

# 40 BILLION REASONS

## MARRYING METAL ROOF SYSTEMS WITH THIN-FILM PHOTOVOLTAIC CELLS

BY BRIAN PARTYKA

**Fact:** 16 percent of all electricity generated in this country is used to air condition buildings—about \$40 billion a year ([www.energystar.gov](http://www.energystar.gov)).

Building owners, homeowners and architects have about 40 billion reasons to explore alternative, cooler roofing options to minimize energy costs. Certainly this can be accomplished using painted metal. Here are some facts about the benefits of an energy-efficient metal roof:

- Reduces the amount of heat transfer into the building
- Keeps roof surface temperature down
- Reflects sun's rays rather than absorbs them
- Cools very quickly
- Composed of recycled materials
- Has a flat surface

You may question why flat is a benefit. However, consider the perfect surface for a solar panel—flat and wide. A 16-inch- (406-mm-) wide surface is ideally suited to receive a laminate of thin-film photovoltaic solar cells. The combination of a cool metal roof system, which carries an Energy Star approval, and a solar panel fully integrated into the roof system presents an excellent method to conserve energy and harvest power. It sounds too good to be true, but true it is. And with further education within the metal construction industry and training programs for metal roofing contractors who aspire to add additional value to their customers, these systems can be easily installed.

### Solar

The solar panel concept is designed to convert daylight into electrical energy that will reduce a building owner's/homeowner's energy bill. For instance, Uni-Solar ([www.unisolar.com](http://www.unisolar.com)), Auburn Hills, Mich., is a manufacturer of a thin-film amorphous silicon PV laminate that works in unison with a metal roof system. This newer thin laminate is lightweight and flexible. These attributes and the product's simple peel-and-stick application method combine for a relatively simple installation (see the step-by-step installation process).

The manufacturer's role does not end with simply supplying the energy-efficient roof system. The conscientious manufacturer also provides the system designer with the roof plan and elevation to

ensure the proper design and installation of the BIPV, or building-integrated photovoltaic.

The metal roof and solar system costs are quoted, for the most part, separately. While it is an integrated system and the metal roofing contractor and PV contractor work closely throughout the design and installation process, both account for their costs in different ways. In most instances, the metal roofing contractor installs PVs onto the metal roof panel, leaving set up and completion of the project to a PV system installer. Because some federal and state incentives require certification of PV installers, the process is different in some areas, such as New York.

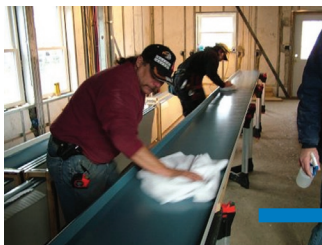
Here is the step-by-step installation process:



A trained metal roofing contractor installs the BIPV laminate directly onto a metal roof panel at the job site.



The roofing contractor completes the PV installation.



The metal roof panel is laminated with the thin-film PV.



The metal roof panels are installed by a trained metal roofing contractor.



Almost complete!



Work is in progress.



Ridge detail.



Metal roofing contractors, such as Dan Perkins of Dan Perkins Construction Inc., Ishpeming, Mich., have created and modified ridge caps to accommodate the wiring requirements of BIPV systems.



Drexel Metals, Ivyland, Pa., has matched the painted metal roof to the color of the PV laminate to make the system more attractive to the homeowner.

## Gaining Awareness

Building owners and homeowners have stringent requirements for PV systems. A system must be aesthetically pleasing; it must be cost-efficient; and it must provide the greatest amount of energy return.

According to the Energy Policy Act of 2005, homeowners who install a metal roof that meets Energy Star qualifications on their primary residence are entitled to a one-time tax credit of up to \$500 within the year the roof was installed (2006 and 2007). A metal roof is the only roof system that currently qualifies for this reward.

Further research can be conducted to find federal incentives or grants available to help fund a project. DSIRE, or Database of State Incentives for Renewables and Efficiency ([www.dsireusa.org](http://www.dsireusa.org)), is a comprehensive source of information about state, local, utility and federal incentives that promote renewable energy and energy efficiency.

Architects are likewise gaining awareness of PV systems and want easy access to system design and cost. (The system requires, for example, that the architect design the structure with a southern exposure for maximum results.) Benefits of maximum integrated PV system design efficiency include possible qualification for renewable energy and metal roof LEED credits, important design goals for many architects.

The technology and resources are available to architects, contractors, building owners and homeowners who are interested in learning more about the installation methods (see “Resources”). Sustainable design is vital to conserving natural resources and creating energy-efficient buildings. The energy savings of a metal roof using reflective pigments combined with the energy generation of a PV laminate is a marriage built to last.

While it takes a little education and research to get started on a sustainable project using PVs, the benefits are well worth it. We should be concerned with the amount of energy and resources consumed, and future generations will benefit from our efforts. ■■

*Brian Partyka is president of Drexel Metals Corp., Ivyland, Pa., and a member of the Cool Metal Roofing Coalition and Metal Construction Association.*



