



## PLTW Engineering

# 10-12/Career Exploration – Solar Panel Engineering Technicians

May 22, 2020



10-12/DE

Lesson: 5/22/2020

**Objective/Learning Target: Students will be able to explain the career paths for occupations in the solar energy industry.**



## Occupations in solar power

The solar power industry employs a wide range of occupations in a number of major industry segments: research and development, manufacturing of solar power materials, construction of solar power plants, operation of solar power plants, and solar power installation and maintenance.

Sales occupations are also integral to the solar power products industry.



## Occupations in solar power science research

Solar power is still gaining popularity and acceptance, so research and development are key aspects of the industry. Continued research and increased returns to scale as production has increased have led to many developments that have decreased costs while increasing efficiency, reliability, and aesthetics. For example, new materials have been developed that allow for low-cost and lightweight thin-film solar panels that are less expensive to produce and easier to transport than glass- or laminate-coated solar panels.



## Occupations in solar power science research

Occupations in scientific research and development have become increasingly interdisciplinary, and as a result, it is common for physicists, chemists, materials scientists, and engineers to work together as part of a team.

Most scientists in the solar industry work in an office or laboratory and also spend some time in manufacturing facilities with engineers and processing specialists.



## Occupations in solar power science research

*Physicists* observe, measure, interpret, and develop theories to explain physical phenomena using mathematics. In the solar power industry, physicists work with chemists, materials scientists, and engineers to improve the efficiency of solar panels.

*Chemists* investigate the properties, composition, and structure of matter and the laws that govern the reactions of substances to each other. Using this knowledge, chemists in the solar power industry are able to improve on solar cell design, develop new materials for making solar cells, or improve existing materials.



## How to become a solar power science researcher

A doctoral degree is a necessity for scientists that conduct original research and develop new products; however, some workers may enter the scientific fields with a bachelor's or master's degree.

Computer skills are essential for scientists to perform data analysis, integration, modeling, and testing. Certification or licensure is not necessary for most of these scientists.



## Occupations in solar power systems installation

Solar photovoltaic installers are key to the process of solar panel installation and maintenance. They use specialized skills to install residential and commercial solar projects. They are responsible for safely attaching the panels to the roofs of houses or other buildings and ensuring that the systems work.

Solar photovoltaic installers must be able to work with power tools and hand tools at great heights, and possess in-depth knowledge of electrical wiring as well as basic math skills.





## Occupations in solar power systems installation

When necessary, installers must be problem solvers, able to repair damaged systems or replace malfunctioning components.

Safety is a priority when installing solar panels because installers run the risk of falling from a roof or being electrocuted by high voltage.



## Occupations in solar power systems installation

Solar photovoltaic installers are often self-employed as general contractors or employed by solar panel manufacturers or installation companies.

Installation companies typically specialize in installing certain types of panels and provide some maintenance and repair services.

When a solar panel system is purchased, manufacturers may provide the buyer with installation services or maintenance and repair work.



## Job duties for solar power systems installers

The main component of a solar installer's job is the preparation of the installation site.

Before the installation process begins, a full audit of a structure is conducted, including a survey of the existing electrical system and developing safety procedures.

The job is then designed based on the characteristics of the structure and the type of system being installed.



## Job duties for solar power systems installers

After the layout and equipment are finalized, the permits are obtained from the relevant governments (local, state, federal, or a combination).

If the installers do not do these preparations themselves, they must familiarize themselves with the site before they begin working on it.



## Job duties for solar power systems installers

Once installation begins, the proper safety equipment, such as a rope and anchor system, must be set up to prevent falls from the rooftop.

Often, the building will have to be upgraded to support the solar panels; this may involve reinforcing the roof, replacing rafters, or installing supports to handle the added weight of the panels.



## Job duties for solar power systems installers

The roof must be marked to show where the arrays will be placed, and holes are drilled in the roof to attach the mounting system.

After the mounting system is in place, the solar panels can be installed. Workers use caution during installation because the panels are fragile, expensive, and weigh at least 40 pounds each. If the panels are damaged during the installation process, the company has to cover the cost of repair or replacement.



## How to become a solar power systems installer

Solar photovoltaic installers typically have a background in construction or as electricians.

There is no formal training standard for installers, but courses are offered by a variety of institutions, such as trade schools, apprenticeship programs, or by photovoltaic module manufacturers.

Training programs vary widely and can range from 1 day to several weeks.



## How to become a solar power systems installer

Many solar installers are licensed as general contractors and many are licensed by the North American Board of Certified Energy Practitioners (NABCEP).

Certification, while not necessary, can improve the job prospects of installers, and many larger projects require workers to be certified.





## How much do solar power systems installers get paid?

According to industry sources, solar installers usually have starting salaries between \$30,000 and \$40,000 per year.

Installers trained as electricians or those that are licensed as general contractors can make significantly more. As with any occupation, wages and benefits vary by employer and geographic location.



## Quiz yourself

1. What is the work environment for most scientific researchers working on solar energy studies?
2. What is the minimum education required to become a scientific researcher in this field?
3. List 3 typical duties for a solar panel installer.
4. What background to solar panel installers commonly have?
5. What is the average pay for a solar panel installer?



## Helpful links

[Solar panel technology video explanation](#)

[Careers in solar panel installation](#)

[A day in the life of solar installers video](#)