



## You're a what?

# Solar photovoltaic installer

As long as there's sunshine, Rebekah Hren expects to have an outlet for her work. Rebekah, a solar photovoltaic (PV) installer, puts solar panels on roofs and in other sunny places to turn the sun's power into electricity. She enjoys promoting renewable energy, in part because it's an emerging field. "It's a fun industry to be in right now," says Rebekah. "It's kind of like the Wild West."

In solar PV systems, solar cells—devices that convert sunlight into electricity—are joined to create different types of solar modules, which are usually further connected. Solar electric systems can be installed on the ground, on poles, or on the roofs or sides of buildings.

The most common type of solar modules is the 3- by 5-foot flat, framed solar panel that is mounted on top of a roof. But solar cells are also manufactured as flexible panels, roof tiles, and shingles. Other cells may be integrated with building materials, such as siding or windows.

Most of Rebekah's installations are on the roofs of houses. Atop a roof, her first order of business is to make sure that there is enough room for the panels and that the roof can hold the weight of the system. If the roof meets both criteria, Rebekah bolts structural framing, or racking, to the roof. Next, she attaches the panels and connects them with wires.

The wires are then brought down to a basement, garage, or outside box to be hooked up to an inverter, which turns the direct current (DC) generated by the solar cells into an alternating current (AC) that can be used to power homes and businesses. Some systems include battery backup to store electricity for later use.

The wiring of the inverter to the utility box and main electrical grid must be done by a licensed electrician. In fact, some municipalities require that solar PV installers have an electrician's license. Rebekah has a license, so she does the wiring on her installations.

Each installation is unique, especially in residential work. That one-of-a-kind feel to

every job keeps it interesting, Rebekah says: "Installation never goes flawlessly, so there's always something new or different to consider." For example, installers might need to reinforce a roof that isn't strong enough to hold the panels. Or they might alter their design to work around a chimney.

Before finishing, installers activate the system, check that it's working correctly, and help with site cleanup. Lead installers or those who have an electrician's license might be responsible for arranging work permits and inspections, or they may work with utility companies to connect the system to the main electrical grid. Some installers also repair solar electric systems that are already hooked up.

For Rebekah, a typical residential installation takes about 3 days, and she spends half of that time placing the modules. Large, commercial installations may take several months. As a result, work schedules of solar PV installers can be similar to those of construction workers, with long hours on some days followed by periods of no employment.

Also like construction workers, an installer's days often start early to beat the worst of the heat. And their work depends on the sun in more ways than one. "If it's raining, a lot of times I can't work," says Rebekah. That's because wet weather can make installation dangerous. Working up high requires taking special precautions, such as wearing a harness, but safety equipment is often no match for hazardous outdoor conditions.

The U.S. Bureau of Labor Statistics does not publish employment data on solar photovoltaic installers. But industry sources suggest that there are about 7,000 solar photovoltaic installers—who may also be known as solar photovoltaic technicians or solar installer-roofers—in the United States.

About half of all solar PV installers work in California, a State that provides many incentives for solar electric power. Because solar power requires a large upfront investment, tax credits and other government incentives help

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make it a more affordable option for individuals and businesses. Given the trend in favorable government incentives, analysts expect that the solar-power industry will continue to grow rapidly.

As the use of solar power expands, the job tasks of solar PV installers are evolving. Some workers concentrate primarily on installing the panels. Others, especially those at small companies, do everything from sales to planning to wiring. Experienced installers in any size company may advance to lead installer, system designer, sales representative, or other positions.

Solar PV installers need mechanical skills and must be able to work with the power tools and hand tools used to construct and fasten equipment. Electrical knowledge and an understanding of basic math are helpful, as are good problem-solving abilities. Attention to detail is important, because completing an installation often requires following diagrams and instructions. Heavy lifting is also required at times: Solar panels typically weigh between 30 and 40 pounds; batteries can weigh double that—or more.

And workers can't be afraid of heights. Although most commercial installations take place on flat roofs, many residential installations take place on pitched roofs—often with a steep slope—and on loose or

fragile materials, such as cedar shake and clay shingles. “The scariest part of the work is being up on the roof,” says Rebekah. “You have to be a certain type of person to climb up on roofs and do high-voltage electrical wiring.”

Most solar photovoltaic installers have a high school diploma and mechanical, electrical, or related experience. People with construction backgrounds are often well suited for the work; roofing experience is particularly valuable. Some employers prefer to hire applicants who have an associate degree in an electrical or related field.

Rebekah says that solar panel installation also attracts career changers from a variety of fields. New workers frequently learn on the job, although specific training in solar installation or solar power is helpful. Voluntary certification is also available and is sometimes required.

Industry analysts estimate that wages for entry-level solar PV installers are about \$12 to \$15 an hour and vary by location, with crew leaders making between \$20 and \$25 an hour. Workers with an electrician license or other qualifications typically earn more.

But for Rebekah and other solar PV installers, their work isn't just about earning a paycheck. “What I really love is installing a system and knowing that it will be creating clean energy for 25 years,” says Rebekah. “It's exciting to be making a difference.”



Photo of Rebekah Hren courtesy of Honey Solar Electric, Inc.

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Installing framed panels on rooftops is one of Rebekah Hren's many tasks.

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