



Paul Macht, a big fan of passive solar energy, balances energy savings and aesthetics.

MICHAEL BRYNANT

## GREEN

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"This is a bad window," says Paul Macht, pointing out an expansive pane on the west wall of his living room overlooking Penn State's wooded Abington campus. "We loved the view, though, so we're willing to pay \$30 a year more in heat loss."

That's the kind of trade-off Macht can live with, but you can bet he gave it some thought. Primarily a residential architect, Macht spends his days weighing such issues: aesthetics versus energy efficiency, cost versus environmental sensitivity, ideal versus pragmatic.

Building his own home brought him face-to-face with a host of such issues. When Macht and his wife, Linda, bought the property 11 years ago, there was nothing green about the house. Actually, there wasn't much house at all, just a small cottage built in the 1940s.

"The windows had so many cracks in them, in the winter there'd be a sheet of ice on the inside," Macht says. In planning the addition that would house his family of four,

## HERE COMES THE SUN

insulation was key. Indeed, the wrapping of rigid insulation made it almost like an adobe house: "In the summer the walls actually absorb heat [instead of transferring it into the house] and then cool back off at night."

The house is also extremely "tight," with virtually no gaps or holes. That meant dealing with "weird, goofy places [where] air can enter or leave a building" — such as the electric outlets.

But when you make a house that airtight, you have to bring in fresh air. Macht installed a machine called a heat exchanger, which expels warm, stale air, but transfers its heat to the air taken in. The result: healthy air and energy savings.

Not surprisingly, a prime motivator for homeowners who want to build green is saving money. Good insulation saves money. So does harnessing the free energy of the sun. Macht is a big fan of passive solar, such as placing windows to make the most of the sun's heat.

In his house, the most significant passive solar wall is in the living room, which is

oriented to the morning sun. "The overhang is such that the summer sun doesn't come in and the winter sun does," Macht explains.

The proof of any energy-saving strategy is in the heating bill, and though their addition increased the size of the house by 300 percent, the Machts say their heating bills have remained the same.

They could probably have saved even more with solar collectors on the roof. Macht decided not to partly for aesthetic reasons, but also because the payback would have been unacceptably long.

"I only add something if it's cheap and pays back quickly. I'm mostly interested in things that just stretch standard technology practices to the tune of, at the most, 4 percent more expensive with a four-year payback. Solar reflectors right now have something more like a 15-year payback, though it's getting better all the time."

Aesthetics also matter to Macht. For his home, he opted for something of an English cottage look. "I was influenced by a lot of the children's books I read to my boys when they were young. The sloped rooflines, in particular, convey the archetypal image of home."

Simple green strategies that make sense aesthetically and economically include using readily available local materials. The sinks in the Machts' bathrooms are Pennsylvania black slate, which is relatively inexpensive because of low transportation costs. The towel rail and other fixtures are poplar and pine, made in stock wood sizes to simple designs easily assembled by a carpenter.

To minimize building waste, Macht left several of the wall cavities half open right up to the end of the project so he could throw the dry-wall scraps inside. Besides reducing waste, that also increased the thermal mass of the house, saving more energy. Extra wood from the construction — there wasn't much, since Macht had been careful to do his math right — was used to build a kitchen island, an armoire for the TV, and a coffee table.

Even the most energy-efficient house will carry a big environmental burden if its occupants have to get in a car each morning to commute to work. Macht solved that one by setting up his studio in a renovated chicken coop next to the house.

TOM BERNARD



Macht's home was influenced by the books he read to his children.