

It isn't easy being green



GERALD S. WILLIAMS / Inquirer Staff Photographer

Architect Paul Macht created an addition to his Rydal home with a passive solar design using south-facing windows and a heat exchanger to keep fresh air circulating.

Generating your own electricity. Building with recycled materials. It takes effort — and sometimes even costs more — but those who do it say there are rewards.

By Diane Goldsmith
INQUIRER STAFF WRITER

Andy Rudin enjoys taking visitors to the rear of his Melrose Park twin and showing them his electric meter running backward. It's not broken: The photovoltaic panels on his roof are generating electricity from the sun and sending it on to Peco. When the sun sets and Rudin and his wife use electricity, the meter runs forward.

The couple paid \$26,186 for their solar electrical system, which was installed last summer. In January, they added solar thermal panels for hot water at a cost of \$2,500. Rudin feels it's money well spent.

"Some people spend \$35,000 for a sport utility vehicle which has no payback on investment. It's just a trophy mobile.

"With energy, [this is] the right thing to do and it feels good and it makes sense," he said. "If it's sold on the basis of economics, it doesn't work very well."

A desire to do right motivates others whose homes reflect a sensitivity to the environment. Some people go to lengths to use recycled and sustainable building materials or to conserve energy. Others with a focus on indoor air quality try to avoid products that emit toxins, and make sure that fresh air constantly circulates within.

When Linda Griffith was planning an addition to her Huntingdon Valley rancher, she scoured the pages of neighborhood shoppers for lumber from dismantled or re-sited barns. She found two barns and paid the owners a total of \$360 for the wood, a fraction of what she'd pay in a lumberyard — if she could find such wide-cut timber.

But preparing it proved arduous. Some of the lumber had to be de-nailed and carted to her home. Once all of it was there, she and her partner had to examine it for flaws, cut the boards to size, and sand and plane them.

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Andy Rudin happily watches his electric meter run backward. That means the solar panels on his roof, left, are generating electricity and sending it to Peco. Rudin and his wife, Joyce Chin (standing in their yard), added the lower panels for hot water. Total cost: Nearly \$29,000.

Being green costs the green ...

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"It was very tedious," Griffith conceded.

So why do it?

"The big reason is that we're great believers in appreciating all the Earth has given us," she said. "So if something is already killed to make life easier for you, it seems right to reuse it and appreciate it and to make sure its loss was not wasteful."

A waste-not attitude is evident throughout the home, from a bathroom where a handful of thrift-shop tiles brighten a wall to lighting fixtures found in the trash that look like anything but castoffs.

"There's that beautiful chandelier on the second floor," Griffith said, referring to a graceful bronze piece with off-white roses and green leaves twining about. "The first time I saw it I thought it was the ugliest thing in the world."

That was before her partner started painting it.

"Now," she said, "it's one of the pride and joys of the house."



Musco Martin began to rethink his work as an architect when he heard this sobering statistic: At least 40 percent of the world's raw and processed materials and fuel used each year are consumed in the construction of buildings, according to the Worldwatch Institute, the D.C. environmental research group.

He began by examining what's



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Candlelight meals help Andy Rudin and his wife, Joyce Chin, stretch the electricity generated from their solar system. Besides, they're romantic.

used. "Some materials are energy-intensive to make or they produce a large amount of pollution," he said. So it's better to find those that are less energy-intensive or use recycled materials.

"Vinyl as a building material takes a tremendous amount of energy to produce, whether it's vinyl siding or roofing made of plastic or any plastic component," he said. "[But] vinyl siding doesn't have to be painted, while wood siding does, so there's a cost associated with that."

The focus on materials includes those that affect the indoor environment, an area of special concern

since homes were made more airtight following the energy crisis of the 1970s.

When Martin renovated the kitchen of his Chestnut Hill home a few years ago, he tried to use what he was learning to choose environmentally sensitive products. Air-Krete, for example, was used for insulation between the inside wallboard and the stone wall.

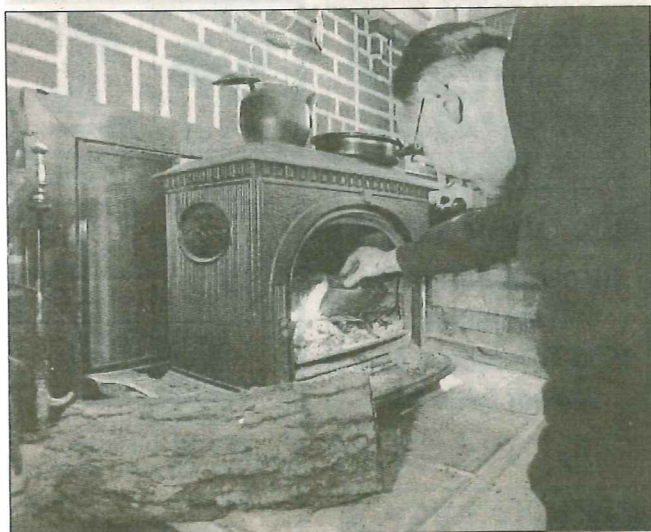
"It's made from something they extract from seawater," so there's no danger of emitting toxins, he said. Flooring and paneling came from a man who recycled wood. A water-based clear urethane finish was used on the cabinets. Martin was pleased that the major paint companies now produce paints that are low in contaminants known as volatile organic compounds (VOCs).

For those considering carpeting, he notes, "manufacturers have made strides in reducing the smell of it, much of which came from the backing for carpet and also the adhesives. You can now ask for low-VOC glues for carpeting."

Of course, he adds, there's nothing like a thorough airing to reduce fumes.

Keeping fresh air circulating is central to the way Paul Macht designs healthy homes. Key is the use of a heat exchanger, which the architect employed along with passive solar design when expanding his family's Rydal residence.

He wrapped the exterior of the enlarged building in a layer of rigid insulation to make it tight and to allow the masonry walls to act as thermal storage for solar energy. See **ENVIRONMENT** on E5



Andy Rudin stokes the wood stove in his living room. When more heat is needed, he calls on his high-efficiency gas boiler.

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The sun pours through a bank of windows Macht placed on the south side.

The heat exchanger, which is located in the heating unit, expels the warm, stale air from the house but not before transferring its heat to the air taken in. A low-velocity fan circulates the fresh heated air throughout the house.

A good time to consider this building strategy, Macht says, is when you're going to re-side or upgrade a home's mechanical systems.

"It's easy to accomplish and not much more expensive than traditional construction."

It's no secret that burning fossil fuels for electricity poses a serious environmental threat in terms of air pollution, global warming and water and land degradation.

Nuclear-generated electricity, meanwhile, produces waste that remains dangerously radioactive for 10,000 years.

But renewable energy being sold in the area, which comes from hydroelectric sources and landfill methane, is largely a clean product, says Liz Robinson, whose Energy Coordinating Agency of Philadelphia is the state host of Green E, a program that certifies energy supplies as renewable.

That leaves little financial incentive for most homeowners to generate their own solar electricity.

Addressing the high cost of solar-energy systems, Scott Sklar, executive director of the Solar Energy Industries Association, said, "We're sort of like where computers and cell phones were in the 1970s. We knew they worked, but we had to create economies of scale and remove market barriers to get lower costs to the consumer."

He attributes a rise in recent years in the number of households with an active solar electrical system to environmental awareness, along with deregulation of the energy industry in various states, and the reduction of barriers homeowners face in becoming solar while staying on the traditional energy company's grid.

The easing of barriers made it possible for Rudin and his wife, Joyce Chin, to proceed with their plans to install photovoltaic panels last summer.

"We saved up for it by living in an apartment for 10 years," said Rudin, a consultant on energy management to nonprofit groups. Three years ago, he gave up his car, which he says saves him \$6,000 a year. His wife, who inspects intermediate-care facilities for the developmentally disabled in Pennsylvania, maintains her vehicle for her job.

The couple chose their modest brick home for its good southern exposure and easy access to public transportation, as well as such other factors as its backyard, which they use to cultivate a luxuriant organic garden.

Pre-solar, they spent \$370 a year for electricity. They estimate it will cost \$130 post-solar to supplement what they can't produce. Electric meters they've attached to everything in the home, from the unheated aquarium to the energy-saving refrigerator, track usage and are a visual reminder that conservation is a house rule.

The solar hot-water panels, meanwhile, are too new for the couple to



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Architect Paul Macht shows the insulation that keeps his house addition tight and allows the walls to act as thermal storage for solar energy.

calculate savings, but Chin and Rudin ease hot-water demand by showering together and by doing their wash in cold water.

In the living room, a wood stove provides heat, and when that's not enough, the couple resort to their high-efficiency gas boiler. There's no TV downstairs.

"We don't watch much TV," said Chin. "We prefer to read and play games," she said, referring to the stack of board games on a coffee table.

Ron Celentano, who did the design work for the couple's solar

electrical system, says others don't have to spend as much as Chin and Rudin did. "You could spend \$10,000 and have a system similar to theirs that generates less electricity."

He also recommends having a backup system, which they don't have. "When Peco goes down," he said, "they don't have any batteries."

Chin and Rudin don't seem fazed.

After all, they have made candlelight dinners a matter of routine.

"I think blackouts are romantic," Rudin said, exchanging a glance with his wife.

For More Information

Here are some resources on home energy conservation and recyclable building materials:

- The local chapter of the American Institute of Architects' Committee on the Environment has compiled a resource guide for sustainable design, which includes a list of books, Web sites and providers. It's on the Web page: www.aiaphila.org/Resources/
- Clean Air Council's Indoor Air Pollution Information Center sells radon and lead-test kits and provides free guidebooks to indoor air pollution as well as lists of safer cleaning materials and fact sheets on government agencies' activities. Call 215-567-4004, Ext. 234.
- To contact Andy Rudin for further information on his systems or on energy management, call 215-635-1122.
- Paul Macht, a Rydal architect, is experienced in solar design; 215-572-7511.
- Campbell Thomas & Co. Architects in Philadelphia are experienced in solar design; 215-545-1076.
- The Solar Energy Industries Association's Web site has a directory of providers: www.seia.org
- Mayse Woodworking Co., Lansdale, recycles long-leaf yellow pine from industrial buildings. 215-822-8307.
- Building Materials Exchange offers surplus and salvaged building materials at low or no cost for low-income Philadelphians; 215-739-1600.