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'Passive' home wastes little

Written by DEBORA GILBERT
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Architect Dennis Wedlick designs Claverack house to meet new standards

CLAVERACK-Arevolutionary house has sprung up in a clearing in Claverack. The Hudson Passive Project, the first passive project in the state, was certified in April. It represents a new approach in American homebuilding although the movement is already accepted in Europe where houses built to use as little energy as possible are already recognized in some national building codes.

The 1,600 square foot, barn-like structure, with a south facing wall of windows and fieldstone/stucco walls, is supported by soaring interior laminated wood beams that evoke historic Dutch barns or even a gothic chapel. The open, spacious, light filled interior belies the fact that it's also a laboratory for the exploration of sustainable homebuilding. The house has the potential to use 90% less energy than a conventionally built home.

Architect Dennis Wedlick whose firm, DWA, is based in Hudson and New York City, designed the house after working with NYSERDA (New York State Energy Research and Development Authority), which has a program that helps architects to create more energy efficient homes.

"We offered him the chance to work with our building science team that did the computer modeling," said Greg Pedrick, NYSERDA's project manager for research and development. "It motivated him to consider passive."

"We're trying to seed a few to realize the benefit but it won't be mainstream for a long, long time, said Mr. Pedrick.

The Hudson Passive Project was realized through the collaboration of a group of energy experts, computer modelers, designers, suppliers, and builders that, in addition to NYSERDA, included Bill Stratton Building Company of Old Chatham, which financed and built the project, and Vermont Timber Frame, which contributed the SIPs (sandwich insulated panels) and the arched interior laminated support beams, among others. Each made sizable donations of time, expertise and materials to the project.

"Every supplier is also a partner," said Mr. Wedlick.

A celebratory gathering last week at the finished house, brought together many of the contributors and collaborators.

"You couldn't do this without a really talented builder. Unless you have a passionate and caring builder you're not going to get certified," Mr. Wedlick said last week, referring to his frequent collaborator Bill Stratton.

A passive house is not the same as a passive solar house. While windows and sun are part of the energy dynamic in a passive house, other technologies are at work as well, but not the solar panels, geothermal systems and radiant heat systems now commonly found in this country in homes heated or powered by solar or geothermal energy. The Claverack house doesn't need those technologies. It's designed with such efficiency it can use electricity to run the sparse demands of its heating and cooling systems.

Mr. Wedlick said the passive house design is based on ideas that originated in houses built in the US in 1970s that were sometimes so tightly sealed they led to "sick-building syndrome." Today's passive houses have high technology air exchange filter devices, a key component. These systems allow a constant exchange of air while conserving heat or cooling the space, and removing humidity and particulate matter, like pollen.

"We're learning how to push the available technologies," he said.

The new house certified by PHIUS (Passive House Institute US) is one of only 12 in the United States. In its innovations, the house exceeds LEED (Leadership in Environmental and Energy Design) standards, the benchmark frequently used for energy efficient buildings.

The design employs simple building techniques and high quality materials already in use in conventional homes. Rigorous application of sealants including injected foam and special tapes create a highly sealed environment. The house faces south and has deep roof overhangs that let in more sun in winter than in summer offer significant benefits. The simple shape that lacks extruding elements that might contribute to lost heat is an important design element. The glued and laminated wood support trusses are light for what they do said one engineer at the gathering, explaining that they are thickest at the point of greatest stress, where the roof and walls intersect.

The structure is designed to prevent heat or cold from traveling through the roof, walls or floor. Even the nails that hold the roofing in place are isolated from the interior of the house, since support beams for the roof lie on top of the roof insulation. Double pane glass windows with a layer of film between to create extra thermal separation are supported by fiberglass housings. The cast cement floor was poured over high density rigid foam with an R60 insulation value. Foot-thick roof, ceiling and wall panels with lap joints insulate the house so well it hardly needs to use its heating and cooling systems.

Drafts often form where insulation is removed or pierced around electrical wiring, said Mr. Wedlick. "It's all about the gaps. If you don't detail around the electric, you still have a hole. They all undermine your heating system. It's like having your furnace on in the summer," he said.

"Computer modeling was used to test the energy efficiency of the design, but the house actually exceeds the computer's forecasts and turns out to be five times more tight than planned.

"Only because it was a bad economy could Bill and I throw so many resources into it. It was a good project to keep our staffs engaged and build our skill sets," said the architect.

The house is for sale for \$599,000 through Gabel Real Estate of Spencertown, and interest in the home is reportedly high. Mr. Wedlick and Mr. Stratton are now incorporating techniques they learned on the project into new homes and remodeling jobs.

For more information go to: www.denniswedlick.com/work/hudsonpassive.html.