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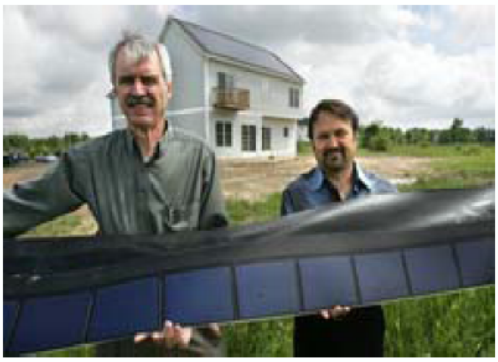

Thomas Ondrey/The Plain Dealer

Keith Kornell of TechMark Construction, right, and Alan Frasz of Dovetail Solar and Wind display a sample of the solar roof shingles that are atop the back roof of this Hambden Twp. home.

Building power into new home

Local firm uses solar shingles to energize new construction

Tuesday, June 12, 2007

John Funk
Plain Dealer Reporter

Keith Kornell is a small home builder offering something you can't get from the big subdivision contractors: solar power.

"I didn't have to do this," he said, standing in a three-acre yard looking up at the solar shingles gracing the rear roof of his company's just-completed Hambden Township colonial. "I did this because I think it's what we should be doing and I think Americans need to wake up to it."

The cloudy Geauga County skies seemed to say otherwise. But the electric meter agreed with Kornell. It was running backward - a beautiful sight to anyone who has paid FirstEnergy Corp.'s highest-in-the-state electric rates.

When it's not sending power to Cleveland Electric Illuminating Co., the 2,700-watt solar system is busy storing electricity in a 48-watt battery bank in locked basement cabinets.

If CEI's lines fail, Kornell said, the "deep cell" sealed batteries coupled with an inverter will supply regular AC power for up to four days to critical circuits - the sump pump, the well pump, the refrigerator and selected lighting.

Under law, CEI must accept the power the house is sending back - and credit the homeowner penny for penny until the net bill is zero. But the utility's remote rural system last week was doing its best to thwart the clean juice.

Voltage spikes -128 to 150 volts rather than the national standard 120 volts - appeared from time to time, forcing the sophisticated system to protect itself and temporarily shut down until the surges subsided.

Ohio utilities are supposed to transmit power at 120 volts but are allowed variances of up to 5 percent, according to state regulation. That means the voltage can legally sag to 114 volts or jump to 126 volts. A FirstEnergy spokeswoman said the company has been trying to track down the problem but hadn't found it as of Monday.

Still, in its first six days of operation, the solar array generated enough power to light 52 100-watt bulbs for 1,000 hours.

Given Ohio's spot on the globe and its weather, the home system should generate about 3,225 kilowatt-hours per year, estimates Alan Frasz, the solar contractor for the house and vice president of Dovetail Solar & Wind of Chagrin Falls. That's not all that much less than it would generate in a place like Southern California, he said.

It's a startling claim, but the U.S. Department of Energy's National Renewable Energy Laboratory in Golden, Colo., backs it up with a Web-based calculator estimating the average productive capacity of solar systems, based on location and climate.

The calculator (go through tinyurl.com/ywg7rv) shows that a solar array in Greater Cleveland can be expected to generate about 75 percent of what one in San Diego typically generates. The system, including the backup battery power addition, was expensive - about $30,000. But a state grant of nearly $10,000, a federal tax credit of 30 percent of the total cost and accelerated state and federal depreciation schedules made the net cost about $5,000.

"We did not add this and mark up the price. We discounted the solar in the [$295,900] price of the house," Kornell said.

Pointing to the neighboring homes that have sold for as much as $308,000, Kornell argues that "the actual cost of solar could disappear very easily when competing in the real estate market."

At today's electric rates, it will take more than a dozen years for the system to pay for itself in lower electric bills. But if the state deregulates rates as scheduled in 2009, allowing utilities to charge whatever the market will bear, the payback time should quickly shrink.

Whoever buys the Hambden house won't be able to cut the wire to CEI, however, no matter what the rates are.

The annual sun power will be enough to replace a quarter to a third of the average residential consumption here, which is about 750 to 1,000 kilowatt-hours a month or 9,000 to 12,000 a year.

But then this home is average in only one sense, its size: 2,150 square feet. All the appliances, the furnace, air conditioning and lighting meet federal Energy Star specs, said Kornell. Combine those efficiencies with solar output and you get electric bills that should be about half what the neighbors in similar homes are paying, he said.

With densely packed cellulose insulation in the walls and attic, Energy Star-rated windows and doors, an extra-deep basement and ceiling fans in the bedrooms with cathedral ceilings, the house is not only an electric miser.

It should also be economical to heat, especially since it is equipped with a high-efficiency gas furnace and "tankless" gas water heat that burns fuel only when hot water is needed.

This is the fifth house Kornell has built under the name Tech Mark Inc., a four-year-old company he operates out of his first business, Crown & Kornell, a Willoughby-based plastics recycler.

He said he became interested in advanced technologies such as solar and wind while looking for stock investing opportunities.

Then, after attending a workshop a year ago sponsored by Green Energy Ohio, a group advocating solar and wind generation, Kornell decided his next house would include solar - not only because of predicted higher electric prices but also because of global warming.

With Europe moving aggressively into solar and wind projects, U.S. utilities are falling behind technologically, he said.

"Aside from all this, whether you believe it or not, this house in 25 years, will save 140,000 pounds of greenhouse gas. Take that and multiply by all the new houses in Geauga County. It would be a massive amount. I am hoping to make that point with this first house."

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There are a couple of erroneous items in this PD article.
John meant to say 48 volts for the battery bank, not watts. The battery bank is made up of qty. 8 deep cycle 6volt, 390 AmpHour AGM batteries wired in a series. For a total of 18,720 WattHours. We typically recommend that the batteries are discharged no more than 50% to prolong battery life. Therefore, the home has about 9,000 WattHours of useful power for emergency backup.
As far as power generated over the last 6 days, John was trying to explain in more common terms that the system had produced approximately 52 kWh He said that that was enough power to light 52 x 100 watt bulbs for 1000 hours. That would be 5,200,000 watt-hours of electricity. He was just off by a 1,000 in his decimal points. He might have said something like the generated power could light qty. 10 100watt bulbs for 52 hours. Or using more efficient 14 watt CFLs (which is what the house actually uses), the generated power would have been able to light 10 bulbs for 371 hours.
Finally, Keith and I estimate that the solar shingle system will provide approximately 50% of the annual power for the house because of its energy efficient design and appliances, whereas John states 25% to 30% several places in the article. That one we'll have to see on once the house is purchased and occupied.
Alan R. Frasz