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Sunday, February 27, 2011

New way to build

Passive method has many benefits



State Rep. Matthew A. Beaton, R-Shrewsbury, stands beside boulders placed as steps to his home, which is slated to become the first certified passive house in Massachusetts. (T&G Staff / CHRISTINE PETERSON)

By Priyanka Dayal TELEGRAM & GAZETTE STAFF
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SHREWSBURY — In the middle of winter, weeks go by before Matthew A. Beaton needs to turn on the heat.

Even when the temperature outside drops to single digits, the temperature inside the Beaton home stays more than 60 degrees.

The beige Colonial doesn't look much different from the average New England house, but looks can be deceiving.

Mr. Beaton and his wife, Laura, live inside 22-inch-thick walls, insulated with recycled newspaper. Every nook, every hole, has been sealed tight so heat doesn't



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escape outside during the winter. The house faces south; that position, combined with strategically built window overhangs, allows sunlight to enter the home during winter, and to be kept out during summer.

It is the powerful sun — not solar panels — that keeps this house comfortable during the bitterest, coldest days of winter.

When the paperwork is complete, this will be the first certified passive house in Massachusetts.

Passive building is popular in Europe, and is steadily gaining interest in the United States. The idea is to build a home that is as comfortable as possible while being as efficient as possible.

"We basically wrapped the entire house in an airtight structure," Mr. Beaton said while giving a tour of his house on a recent afternoon.

Mr. Beaton, 32, is a newly elected Republican state representative for Shrewsbury and Westboro, who owns a green construction company. Much of his house he built with his own hands while running for office.

The house sits in a dense neighborhood of older homes on Surrey Lane, near the center of Shrewsbury. It is by far the most efficient.

"This is a Prius," Mr. Beaton says. "All the other houses around here are pickup trucks."

While Austria and Germany boast thousands of passive homes, the United States has just more than a dozen certified passive homes, according to Mike Kernagis, co-founder and program director of the Passive House Institute U.S. Another 25 American homeowners are working toward passive certification, he said.

The staff at the Passive House Institute, in Urbana, Ill., has seen increased interest in passive building through the number of people they train to certify projects. In 2008, they trained 20 consultants. "Since then, we're training 200 people a year," Mr. Kernagis said. "We've seen nothing but increase in the last three years."

Passive building comes with added costs — about 10 percent to 20 percent more than for a traditional building — but experts say the cost increase varies from home to home. They also say there's no simple way to calculate payback.

One way to calculate savings is in heating and cooling bills; Mr. Beaton, who moved into his home in September, estimates he will save \$2,000 to \$3,000 a year.

Mr. Kernagis said passive building is not just about payback.

"To build a house that's environmentally sound," he said, "that's sort of a quality of life issue. There's more to it than just return on investment."

Large-scale passive developments in the U.S. may be a long way off, according to Paul W. Panish, principal at Newton-based DEAP Energy Group.

"To get our builders to that level is a major challenge," he said. "It's difficult to convince someone to do this. It's a hard sell when energy costs are so low."

Mr. Panish, a trained consultant for the Passive House Institute, has been working with Mr. Beaton to attain certification.

To be certified, homes must meet a threshold for energy use and air tightness. Mr. Beaton used a fog machine to find all the tiny cracks in his home.

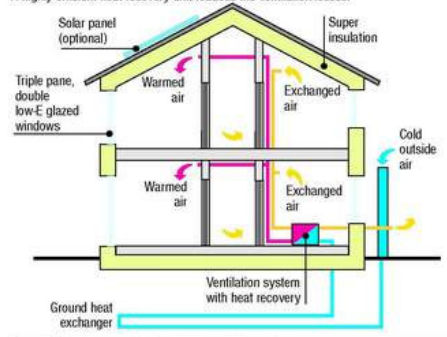
When insulation and sunlight is not enough to keep the house warm, the Beatons switch on a wall-mounted heater. They have one on each floor. The same two units provide air conditioning in summer.

Residents of passive homes can open the windows any time they want, but they might not feel the need to. Passive homes, including Mr. Beaton's, have ventilation systems that allow fresh air to circulate even when the windows are shut.

In addition to building to passive standards, Mr. Beaton employed a few other environmentally friendly techniques. He tried to disturb the site of his house as little as possible, going so far as to build the house around

Passive housing

In a passive house the consumption for space heating is reduced by 90% compared with average existing houses and by 75% compared with ordinary new construction. In contrast to ordinary buildings, a passive house uses the free heat sources inside of the building envelope - e.g. the heat from the persons in the house and from solar energy entering through windows - and the heating system is simplified significantly. Special windows and an envelope built from highly efficient insulation panels help to keep the heat inside. Fresh air is constantly delivered by a ventilation system without drafts. A highly efficient heat recovery unit reduces the ventilation losses.



Source: Dr. Wolfgang Feist Passive House Institute, Germany
T&G Staff/DCN LANDGREN JR.

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“ This is a Prius. All the other houses around here are pickup trucks. ”

-- STATE REP. MATTHEW A. BEATON, OF HIS PASSIVE HOME

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a giant boulder in the ground. Many other slabs of granite were found at the property. Some of those became the front steps.

The red oak trees that were removed to make room for the 3,000-square-foot house were not discarded. Those became the hardwood floor.

"It's the idea, 'If you have it here, let's use it here,' " he said.

The Beatons also are planning to grow fruits and vegetables on the property.

Mr. Beaton said he has always been interested in nature and the environment. He has always been politically conservative, which he acknowledges is a somewhat rare combination.

His passion for so-called green issues (he feels the word has become overused, but he still uses it) is obvious. He said he's hoping it can make a difference in the state Legislature. Mr. Beaton, who won the seat formerly held by Karyn E. Polito, said there are many ways to tweak state laws to promote responsible building and energy efficiency. For now, he is choosing to listen more than lead. He is sparingly signing his name onto bills.

"I think to be effective I first need to develop relationships," he said.

Mr. Beaton believes part of his role is educating the public on the benefits of responsible building. Perhaps just as great a challenge is educating his colleagues in the Republican Party that fiscal conservatism and environmental conservatism can work together.

One idea he supports is mandating energy ratings for all homes for sale. The ratings would allow prospective buyers to compare not just the upfront cost of a home, but the cost of running it — similar to comparing the fuel efficiency of different cars.

Mr. Beaton supports stricter regulations that require new buildings to be energy-efficient, but says regulations should not be overly onerous or costly.

State Rep. George N. Peterson Jr., R-Grafton, the second-ranking Republican in the House, said he's opposed to widespread implementation of the so-called stretch energy code and its costly mandates.

But, Mr. Peterson said, party leaders are glad to have Mr. Beaton, a new member with a new knowledge base, in their ranks. Republicans will spend more time on environmental issues this session, he added.

"For too long Republicans have been painted as sort of anti-environment, which is not the case," Mr. Peterson said. "I know we will be a lot more active in this session."

In his time away from Beacon Hill, Mr. Beaton will continue to put the finishing touches on his home, which he calls "one big experiment." He has a few months to finish before another member of the family moves in. He and his wife are expecting a baby — their first — in May.

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