

## **Someday soon, a solar world**

*By Jim Austin, associate editor*

The 1970s ... people remember the decade fondly for a variety of reasons. Like any past decade, it's now viewed as a simpler time. It will also be marked as the decade of the first energy crisis in America and around the world. An oil shock in 1973 led to the rationing of gasoline in many countries, including the United States.

During the shortage, many began seeking out energy alternatives, including a growth in the interest of solar energy, a source first turned into mechanical power almost 150 years ago. A lack of public interest and support squashed its success in the 1800s and for the most part, again in the 1970s. A more educated America realizes today that at some point, alternative energy sources will be a necessity, not just alternatives. Many believe a little support from the government would go a long way toward a significant shift to a greater use of solar energy and the fate of repetitive history. So would a reduction in the cost of solar energy gathering systems, which will have to be done through better technology.



Metal roofing has a huge place in the future of solar energy production — more and more metal roofing manufacturers are poised for any substantial growth spurt. No one is sure when it will occur, but many are confident it will.

## **Metal is where it's at for solar**

"Honestly, I'm excited about the potential," says Kevin Corcoran, Englert vice president of business development. "To me, there's not a better platform for solar integration than metal."

The first and only residence with a metal roof to earn a Platinum score according to the U.S. Green Building Council's LEED rating system was made possible in part by Englert, which donated the roofing and installation labor on the Paterson, N.J., home. With its Ultra-Cool coating from BASF, and solar energy systems from Dawn Solar (integrated into the roofing system) and United Solar Ovonic (laminated panels on the standing seam roofing), Englert's metal roofing system played a large part in the successful LEED rating of the project.

Manufacturers of solar energy collectors want to incorporate their products with any roofing system possible — they want to sell product like anyone else. Metal roofing is most compatible with most of those systems. The belief is interest in putting the two together can only grow both industries.

Corcoran believes both the metal roofing and photovoltaic industries are ready for that boom when government incentives become significant enough to excite the general public.

United Solar Ovonic, or Uni-Solar, is positioning itself for growth by building 12 manufacturing plants before 2010 to meet what it forecasts as a greater demand. The company's goal is to work its product into the mainstream through existing building channels and one of those channels is metal roofing. Another is membrane roofing. Currently, Uni-Solar is not designing products for wall installations. "We're sticking to the roof because that's where the sun shines," says Dennis Witte, Uni-Solar's director of marketing and engineering.

Uni-Solar laminated PV cells are currently best suited for installation on Galvalume roofing and prohibited from installation on copper and some aluminum panels, according to Witte. He expects someday the company will have products for those materials, which expand and contract more than Galvalume. He says manufacturers of those materials with higher thermal expansion are working on solutions to those problems themselves because they don't want to be left behind when the solar market takes off.

“Right now, the solar market is the bigger commercial and industrial players, the GMs and Wal-Marts,” Witte says. “Companies like Staples and Walgreens are marketing themselves as green companies. That generates a lot of positive community interest.”

Witte says two Wal-Mart stores, one in Colorado and one in Texas, have installed Uni-Solar film cells and the solar energy collectors of two other manufacturers as a test. Metal roofing will likely be a part of the “winning” results. He says some metal manufacturers believe their ability to work so well with a variety of solar products creates the next great “differentiating opportunity” for metal roofing over metal roofing competitors.

Dawn Solar Systems was founded in 2004 to develop solar energy systems that preserve architectural aesthetics while reducing energy costs. The company’s mission “is to increase the adoption of solar energy in homes and commercial buildings by providing products easily integrated as structural elements of buildings, not peripherals.” The Dawn Solar system completely integrates into building architecture under virtually any exterior roof (or wall) materials without complex issues.

“As Dawn Solar grows, we continue to extend compatibility with as many roofing and siding systems as possible,” says Bill Poleatewich, co-founder of Dawn Solar. “Our systems can already be built with many exterior roofing and siding materials, such as metal, slate, asphalt, membrane, cement, ceramic — and even photovoltaic roofing.

We want to ensure compatibility with as many roofing systems as possible in terms of both installation and energy transfer.” Poleatewich says Dawn Solar solar thermal energy roofing systems are compatible with roofing products manufactured by Englert, ATAS International, Berridge Manufacturing, and Decra Roofing Systems, among others. They also work well with retrofitted systems such as the Roof Hugger.

Brian Partyka, president of Drexel Metals, first became interested in solar roofing with Drexel panels at the 1999 METALCON trade show in Chicago. Drexel Metals did some testing with Uni-Solar laminate thin film solar products and the results were positive, according to Partyka. “It should be noted that metal roofing provides the perfect platform for the laminate as well as the crystalline solar collectors,” he says. “We’re investigating the idea of integrating both technologies in the same project.”

Drexel officially took the solar plunge by introducing DrexelSolar in late 2006. DrexelSolar systems provide homeowners and commercial building owners with the chance to install renewable-energy metal roofs, many that qualify for federal and state tax credits and LEED credits. Partyka says Drexel is fielding approximately 15 queries a week about DrexelSolar.

Crystalline solar collectors, manufactured by companies such as Sharp, Shell Solar, Sanyo, BP Solar, Kyocera, and RWE Schott Solar were the original solar systems, according to Rob Haddock of Metal Roof Innovations and patent holder of the S-5! clamp. The clamp is effective for the installation of crystalline systems because it doesn’t penetrate the roofing system — it clamps onto the standing seam.

Haddock believes the crystalline systems are more durable, lasting up to 30 years. “Thin film systems perform better in low light situations,” Haddock says. “In bright light, there’s no contest. The crystalline systems are far and away output more than the thin film. The hard figures I’ve heard are anywhere from 50 to 60 percent more.

The Garland Company has the ability through partnerships and agreements with various manufacturers and solar developers to design, deliver, and install solar electric with metal roof systems for commercial, industrial, and institutional clients, according to Bill Kenny. “The electric generating roof is designed for project-specific requirements,” he says. “Once energy calculations are completed, then the parameters of KW required, roof area needed, weight restrictions, and exposure to vandalism will determine the type of solar technology to be installed on the metal,” Kenny says.

Currently, the two main proven technologies Garland employs are thin film and crystalline, both mono- and poly-crystalline. The thin film has the advantage of being lightweight, flexible and very durable against vandalism, particularly with schools. The disadvantage is that you need approximately twice the roof area to achieve the same electrical output as the heavier crystalline panel on S-5! clips.

### **The role of government**

In California, there are monetary incentives to use solar products. Who can resist that? "It's a no-brainer to go with solar," says Paula Grider, an architectural representative for McElroy Metal. For many commercial projects, she says the payback can come in as little as five years and a little longer for residential applications.

McElroy Metal first built a relationship with Uni-Solar about 10 years ago by providing the photovoltaic laminate manufacturer with metal panels for testing. "It was pretty expensive back then and wasn't taking off like a ball of fire, but because of the incentives provided by government entities and energy suppliers, it has started to snowball and it will continue to grow," Grider says. "Solar growth is estimated at 30 percent per year."

Grider says she was intrigued with the Uni-Solar product when she first saw it. She and other McElroy reps took a tour at the Uni-Solar facility in Auburn Hills, Mich., and she immediately saw the potential for her market. "Some of the others didn't get it because there wasn't and isn't a big demand in their areas," she says. "I really grabbed on to this project."

In an attempt to appeal to those customers looking for "green" systems, McElroy has packaged a metal roofing envelope with four green products — StrongSeal underlayment is comprised mostly of recycled tires; the company's own metal roofing panels, manufactured from recycled materials; Valspar coatings that meet reflectivity and emissivity requirements; and the Uni-Solar PV laminates. "People in California are trendsetters, they think outside the box and this is an idea that appeals to them,"

Grider says. "Sometimes, we have to throw ourselves into another industry to understand and appreciate the value, but it all works with metal."

She says in California, consumers hear about green roofing, cool roofing, and the heat island effect. They are in tune with environmental issues — some because they care about the environment and some because they care about the incentives. Either way, metal can be at least a part of the solution.

### **The future**

Because these systems add significant cost to a roofing system or a building project, does the federal government hold the keys to the success of solar energy use?

"There are two things that have to happen. First of all, we have to create more or greater incentive avenues, and second, we have to drive down the cost of the product and installation," Witte says. "We feel we have the obligation to do both."

Partyka says, "It's going to take enough grants, enough federal dollars, and enough incentive for people to get excited about it."

Think about the potential for excitement. "Customers now have the choice between a long-term standing seam metal roof and one that produces electricity," says Kenny of Garland. "These applications can be installed on properly prepared existing roofs as well. The future is exciting!"

The advent of various composite technologies and advances in finishes and coatings is allowing us to explore the development of a monolithic energy producing metal roof system. The idea is that the photovoltaic cells will be built into the finish of the metal. This concept will address ease of application, consistency with factory quality control, eliminate weather problems and contractor field error. The other benefits are that this will make the most productive use of the space available, lower the weight requirements, and, of course, address the aesthetics of the building."

Obstacles exist for the metal roofing industry and the solar energy industry. Both industries are working to overcome them or at least minimize them. U.S. Metals of Denver distributes metal roofing systems and/or coil for Drexel, Englert, RHEINZINK, and Coated Metals Group, handling steel, aluminum, copper, titanium, and stainless steel. Elliott Boyle says U.S. Metals is also certified to distribute Uni-Solar's laminate panels for use on standing seam roofing. For contractors and installers who are intimidated by the new technology, Boyle has a story.

A Drexel roofing system was recently supplied — with minimal jobsite tutoring — to an ambitious do-it-yourselfer, according to Boyle. All alone, a retired electrician installed RHEINZINK shingles, Drexel Metals 1-1/2-inch standing seam panels and the Uni-Solar PV laminates on his Colorado residence. "I honestly thought he'd be back in two weeks looking for an installer, but he stuck it out," Boyle says. "It's one of the best self-installs I've seen."

Boyle says the man had been chasing down information for about two years and finally decided to take on the project last summer. With no help, he completed the job in about four months. Boyle estimates a professional roofer would have done the job in 3-4 weeks and a crew would have been in and out in 1-1/2 weeks.

The Drexel Galvalume 1-1/2-inch standing seam profile was chosen because Uni-Solar will not warranty an installation on zinc because it expands and contracts more than Galvalume. Drexel's pre-weathered Galvalume was a close match to the color of the RHEINZINK shingles. In the Colorado mountains, where summer temperatures can rise to 90 degrees during the day and drop into the 30s at night, the accompanying thermal expansion could certainly have an effect on the laminate. (Boyle says the install is not covered by warranties from RHEINZINK or Drexel because a certified installer did not install the roofing.)

Haddock says it's simple math. If someone is paying 9 to 11 cents per kilowatt-hour, paying to install a photovoltaic system doesn't make much sense. In Germany, he says customers are paying 19 to 21 cents per kilowatt-hour. "Then it's a whole different story," Haddock says. He says Germany and Spain are proactive European countries when it comes to incentives initiated by regulators. In the U.S., there currently are a number of states that offer incentives — Haddock cited California, Colorado, Hawaii, New York, New Jersey, Florida, and Illinois as the most proactive. That's a short list.

"And one of my pet peeves is that so many of the programs are tailored for residential installation, small jobs," Haddock says. "To me, that doesn't make sense if you're looking to reduce the demand on the electrical grid. The bigger projects should have equal or greater incentives."

Still, Boyle is excited about the possibilities of solar roofing in the Centennial State. "From what I've heard, Colorado offers the highest rebate of any state in the country," he says. "It costs about \$7.50 per watt to purchase the equipment for this type of installation and Colorado offers a rebate of \$4.50 per watt generated, so the install cost is about half covered by the rebate. Instead of a 30-year payback, now it's like 10 years." Which means the next decade could be one as fondly remembered as any in the metal roofing and solar energy industries.