the exterior with wide, flat sheets of eco-friendly fiber-cement and cedar-plank siding. A white rubber-membrane roof was also added to reflect summer heat, minimizing cooling needs during warmer months.

Heating and cooling account for half of the typical home’s energy use. To reduce those loads, Boehm installed a forced-water heating system that achieves 94 percent efficiency, then supplemented it with energy-saving fireplaces. Boehm also installed undersize ductless air-conditioning units, and created smart open-plan interiors that encourage proper airflow. Ideally, however, the air-conditioning switches will rarely be flicked on; instead, powerful whole-house fans will suck warm air into the attic and push it outside, while high-efficiency casement windows can be tilted to maximize prevailing winds. “I’m proud of the cooling system,” says Boehm. “I really wanted to avoid the need for using AC.”

To win an official Energy Star rating, a house must be inspected during construction and is subjected to a strict “blower-door” test. Using an enormous fan, an inspector pressurizes the building, then uses digital equipment to measure its ability to keep air in and out. Both condos scored about 60 points on a scale of zero to 100 (with zero signifying total efficiency), meaning the building is nearly 40 percent more efficient than a typical home. Boehm figures that will translate into a few thousand dollars worth of rebates and incentives available through the utility company and various local agencies

As an added bonus, going green may yield a marketplace advantage, too: After less than two months on the market, the units sold for \$500,000 and \$690,000. ■

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