



Zero-Energy Homes

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“Ed’s house is unique in that he had a full commitment to meeting the criteria of a net-zero end result, which is a very ambitious goal, especially in our climate with its heating and cooling demands,” said Rob Faucett, the architect and builder who teamed up with Jenks in the planning and construction of this home. “Not everyone is willing to make that level of commitment. He was very committed to hitting that goal net zero in every aspect of his house — and he did it. It’s quite impressive.”

About eight years ago, Jenks and his wife Joan decided to move to the Flemington area to live closer to one of their daughters and their grandchildren, but they were unable to find a one-story house that suited their purposes for aging in place.

“All the one-floor houses in the area were built in the ‘50s, ‘60s, or ‘70s,” Jenks wrote in his Net-Zero House blog (net-zero-house.com). “All had poor insulation, poor windows, and small rooms.”

So, they decided to plan and build their own comfortable, energy-efficient home, designed to resemble a 1920s Craftsman dwelling.

With its focus on human-made craftsmanship and the beauty of natural materials and forms, the Craftsman style, with the appeal of its simplicity, remains popular for homes. Some of the distinctively Craftsman-like characteristics in Jenks’ home, are the low-pitched roof with gables and overhanging eaves, the earth tones — light green and brown, the one-and-a-half-stories height, and the wide front and back porches held up by tapered columns.

“My background is in computer analysis, then 20 years in IBM management,” he said. “I challenge things. I question.” He is a problem-solver, and the problem he decided to solve seven years ago was how to build a net-zero energy home. “I knew energy efficiency was the way to go,” he said. “I didn’t know much about it then, but I spent two years researching it.”

Jenks knew he could build a home that was more energy efficient than anything on the market, but he did not know how far he could go.

He first came across the Passive House, a concept devel-

oped in the early 1990s in Germany. A Passive House is an ultra-low energy building with reduced ecological footprint requiring little energy for heating or cooling. It is designed to capture solar energy to help heat the house. The house would face south with lots of windows on the south side and no windows on the north side.

Jenks was not satisfied with the Passive House concept for his New Jersey home. He did his research and started going to conferences.

As for the Passive House certificate to hang on the wall, “I didn’t care about the piece of paper,” said Jenks, “I just wanted a comfortable house.”

In his research Jenks came across the term “net-zero house,” a standard created by the U.S. Department of Energy (DOE). He was looking for a comfortable house and the lowest possible energy bills, and after reading several DOE and Canadian studies on net-zero he decided that was the route to take.

“The easiest way to describe a net-zero house is that it is built like a thermos bottle with windows,” he wrote in his blog. “It’s a house that is so well insulated and so tight it takes very little energy to heat or cool it said Jenks.”

“The whole idea if you’re building an energy-efficient house is two things: insulation and tightness, how tightly the house is sealed,” he said.

He cited examples of homes he had read about that would retain almost all their heat overnight despite sub-freezing temperatures. “And heating bills going from thousands of dollars a year to low hundreds,” he added. “Then what little energy it takes to run the house, that gets covered by a small solar photovoltaic (PV) system.” (Solar panels cover the roof of Jenks’ garage.)

Abundant, strategically placed insulation is key, from the basement floor and walls to the above-ground walls and the roof. “The idea is a continuous flow of insulation surrounding the house,” he wrote.

A crucial problem Jenks had to solve was “thermal bridging,” the conductivity of heat and cold through walls, doors, windows — a major source of energy loss. “Thermal bridging is a four-letter word in house construction,” he said. “In a traditional exterior wall the studding will thermal bridge cold into the house, so will traditional windows, sill plates, and on and on, so fighting bridging is a high goal.”

For insulation, Jenks used a combination of cellulose and spray cell foam. He found a vendor in Easton, Pennsylvania, who sold the product he was looking for and was interested in his zero-energy project. They sealed up as many leaks as possible by spraying two or three inches of closed cell foam on the inside and a layer of high R value cellulose next to it.

The doors of the house are another energy-saving measure. They are all thermal doors with an R-19 value and latching in several places. “It closes like a refrigerator door,” said Jenks. “It’s airtight. When it closes it pulls the seal in.”

The next step was sheathing the house, using R-6 value insulated zip sheathing, after which they tested the house for air leaks.

The next step on Jenks’ zero-energy quest was a blower door test. The Easton insulation man came back, and mounted a box with a fan in the front door. They measured the amount of air being sucked out of the house to tell whether there were any leaks. With a smoke wand they were able to locate a few small leaks, which they plugged up.

Jenks added that his hot water heater is a heating pump., not using electric coils to make heat but taking heat out of the air in the house.

He continued, “The house almost self-heats, which is why our energy bill is so low, about \$250 per year. A solar panel covers the cost.”

“Everybody should do this,” Jenks emphasized. “It cost only 10 to 15 percent more to build this house, about \$700,000 total, and I didn’t spare expenses.

He said that state and municipal building codes are influencing the way people build and he predicted that they would evolve to push all home builders in the direction that Jenks took towards zero energy. California is already approaching the zero model as a baseline, he noted.

He urged anyone with questions to email him at joe@zeroenergyproject.org. “I hope to answer their questions and get them inspired,” he said.

Here is a link to the full article:

<https://www.princetonmagazine.com/zero-energy-homes/#more-15769>