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ENERGY

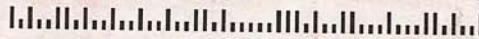
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GET INVOLVED IN ALTERNATIVE ENERGY

BY DAN PERKINS

A METAL
ROOFING
CONTRACTOR
DISCUSSES
HIS ROLL IN
ALTERNATIVE
ENERGY



Amorphous-film photovoltaic laminates are adhered directly to standing-seam metal roofs. Photo courtesy of Uni-Solar, Auburn Hills, Mich.

THE MANUFACTURE AND distribution of energy in forms usable for consumers and industry arguably is the most crucial endeavor the human race ever has pursued. Almost every major advance in technology, food production, transportation and lifestyle can be directly linked to the discovery and development of energy sources.

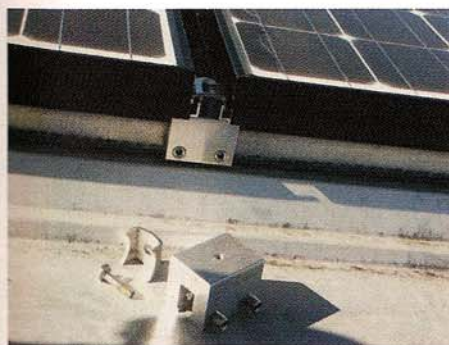
Energy is not scarce. Abundant energy surrounds us in many forms: wind, sunlight, tides, geothermal heat, and a myriad of chemical processes that either absorb or release energy. Fossil fuels hold energy harvested by plants for millions of years using sunlight to separate carbon from carbon dioxide (CO²) molecules. As we burn fossil fuels, carbon is reunited with oxygen releasing energy and CO².

There is no shortage of fossil fuels. The easy ones to get and manufacture are giving way to more expensive versions, but that is a good thing. The dawning of a new age of alternative energy is upon us, and higher-priced energy is a necessary component for the development of this new industry.

ROOFTOP SOLAR ENERGY

The alternative energy technologies of interest to metal roofing contractors are the ones on metal roofs. These technologies currently include a variety of photovoltaic modules, hot-water units and air systems. Other new ideas are being developed all the time. The question for our industry is whether one or more of these technologies will integrate well with metal roofing and emerge as mainstream roof systems to replace or modify our current nonenergy-producing ones. What part can we play in bringing these advances to our trade?

[BUILDING GREEN]



TOP: This glycol-based system from Dawn Solar Systems Inc. uses metal roofing over a proprietary thermal purlin and multiple circuits of tubing to pull heat off rooftops for heating and process cooling applications. Hybrid applications of the system will produce solar electricity and solar-heated water from the same roof plane. *Photo courtesy of Dawn Solar Systems, Brentwood, N.H.*

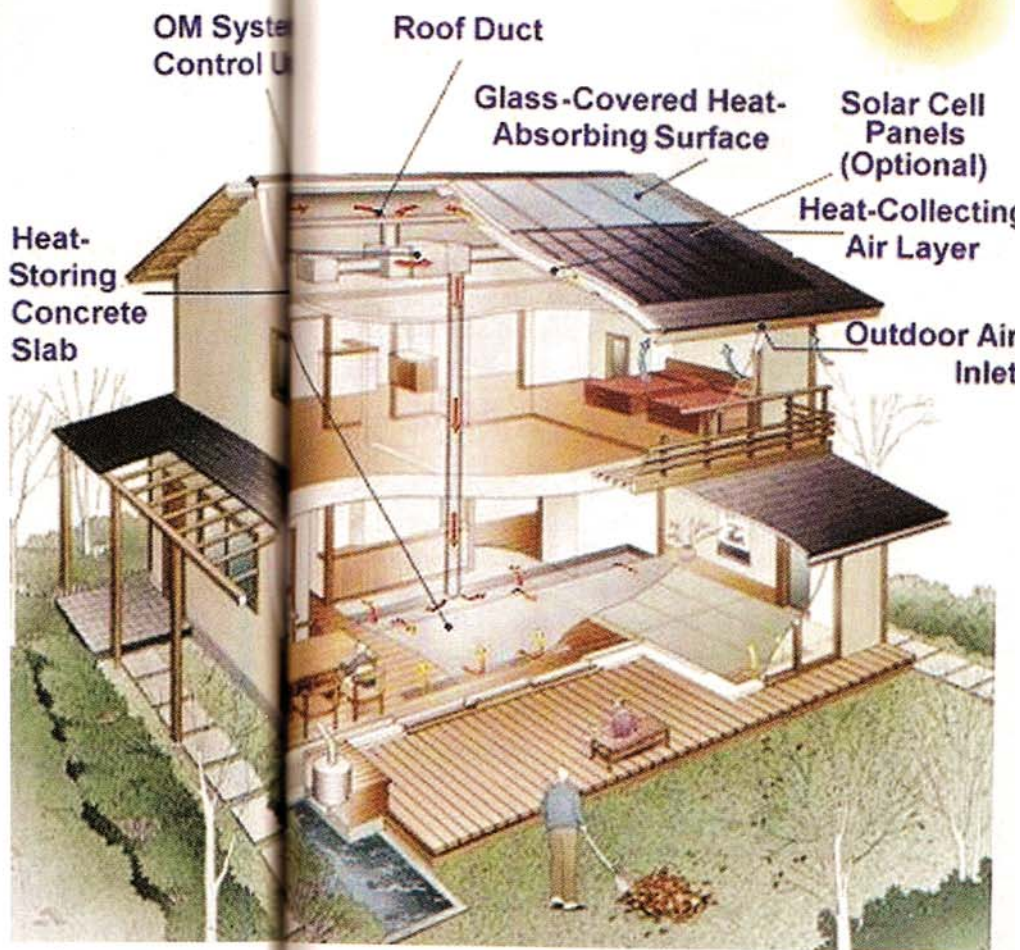
BOTTOM: S-5! clamps can be used to attach crystalline photovoltaic modules directly to standing-seam metal roofs. *Photo courtesy of Metal Roof Innovations Ltd., Colorado Springs, Colo.*

CURRENT PHOTOVOLTAIC TECHNOLOGIES

Silicon Modules

Photovoltaic systems run on photons or visible light. Silicon molecules become energized when struck by photons and send electrons flying randomly in photovoltaic cells. These electrons are channeled into direct-current circuits with positively and negatively charged doping agents. The standard photovoltaic module currently takes the form of an aluminum-framed glass-encased panel that can be mounted on roofs or freestanding poles. It typically harvests 12 to 16 percent of the energy available to it in the visible light spectrum with cells made from large factory-grown silicone crystals. These crystals are sliced to build single-cell modules or shattered and reformed into multicrystalline modules. These modules can be mounted directly onto the ribs of standing-seam roofs.

In 2002, I saw Rob Haddock, president of Metal Roof Innovations Ltd., Colorado Springs, Colo., and inventor of S-5! attachment technology, at the American Solar Energy Conference in Reno, Nev.



ABOVE: OM Solar has developed a system to move and store energy from hot air generated in a roof system. This was developed in Japan and recently has begun to make inroads in the United States. *Illustration courtesy of OM Solar, La Canada, Calif.*

He was promoting his S-5! mounting blocks to photovoltaic module manufacturers. This technology now seems to be the standard mounting system used for modules on metal roofs.

Amorphous Film

Amorphous film is a noncrystalline type of photovoltaic cell that is made with micron thick layers of silicon and doping agents deposited into metal sheeting or glass. Some of these have been designed specifically for use with metal roofing, such as Auburn Hills, Mich.-based Uni-Solar's photovoltaic laminates made to adhere directly onto standing-seam metal panels.

Industry leaders involved with this type of photovoltaic product include: Kevin Corcoran and Richard Welton of Englert Inc., Perth Amboy, N.J., (800) 898-7573; Richard Carol and Brian Partyka of Drexel Metals Corp., Ivyland, Pa., (888) 321-9630; Paula Grider of McElroy Metal, Bossier City, La., (310) 515-6648; and Steve Hecheroth of ECD Solar Systems LLC, Albion, Calif., (707) 937-0338. David Cocuzzi

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and Harold Schroth of Akzo Nobel Coatings Inc., Columbus, Ohio, (614) 298-1832, are responsible for much of the testing of these products on coated steel.

Heat Collection Systems

Heat energy also can be collected on rooftops. A number of approaches have been

pursued that move and store heat generated from a roof system. OM Solar, La Canada, Calif., (415) 331-3702, creates an example of a successful version of this type of technology. The OM Solar system was developed in Japan and recently has begun to make inroads in the United States.

A glycol-based system developed by Dawn

Solar Systems Inc., Brentwood, N.H., (800) 803-1476, and certified by the Florida Solar Energy Center, Cocoa, Fla., (321) 638-1000, uses metal roofing installed over a proprietary "thermal purlin" and multiple circuits of tubing to pull heat off rooftops for heating and process cooling applications.

Hybrid applications of this system now under construction in Connecticut and New Jersey will produce solar electricity and solar-heated water from the same roof plane. These applications use a Dawn Solar System installed under the metal roof and Uni-Solar thin-film laminate panels bonded to the metal rooftop.

METAL CONTRACTORS AS INNOVATORS

Contractors who manufacture their own roofs onsite are continually developing new ways to apply products or make their operations more efficient. It takes a special personality type to buy the equipment necessary to do what we do, given that this is a time when our industry still is relatively young and everything from estimating procedures to manufacturing techniques to trim detailing still are being developed. This type of personality is exactly what is required to take these emerging energy technologies and convert them into building integrated roof systems.

Our industry's trade organizations (namely the Metal Construction Association), manufacturers and coil coaters exemplify this drive to evolve and progress, as well. This is witnessed in the recent development and promotion of cool-roofing pigments. This advance has opened doors and opportunities for all of us. Alternative-energy technologies hold far more potential in the long run, but the quality and effectiveness of the systems developed have everything to do with their success.

The rooftop energy-generation vision is not fully formed, but the prize will go to those who develop it. I am confident the people who make up our industry have as good a shot at it as anybody. ■

Dan Perkins is a metal roofing contractor in northern Michigan who has worked with photovoltaic product development on a California Energy Commission grant team and continues to promote rooftop energy-generation systems within the metal roofing community. He can be reached at (906) 485-2045 or danperkinsroof@aol.com.