

Green Building – A Balancing Act

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Connecticut builder Bill Freeman strikes an effective balance between environmental and market sensibilities with a high-performance house.



As a move-up spec builder, Bill Freeman knows the importance of building homes that are marketable and profitable. But he also respects the need to reduce the environmental impact of what he builds—which can be a challenge to accomplish without sacrificing those other objectives.

For his most recent project, a 3,000-square-foot house in Essex, Conn., Freeman met that challenge head-on. Inspired by a contest sponsored by his local utility to achieve net-zero energy use for new homes built by the end of this year, he purchased a stock house plan in a regionally familiar neo-Cape style and set course to boost its performance as much as possible.

The finished house, now listed for sale at slightly less than \$1 million, ultimately achieved a home energy rating (or HERS) score of 46—less than half of current International Energy Conservation Code standards. A heavily wooded lot discounted the potential for solar thermal and photovoltaic (PV) options to offset grid-supplied power (adding PV alone would have dropped the home’s HERS rating by 20-plus points), and the home’s orientation on its lot did not allow the builder to maximize the southern sun. “Our goal became to build a marketable, upscale home that was extremely energy efficient under the conditions we had,” he says.

Beyond that, Freeman also gained the insight of a HERS rater, a free service to builders participating in the challenge. “It was very valuable to have someone look at our plans and specifications and suggest ways we could improve [energy efficiency],” he says.

Bill Freeman in standing in a foamed attic space



Still, Freeman's existing practices only required a bit of fine-tuning to achieve greater energy savings and resource efficiencies for the challenge house. He already encases the entire shell of his homes in open-cell expanding foam insulation, from the foundation walls through the 2x6-framed walls to the underside of the attic roof, to achieve a tight thermal shell. The attic floor does not need to be insulated in this scenario, saving Freeman money and time. "I haven't used batt or blown-in insulation for years," he says, noting that the home's air conditioning had yet to engage as of mid-June despite outdoor temperatures into the 90s.

His insulation application also allows Freeman to place central air ducts in an attic space and his HVAC equipment in the basement, where temperatures are within 5 degrees of the living areas. That environment reduces thermal loss and lessens the energy burden on the HVAC system.

Meanwhile, Freeman upgraded the geothermal heating and cooling system with a constant pressure pump and a "desuperheater" (or preheating system) that regulates the energy used for domestic hot water depending on demand. Already, the two-stage geothermal system operates at an energy-saving 67 percent capacity to maintain indoor comfort, kicking up to full capacity only in extreme conditions.

In addition to high-performance insulating windows to complement his tight thermal envelope, Freeman also specified tankless water heaters, low-flow plumbing fixtures, low-VOC-emitting paints, Energy Star-rated appliances, and an efficient lighting package featuring compact and single-pin fluorescent lamps.

Potential buyers and the eventual owners, though, will only see a high-end kitchen, experience the convenience of instant hot water, and enjoy comfortable (and healthier) living spaces—all while saving (by Freeman's estimation) about \$4,000 a year in utility costs compared to a conventionally built home of similar size. "I'm trying to add more to my standard package without losing sight of what people want," says Freeman.

Unlike most of his builder brethren, though, Freeman is also willing to sacrifice a bit of his profit margin to reduce his carbon footprint. "You have to keep pushing the envelope between profit and environmental consciousness," he says. "A lot of builders don't like hearing that, but it's the reality now."

By: [Rich Binsacca](#)