



# Professional Roofing

the roofing industry

## PV possibilities

Expanding into the solar market

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Photo courtesy of Solar Energy International.

# Time to jump on the bandwagon?

Roofing contractors have a tremendous opportunity to capitalize on the rapidly growing rooftop photovoltaic (PV) system installation business. Although the massive growth of PV system installations is by itself a compelling reason to consider expanding into the market, it is important to note solar systems have a 30-year productive life but a majority of them have been installed on roofs with only five to 15 years of remaining life. This is an opportunity for PV-knowledgeable roofing professionals to perform removal and reinstallation services for solar arrays along with necessary roof system replacement or repairs.

Roofing knowledge gives roofing contractors a solid platform for entering the PV system market

by Jeff Spies

## A distinct advantage

Typical PV system removal and replacement costs can be significant, and repairing or replacing a roof system featuring PV components offers considerably more opportunities.

Roofing contractors have a distinct competitive advantage over electrical and solar contractors. Once a contractor learns the electrical aspects of PV system installation, they mostly are replicable from job to job, but roofing obstacles vary from one building to the next and often present challenges to contractors who do not have a roofing background.

Roofing challenges are further complicated by new 2012 International Fire Code® requirements that mandate increased PV array setback distances, resulting in the need to locate arrays in more challenging roof areas where obstacles are more likely to require removal, relocation or work arounds.

Another advantage unique to roofing contractors is their ability to address one of the major concerns of homeowners and building owners: “Will my roof be protected?”

Roofing contractors knowledgeable in PV system technology are able to instill greater confidence in prospective PV customers. They can confidently tout their qualifications to effectively waterproof complex PV penetrations and offer warranties that address long-term waterproofing.

“Roofing contractors have major advantages over solar or electrical contractors,” says Chip Upshaw, managing officer for Fidelity Roof Co., Oakland, Calif. “Established roofing contractors have an existing customer base that can be a great source of new business. And most customers prefer a one-stop shop where getting the roof system and solar warranties from the same provider is a major plus.”

PV system installation companies that do not have a roofing professional on staff or a close partnership with a roofing contractor often struggle to address this common concern.

When I first began my career in the PV sector in 2007, I was intrigued to learn few installers came from a background in electrical contracting and even fewer had experience as roofing contractors. Most established PV contractors were environmentally focused solar champions who came from diverse



Photo courtesy of Jason Vetterli.



Photo courtesy of Fidelity Roof Co., Emeryville, Calif.

Roofing contractors have an advantage over electrical contractors when it comes to roof system penetrations and waterproofing

backgrounds outside the electrical and roofing trades and were committed to building a market for clean energy.

Then, everything changed in 2008. The housing crisis caused a massive decline in construction activity. All of a sudden, PV was hot when new home construction was not. Major changes occurred, and training classes started attracting electricians and roofing contractors anxious to learn how they could find work in the growing PV field.

### What drives the market?

By far the most important ingredient in an active PV market is high-priced electricity. Areas of the U.S. with expensive electricity present an attractive investment opportunity to prospective PV customers. States with the largest PV markets include California, Hawaii, New Jersey and New York—all areas with expensive electricity. System owners are able to achieve payback on their investments within five to 10 years. Arizona and Colorado, which have less expensive electricity, have payback times ranging from 10 to 15 years.

As electricity rates continue to rise faster than inflation, more areas are becoming financially viable for PV system installations. Solid training can help you determine whether your market area is favorable for a growing PV market opportunity.

### Selling and leasing

A vast majority of homeowners and building owners don't "need" PV systems—the decision is based more on wanting to pursue an investment opportunity rather than needing a new roof or solar-generated power. Solar customers typically need to be sold on the investment's value. As a result, many roofing contractors who enter the PV industry fail to succeed if they lack investment-oriented sales expertise.

As an alternative, solar leasing programs have grown considerably during the past three years to the point where leasing comprised 75 percent of residential PV systems installed in 2012. Leasing tends to be available only in the more expensive solar markets such as California, Hawaii or New Jersey. In those markets, homeowners pay a monthly amount less than the cost of the electricity they were purchasing from the utility company.

Persuading a homeowner to sign a lease can be easier than selling a PV system outright to a homeowner. However, there are several considerations lessees need to address, such as ownership at the end of a lease, transferability of

a lease if a house is sold and how roof system repairs will be addressed during the system's life.

Leasing companies come in three basic varieties:

- Companies that have their own installation crews, a model favored by several of the largest leasing companies
- Companies that provide only leasing services to installers who have internal sales and design departments
- Companies that sell and design systems and manage permitting and incentives but subcontract installation work to local installers

Roofing contractors who believe sales may not be their strong suit still can participate in the PV installation business by becoming an installing subcontractor for a leasing company.

Despite the distinctions, Tony Ruffine, vice president of sustainability and strategic marketing for GAF, Wayne, N.J., advises roofing contractors not to see solar as a different business model.

"Solar is not totally different from roofing; in fact, it has more similarities than differences," he says. "Don't try to develop a new business model. Leverage your strengths as a roofing contractor, like selling to homeowners, solving roofing problems, and recruiting and managing crews."

### The benefits of partnering

Sixty to 70 percent of the labor in a rooftop PV system is roofing-related; however, a PV system installation also requires a licensed electrical contractor to wire and ground the array; run conduit; install electrical disconnects, combiners and inverters; and design and configure a system's electrical components.

Many roofing contractors starting out in the PV market think they can shortcut the electrical complexities by using simpler micro-inverter systems, which convert direct current (DC) to alternating current for each PV module. Micro-inverters minimize some design complexities of a solar system, but they still need to be installed by electrically knowledgeable installers. Micro-inverters offer nice features such as shade mitigation and module level monitoring, and they inherently are safer because they are not high-voltage systems after disconnection from the grid. Despite these benefits, they may not be the right product for every installation, especially when cost is a driving factor.



## History of residential PV

The first practical silicon solar cells were developed during the mid-1950s by Bell Labs and used for remote telecommunications systems where grid power was not available. Within a few years, solar panels found their way into space powering early satellites. During the 1960s, electronics companies started using solar cells to power calculators and watches, but the market for solar electricity remained small and hidden.

During the late 1970s, a group of backwoods homesteaders in northern California started converting automobiles to charge a second battery stored in the trunk or backseat. They would drive their cars daily to charge the battery and after returning home, plug an extension cord into their battery to power stereo and electric lights, reducing dependence on dangerous kerosene lanterns. These homesteaders first discovered solar panels in the early 1980s, and despite the high cost of PV panels (about 40 times more expensive than current prices), they flocked to the technology to charge their home batteries.

Charging batteries with solar in the early 1980s was not cheap, but it was cheaper and simpler than driving cars every day just to keep home batteries charged. Cheaper electricity drove the early residential solar markets, and it still does. Solar electricity is noticeably less expensive now than grid power in many parts of the U.S.

## Resources

One of the best ways to research solar products is by attending trade shows. Intersolar North America is held each July in San Francisco, and Solar Power International 2013 will be held in Chicago in October. Both shows host lively conferences and large expos that allow solar contractors to meet suppliers and examine the latest products in solar technology.

In addition, solar trade publications, such as *SolarPro*, *Home Power* and *Solar Industry*, are a good way to keep abreast of the latest equipment, installation techniques and industry activity. A technical resource is the RE-wrenches list ([lists.re-wrenches.org/listinfo.cgi/re-wrenches-re-wrenches.org](http://lists.re-wrenches.org/listinfo.cgi/re-wrenches-re-wrenches.org)), an online forum frequented by many top industry technicians discussing products and industry issues.

Roofing contractors with a long-term view will have many advantages to help them succeed in the PV marketplace.

Conventional high-voltage DC string inverters are a bit more challenging to design, but they are less expensive to purchase and install, have a long track record of proven performance, and are noticeably less expensive to service or replace because you can do the work from the ground rather than on the roof.

Partnering with an electrician allows roofing contractors to design systems that meet the application needs while maintaining cost targets necessary to be competitively priced.

## Penetrations and waterproofing

Roofing contractors have a distinct advantage over electrical contractors when it comes to roof system penetrations and waterproofing, but solar penetrations are much more difficult to seal for the long term when compared with typical pipe penetrations. A solar system usually consists of a metal racking structure bolted to a wooden roofing structure. Metal and wood have differing rates of expansion and contraction because of changing temperatures. As a result, the roof mounts for a racking system constantly are stressing the waterproofing system.

Although a leaking pipe flashing is relatively easy to replace, a PV penetration is not. To repair waterproofing material around a PV penetration, the array needs to be removed; the leak needs to be fixed; and the system needs to be reinstalled. This often requires considerable labor to repair or replace wiring, grounding and racking hardware. The cost to remove and reinstall an array is shocking—prices range from 20 to 50 percent of a new system's cost. This underscores the benefits of installing a new roof under a PV array's field and using quality flashed mounts that last for the 30-year solar array's productive life.



Above: The Classic Composition Mount integrates the mounting block with aluminum flashing, providing simple, single-bolt installation for retrofitting a PV system onto an existing roof.

Right: Using a fortified base-and-post method, the QBase Composition Mount makes it easy to install PV components concurrent with new roof system construction.



This will prove an unhappy surprise to many PV system buyers—and create a fantastic business opportunity for roofing contractors who have solar electric skills.

### Incentives and policy

Because customers who purchase PV systems tend to be driven by financial benefits, knowing how incentive programs work can make or break a PV business.

Roofing contractors who know the ins and outs of incentive programs tend to outlast those who fail to invest the time to learn the programs' rules, processes and loopholes.

There is a strong connection between incentives and government policy. Active solar markets are driven by government mandates requiring a percentage of all power come from renewable energy sources. Many larger solar companies hire professionals who monitor and influence government policy, enabling them to make better strategic business decisions. Companies that stay informed about incentives often outmaneuver competitors that fail

High-quality, robust, waterproof solar mounts are critically important to a PV system's long-term financial performance, especially when you consider the average rooftop PV system installation has several dozen penetrations. With all those holes in the roof, waterproofing becomes a statistical challenge—even a “small” 1 percent leak rate after 15 years means one out of every two or three roofs could experience a premature leak.

to appreciate the connection between government policy and solar growth.

The best resources to learn about incentives and policy are the Database of State Incentives for Renewables and Efficiency (DSIRE™) ([www.dsireusa.org](http://www.dsireusa.org)), Solar Energy Industries Association® ([www.seia.org](http://www.seia.org)) or local utility companies.

### Utility requirements

Another challenge new PV system installers face is the diverse electric utility interconnection rules and regulations. An installer cannot wire a solar system into a grid without explicit approval from the local electric utility. Most utilities have stringent guidelines for system configuration, labeling of components, system size and other factors.

Learning each utility company's rules can be daunting, underscoring the value of having a knowledgeable electrical partner who is able to communicate clearly with utility officials to ensure compliance with interconnection requirements. DSIRE's website has links to leading utility companies for interconnection requirements.

### Inspectors and code compliance

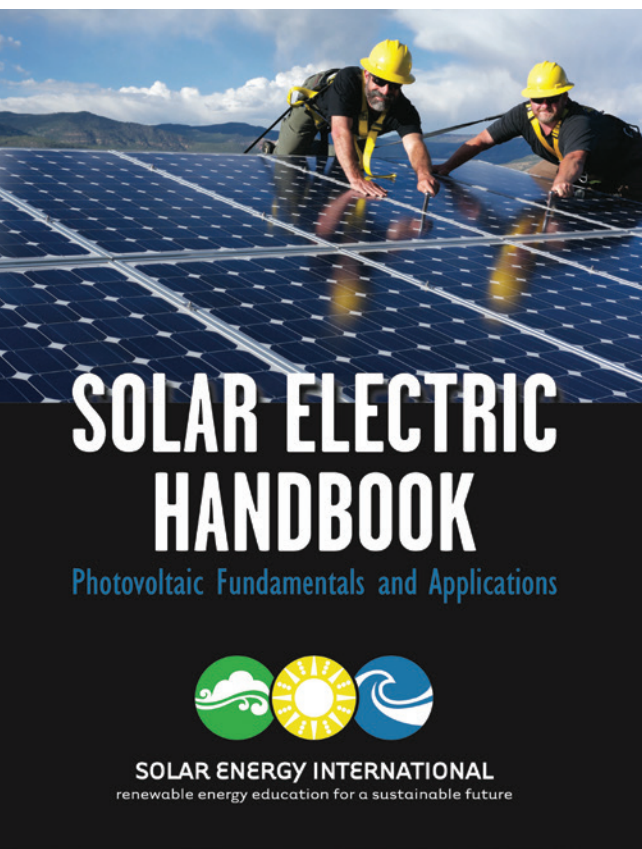
Local building departments often have unique interpretations of roofing code requirements as well as the electrical code that governs PV system installations. Roofing contractors who have partnered with capable electrical contractors will have fewer problems than contractors who do not have a firm grasp of the codes and best practices for a system's electrical design.

One of the most valuable resources for PV system installers is the *National Electrical Code*® published by the National Fire Protection Association. It provides examples to help demonstrate the concepts in the code requirements.

### Products and suppliers

During the early boom years of PV system installation, many roofing contractors focused their activities on adhered PV laminates or solar roofing tiles, but, eventually, they learned these products were more expensive than conventional aluminum-framed glass solar panels with crystalline cells and they also proved to be less reliable.

Most manufacturers of adhered solar laminates and solar roofing tiles exited the market within a few years



The *Solar Electric Handbook* is considered by many to be the definitive textbook for the solar industry.

because they could not compete with conventional framed-glass PV panel manufacturers. Although new building-integrated solar roofing products are entering the market, they are quite pricy and their reliability is unknown. Currently, a vast majority of rooftop PV companies have standardized conventional framed-glass PV panels mounted on rooftop racking systems. This time-tested configuration provides the best combination of cost, long-term reliability and modular design flexibility.

Most new PV contractors rely on distributors to supply the modules, racking, inverters and other system components, and this is a logical strategy for newcomers. Distributors offer a range of valuable services, including local stock, product training, design guidance and technical support.

The rapidly changing landscape of equipment suppliers can make product selection tricky. Consolidation is under way in the PV module field, and it is desirable to select equipment from manufacturers that likely will be around to service 25-year module warranties and 10- to 25-year inverter warranties.

## Education and certification

One of the most notable differentiators between successful PV businesses and those that fail is quality solar training. Companies that invest in education stay abreast of the latest technologies, installation techniques, code requirements and incentive programs.

Jim Kirby, vice president of sustainability for the Center for Environmental Innovation in Roofing, says: “The electrical elements of solar installation can be intimidating at first, but wise roofing contractors won’t let this scare them away. There is always fear with new technology, but good training can help you overcome the challenges.”

I strongly recommend training from a reputable solar training organization such as Solar Energy International (publisher of the *Solar Electric Handbook*) or the Midwest Renewable Energy Association. The knowledge gained by learning from experienced PV installers in a quality training program is one of the best investments a PV professional can make in his or her future success.

Certification is formal recognition an individual has proficiency and comprehension of PV system design and installation. This can be a powerful marketing tool for new installers. It offers customers the comfort of knowing a certified installer has demonstrated skills and knowledge to an accredited certification body.

The Roof Integrated Solar Energy™ (RISE™) certification program is targeted toward roofing contractors who install PV systems on low-slope roofs. More information about the RISE program is available at [www.riseprofessional.org](http://www.riseprofessional.org).

And the North American Board of Certified Energy Practitioners (NABCEP™) is the recognized solar PV certification agency in North America. NABCEP, which is accredited by the American National Standards Institute, offers certification programs for PV system designers and installers, as well as PV technical sales professionals.

## The key to success

Solar professionals who receive the proper training, partner effectively and develop solid solar business strategies can make a comfortable living in the solar trade and take pride in the fact they are helping contribute to a positive energy future for generations to come. ☺☀️

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### ON the WEB

For a link to PV statistics, log on to [www.professionalroofing.net](http://www.professionalroofing.net).