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House of Straw

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Bob Brecha takes his research on climate change and sustainability very seriously: He bet the house on it.

Last August, the University of Dayton physics professor, his wife and their two children moved into a small house on a corner lot in the village of Yellow Springs. From the outside, it may catch the occasional eye: six solar hot water panels on the roof, a garden growing atop the shed, clothes hanging out to dry.

But it's what is pressed between the earthen plaster walls of the house that make it a topic of conversation: dozens of bales of straw.

Whenever I tell people I live in a strawbale house, there's always a set of questions that come up right away," Brecha said. "They ask, 'What about insects eating all the straw?' 'What about fire?' and, of course, from the *Three Little Pigs*, 'What about the house getting blown down?' "

But often these questions lead to conversation. And a conversation, Brecha says, can lead to a whole new way of life.

A physicist by training, Brecha began his career at the University of Dayton 20 years ago conducting basic research on lasers and atomic physics. But as a teacher, he soon became interested in climate change, energy resources and the economy, and he slowly began incorporating it into his writing and research.

Today, he is the University's coordinator for its Sustainability, Energy and Environment minor and curriculum, and he spends his summers studying and writing at Germany's Potsdam Institute for Climate Impact Research.

In 2010, Brecha and a neighbor launched 2 For 1 Energy, a local energy audit business that helps homeowners identify ways to save money and make their homes more energy efficient.

"It's all sort of snowballed," he said. "I've recently begun working with colleagues in mechanical engineering to do energy audits of homes and businesses and collect data from utility companies on energy consumption."

All along the way, as Brecha studied, taught and advocated for more sustainable living, he was forced to confront his own lifestyle and carbon footprint. For years, he had made small choices like trading incandescent light bulbs for more energy efficient ones, upgrading to Energy Star appliances, turning off lights and electronics when not in use and air-drying laundry.

But he wanted to do more.

"I felt that it was important to actually live more sustainably, not to just make it a program at the University," he said.

He heard about a local resident, Andy Holyoke, who was building strawbale homes around Yellow Springs. In 2005, Brecha and his family enlisted Holyoke to build one for them and even joined in on the construction of others.

In the beginning, the house looks like any other: a wooden frame, a wooden roof, a concrete slab. But instead of installing fiberglass for insulation, strawbales are stacked up between the wooden beams.

The straw and beams are then covered with an inch-thick earth plaster mixture of sand, clay, chopped straw and water. The plaster hardens and forms a water-wicking exterior that keeps the straw dry and dehumidifies the interior.

"One of the things that I like about the strawbale house is that it uses local, roughly waste materials," Brecha said. "The straw would otherwise be a waste material, the clay and the sand were excavated by a local company. So we built a house that uses little energy on an annual basis but also has low energy costs of construction."

Six solar hot water panels are affixed to the roof that has a long overhang designed to keep the house cool and the outside walls dry.

A 400-gallon water tank pumps water to the solar collectors to get heated and returned to the tank for use in washing dishes, showers and laundry. The heated water is also pumped through pipes in the floors to heat the house. The house does have a natural gas backup system if there is not enough sun to heat the water, but Brecha says he only used it intermittently between November and March.

Well-insulated, warmed with solar-heated water and filled with energy-efficient lights and appliances, Brecha's house uses about 80 percent less energy than a standard house.

"We feel like we're living very comfortably here, taking advantage of the free sunlight and making choices each day to live more sustainably," he said.

Brecha says he would never suggest everyone should build a strawbale house, or even make dramatic changes to their own lifestyles. What he hopes for is that conversation.

"The important thing is just to start thinking about how we do different things in our lives," he said. "It's getting the message across. I hope that by taking the step to move into a strawbale house it makes all my talk and research a little more credible, that this is something I do take seriously.

"What I want is for everyone to realize that climate change is an important issue and to ask themselves, 'What am I going to do? I can't expect someone else to take action all the time.' "

Even for those who are skeptical of climate change, he says, sustainable living makes just plain economic sense. Oil prices keep going up because the world's oil supplies can't keep up with demand. Natural gas is cheap now, but it comes at the cost of controversial extraction practices like fracking. Coal mining has led to stripping mountain tops and tossing them into valleys.

"These to me are signs of desperation," he said. "So there are many different reasons to step back and say, 'wait a second, is this really what we want to be doing to the planet?' Can we find ways to simply use less of this energy and avoid the need for some of these extreme measures to extract energy?

"Again, it's easy for me to say that and put up some graphs and talk about it, but unless I'm trying to at least move in that direction myself, then it lacks credibility."

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