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Solar Roofing Materials

Integrating solar cells into building materials could make solar power more attractive to homeowners.

By Alexandra M. Goho

In an effort to promote the adoption of solar technology, United Solar Ovonic of Auburn Hills, MI, has teamed with a major roofing company to create a metal roof system that generates electricity from sunlight. The partnership offers seven different prefabricated systems, ranging in capacity from 3 to 120 kilowatts. Tests show that the solar roof panels are rugged and can withstand winds in excess of 160 miles per hour.

In addition to being more aesthetically pleasing than bulky rooftop-mounted panels, solar roofing materials can cut the cost of household solar installations by doing double duty, generating electricity while protecting buildings from the elements. "Ultimately, if you can use one product to do two things, you can save a lot of money," says Cecile Warner, principal engineer at the National Renewable Energy Laboratory's National Center for Photovoltaics, in Golden, CO.

Building-integrated photovoltaics (BIPV) have been around since the late 1980s, Warner says, but only lately have they begun to see some success with large commercial and residential developments. Recent advances in flexible thin-film photovoltaic materials--such as those sold by United Solar--are allowing manufacturers to more easily integrate photovoltaics directly into the roofs and facades of buildings.

Nonetheless, many builders remain leery of the new technologies. "In the past, people in the construction industry have been burned by trying out new products," Warner says. In particular, she says, they're wary of products that would be difficult to recall should they prove defective. Roofing materials certainly meet that description. "I think that's probably been the sticking point all along," Warner says.

EnergyPeak, the partnership between United Solar and Pittsburgh-based Centria Services Group, is an attempt to allay this skepticism. "We worked with Centria to develop a program that would get our product out to a number of small installers because Centria already has the infrastructure to do this," says Marcelino Susas, vice president of strategic marketing at United Solar's parent company, Energy Conversion Devices, based in Rochester Hills, MI.

When solar companies partner with construction firms, "it gives the product a lot more credibility, and it helps to break down the barrier to adoption," says Warner.

Centria designs and assembles the solar roof systems using United Solar's adhesive thin films, which can simply be peeled off of their backings and stuck to the roofing materials. The company then distributes the final product through small metal-roofing manufacturers that do the installations for building owners and architects. EnergyPeak comes with a 20-year warranty and, depending on the state in which the solar roof is installed, could pay for itself in less than 10 years, Centria says.

Because United Solar's materials are flexible and lightweight, they can be easier and cheaper to install than conventional crystalline-silicon solar cells, and they can be applied to curved roof designs, says Susas. United Solar's amorphous-silicon photovoltaics also perform better than conventional crystalline-silicon solar cells under low light and high temperature, he says.

"BIPV is very interesting because it offsets some of the costs associated with installation and will probably occupy

a larger market share of the residential portion of the market," says Michael Locascio, a senior analyst with Lux Research, in New York. "But that portion is very small," he adds. That's because BIPV systems are primarily limited to new home construction or situations in which the owner needs to replace the roof.

And although the adoption of solar power is growing fast, Locascio cautioned that the future of the industry, at least in the United States, is uncertain. The federal Investment Tax Credit, one of the key incentives driving the adoption of solar power in the United States, is set to expire at the end of the year, and it is unclear whether Congress will extend it.

Currently, Europe remains the largest market for BIPV and solar products in general, says Susas. "There are very high incentives for BIPV in Italy and France." For instance, United Solar currently sells its solar laminates to a large asphalt-shingle manufacturer in Italy that supplies residential clients with solar shingles.

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