Right now, rooftop solar applications account for only 2% of the entire commercial roofing market. Clearly, huge opportunities await solar professionals, particularly in the building-integrated photovoltaics space.

Know Your Roof: Photovoltaic Installations Beyond Mounting Panels

There is a tremendous market for commercial rooftop PV installations, but many functional considerations must be addressed during planning.

■ Markian Duma

We are all well aware of the figures outlining the exponential growth the solar industry is experiencing. There are various local and government incentives and credits offered for installing and utilizing renewable energy.

According to the U.S. Department of Energy, the Solar America Initiative seeks to have the electricity produced from photovoltaic systems be competitive with conventional power sources by 2015. But today, the investment in PV in the U.S. is still considered by many to be very costly.

PV installations on commercial roofs in the U.S. today constitute only a very minute fraction of the commercial roofing industry. An article recently published in the August 2008 issue of Professional Roofing mentions that rooftop solar applications account for only 2% of the entire commercial roofing market. To date, companies taking advantage of commercial roofs are generally major national and regional retailers.

It seems there is a tremendous market for rooftop PV installations, which vary widely in assembly and application - from traditional rack-mounted systems to PV attached to rooftop insulation panels, where the insulation is in direct contact with the roof.

In principle, building-integrated photovoltaics (BIPV) can be added to a structure after it is constructed, but the idea is to integrate PV when a building is being planned. BIPV systems can be integrated as part of the facade or roof - rooftop applications, by far, comprise the largest piece of the pie when compared to all other BIPV applications.

So far, BIPV systems have been considerably more expensive than more traditional roof- and ground-mounted PV systems. However, BIPV's popularity is growing, and some industry observers anticipate that when PV reaches grid parity, BIPV systems will become the industry standard.

The role of roofs

Whether you are working with a manufacturer or installer, or involved

with a power purchase agreement, an engineer will more than likely be involved with reviewing the system and facility. However, the engineer typically does not focus on the roof system in detail. Instead, the roof/PV integration is usually inspected and evaluated by a roofing expert.

Unfortunately, it is common knowledge that roofs are typically ignored until they begin to leak or create other problems - and roofs can prove to be nightmares *without* the involvement of PV systems.

Roofs form an integral part of the building envelope. Primarily, the roof acts as a barrier to shield its occupants from the elements. But in many applications, they also incorporate insulation in the assembly, which, in turn, aids energy-conservation efforts.

Commercial or low-slope roofing is basically broken up into two categories: singly ply and bituminous. Most bituminous systems do provide a good platform or base for PV applications. Bituminous systems are often referred to as modified roofs or built-up roofs.

On the other hand, single-ply systems are single-layer roof membranes. Not all single-ply systems offer a good base for PV applications. Other than roofs that are fully adhered, some alterations may be required in order to minimize the flutter or flapping of the membrane.

In many roof systems, one will find insulation under the membrane. The roof insulation primarily acts as a buffer for the building exterior and also serves as a base for the roof membrane. Additionally, it can be tapered or used to provide positive drainage on the roof.

Roof systems also can incorporate guarantees. These guarantees can vary in terms, as well as in levels of coverage. Typically, roof guarantees can vary anywhere from 10 to 20 years. Their coverage can encompass all labor and material for the term of the guarantee or only include coverage for materials.

Numerous circumstances can contribute to roof failure. As it relates to PV applications, the roof must be protected during installation. Most roofs are not designed to accommodate high traffic, because this burden can cause excessive wear of the roof membrane. Also, the various tools and materials used in a PV installation can contribute to excessive punctures or compromise penetration flashings (such as simple vent stacks to conduits and steel supports).

Some PV applications are minimally evasive, while others may require the system to have numerous penetrations. It is common for those who are not familiar with roof applications to use materials that are not compatible with a roof in an effort to provide a waterproof seal.

This is an area where an expert should be involved in the PV design stages as early as possible. The roof system needs to be investigated prior to installation, and the expert should be able to provide information about the proper products and their applications. In some cases, a guarantee that is in place might become void if the proper protocol is not followed.

The roofing industry

There is only a small handful of spinoffs from roofing firms that are dedicating their efforts to PV and BIPV applications. For roofing companies, the use of PV is still very much in its infancy.

However, many progressive roofing companies see the opportunity in BIPV systems, and some have teamed up with roof-system manufacturers to promote new roof systems - systems that carry guarantees covering both the roof system and the PV/BIPV component.

In other instances, some roof-system manufacturers have partnered with PV providers to offer a comprehensive line of products and guarantees for the roof and PV system.

Regardless of the type of PV application, be sure to do your homework. Closely review the roof, or have someone on your team who is an expert in roofing (and has intimate knowledge of the proposed PV system) assess the planned installation.

If a roof has been evaluated and all of the remedial work has been done, why should you still be concerned? As previously mentioned, the high volume of traffic and penetrations may compromise the roof system. So, it would be wise to have someone assess the project before the installation, as well as monitor the entire assembly of the PV system, in an effort to protect the structure, the property owner and the building's occupants.

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