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Alan and Jan Marie Rushforth have turned their Havertown home more eco-friendly.

Rushforth's turn to sun to make their house eco-friendly

By LOIS PUGLIONESI
Times Correspondent

When Alan Rushforth says he's gone from suburban ranch home to solar palace, he may not be exaggerating.

Over the past few years, Rushforth and his wife, Jan Marie, have given their conventional 1960s home a 21st-century energy makeover.

Thanks to their hard work, determination and considerable investment, photovoltaic and thermal solar systems now provide 60 percent of the Rushforth's electricity, 100 percent of their domestic hot water and enough space heat to keep this Haverford couple toasty on many a cold winter day.

Best of all, the energy upgrade has rid the Rushforths of an 1,100-gallon-a-year fuel oil habit, and reduced carbon dioxide emissions by about 30,000 pounds annually, making for a healthier environment.

Solar awakening

A contractor for 30 years, Rushforth became interested in energy alternatives decades ago, when he began learning about global warming. Rushforth installed a solar hot water system on a prior home, and continued exploring solar materials.

This interest intensified around 2005, when Rushforth became acquainted with theories of "peak oil."

"I had been learning how geologists are predicting that humanity is about at a point where we've used up half the world's oil. We're going to plateau on production, and then it's going to start declining in a bell curve. We're going to hit the second half of the bell curve, whether we're ready or not," said Rushforth.

Jan Marie recalls that a screening of the alarming documentary, "The End of Suburbia: Oil Depletion and the Collapse of the American Dream," added further impetus to Alan's solar mission.

Wouldn't take no for an answer

Rushforth initially contacted Hap Haven, a certified home performance auditor and thermographer, for assistance.

Using a "solar pathfinder," Haven walked along Rushforth's roof, looking for optimal exposure. He came back, however, with discouraging news. The house was too low, the roof too flat and shady.

"I was not a happy camper when he said I couldn't do solar," Rushforth said. "And I don't take no for an answer."

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Family does its best to help save planet

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Since his house needed a new roof and extensive renovations at the time, Rushforth saw an ideal opportunity to incorporate green features. He decided to add a second floor with a steeper roof, for another 15 feet of height. Raising the roof and clearing a few trees solved the worst of the shade problem.

Fortunately, the Rushforth's home has good orientation for using solar technologies.

"It's important to have a roof facing within 15-20 degrees of due south," Rushforth said. "You have to have good sunlight exposure."

Haven thought the plan would work.

Harnessing the sun

Although they are not visible from the street, three different types of solar panels currently soak up rays on the Rushforth's roof.

Uppermost is a photovoltaic (PV) panel that converts sunlight directly into electricity. Its 5.2-kilowatt output has reduced the Rushforth's electric bills from an average $100 per month to $50, plummeting to $1-$5 in summer. Surplus energy can be sold back to power companies.

Although everyone is interested in PV these days, Rushforth cautions that residential applications are costly and yield the slowest payback. His PV system cost about $36,000. To help offset costs, Rushforth obtained a $2,000 federal energy tax credit, as well as a Sustainable Development Fund rebate and production credit, totaling $23,000. With net costs of about $9,000, Rushforth anticipates a 12-year payback. Commercial applications get better tax breaks, Rushforth noted.

Rushforth also installed an evacuated tube solar hot water system. More efficient than PV, these insulated tubes capture about four times as much energy per square foot. Hot water is stored in a 950-gallon tank in Rushforth's basement. Heat from the tank can be siphoned off to supplement space heating as well.

Large-scale, commercial applications of solar hot water systems, as in apartment buildings, condominiums and hotels, have the best payback, Rushforth said.

Lastly, Rushforth built a hot-air solar collector that delivers additional warmth during winter months. This low-tech system draws cool air from the lower floor through a duct leading to the panel, which contains heat-absorbing black aluminum. A blower pushes the warmed air back to a far corner of the house.

Rushforth estimates this simple system saves about $700 per year in heating bills.

Additionally, Rushforth purchased a clean-burning wood gasification central boiler, and took steps to better insulate the house.

Rushforth estimates his annual energy costs went from $4,500 to less than $1,000.

But with total investment exceeding $100,000 it's clear that payback wasn't Rushforth's primary motivation.

"I did it in part for my nieces and nephews, for the next generation," Rushforth said. "I don't want them coming to me in 10 or 20 years and saying, 'Your generation (fouled) up this planet. How could you have done such a thing?' I can only do so much as one person, but I'm going to try on my own level.

"I'm glad we are, for the most part, off of oil. I like burning less fuel and having lower carbon emissions."

Rushforth estimates he's eliminated 23,600 pounds of carbon dioxide annually by cutting oil consumption, while his solar PV panel saves 6,885 pounds annually.

Haven went so far as to say that "payback is irrelevant."

"The question is does it have value? If you're more comfortable, you're saving energy, keeping people from going to war, and the environment is getting better, that's a lot of value. The entire discussion has to revolve around what do we value and how do we get there," Haven said.

Build it green

A passionate environmentalist, Jan Marie thinks the energy makeover has been "worthwhile, educational, and hopefully inspirational." She acknowledged, however, that it is neither easy nor cheap to do a major energy retrofit on an existing home.

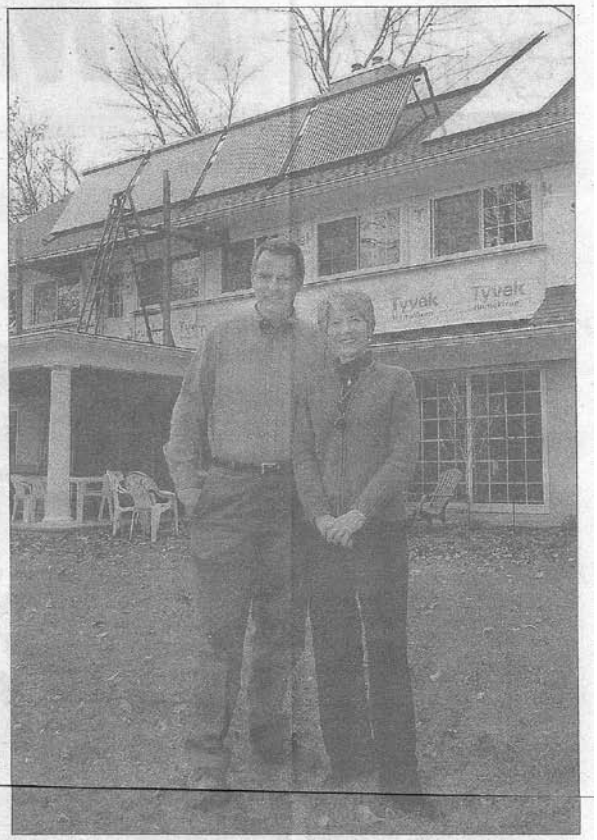
The best time to incorporate green features is during construction, Alan Rushforth said.

"We know how to build houses out of foam and concrete, or structurally insulated panels that use a fraction of the energy of two-by-fours and fiberglass," Rushforth said. "The builders can do it, but they don't see demand. Consumers have to demand it."

The Rushforths point to a new zero-energy development, Maple Point Solar Town Homes in Philadelphia, as a shining example of green design.

Rushforth hopes to continue shedding light on ways to save energy and cut carbon emissions. As the only North American Board of Certified Energy Practitioners certified solar thermal installer in the Philadelphia region, he has launched his own business, Rushforth Solar LLC. The company designs and installs solar hot water systems for apartment buildings, hotels, nursing homes and other commercial users.

Rushforth will present a workshop on solar hot water systems 8 a.m. March 14, at the Chester County Economic Development Council, 787 Constitution Drive, Exton. The event is hosted by the Smart Energy Initiative of Southeastern Pennsylvania.



Times staff / ERIC HARTLINE

Alan and Jan Marie Rushforth have turned to solar power in their Havertown home.

Houses are biggest villains in fighting battle

By LOIS PUGLIONESI
Times Correspondent

Jan Marie Rushforth is presently a stakeholder in a local climate protection initiative. Haverford Township is contracting with ICLEI–Local Governments for Sustainability, to inventory local greenhouse gas emissions, and prepare an action plan for reducing them.

ICLEI intern Jonathan Knauer pointed out, however, that government entities typically produce only 2-5 percent of greenhouse gas emissions in a community.

"The big thing for us is encouraging individual homeowners to take steps on their own. Governments and school districts can do extraordinary things to max out their efficiency and it's not going to mean that much unless citizens do something as well," Knauer said.

Of course, not everyone can buy a new, energy-efficient home or undertake major energy upgrades for an older home.

There are, however, relatively simple and cost-effective things we all can do. Knauer made the following recommendations:

- Switching from Incandescent to Compact Fluorescent Lights (CFLs)

According to the U.S. Environmental Protection Agency ENERGY STAR Web site, CFLs use about 75 percent less energy than standard incandescent bulbs and last up to 10 times longer. On average, each CFL saves slightly more than $30 in electricity cost over its lifetime, while producing 75 percent less heat, thereby reducing the operating costs of cooling buildings.

- Installing Programmable Thermostats

Programmable thermostats allow automatic adjustment of home-temperature settings, fostering energy savings while homeowners are away or sleeping. Proper use of programmable thermostats can potentially cut energy costs in the average household by about 9 percent. These devices are relatively affordable, with prices ranging from about $30 to $200. The payback period for installation is about one year.

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