



Farming and Energy Use Series **Solar Power on the Farm**



Did you know?

The sun supplies Earth with more energy each hour than the entire human population uses in a year!

Source:

<https://www.nrel.gov/gis/solar.html>

Want more information?

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pennsylvania
DEPARTMENT OF ENVIRONMENTAL
PROTECTION

It's a Great Time to Choose Solar

Solar energy on the farm is playing a major role in the growing interest in clean, renewable energy in Pennsylvania. Here's why:

1. The price of solar photovoltaic equipment is coming down, and the efficiency of the technology is improving.
2. Pollinator plants that boost crop yields and reduce soil erosion can be planted alongside ground-mounted solar panels.
3. Techniques in agrivoltaics—using the same land for both solar panels and agriculture—are increasing, such as planting beneficial vegetation under panels or grazing sheep under them (see <https://extension.psu.edu/solar-energy-and-agrivoltaics>).

Installing Solar Panels for On-Farm Energy Use

Solar panels can be installed on the roof of a building ("roof mount") or on metal framing or posts on the ground ("ground mount"). There are pros and cons to each, such as cost, performance, and local permit requirements. Learn more from the Public Utility Commission at: https://www.puc.pa.gov/Electric/pdf/Renewable/FS-Solar_FAQ.pdf

If using a roof mount, it's important that the roof be in good condition. Ground-mounted solar should go on cleared, unused acreage or marginal land. The panels can be set at a fixed angle or have a tracking system that tilts them to capture the optimal amount of sunlight. Panels are modular and can be sized to produce enough electricity to meet your needs. Multiple solar panels can be combined into a solar array.

When you install solar panels to produce electricity directly for your farm, you reduce the amount of electricity you purchase from your electric utility. You may even send excess electricity back to the utility for payment or bill credit.

How to Get Your Solar Project Started

Get an energy audit of your facilities. There are many ways to reduce your farm's electricity use that are less expensive than installing solar panels. An audit will identify them. Learn more about energy audits in our related handout, "Finding Hidden Opportunities for Energy Savings," at www.dep.pa.gov/agricultureenergy. If you look at energy efficiency first, this will guide you in choosing a properly sized solar system to reduce costs.

Engage a registered solar contractor. A contractor will estimate solar system size, potential location(s), cost, and permitting requirements. A contractor will also do site preparation, surveying, and installation of racking systems and panels. An electrical inverter will be needed to convert DC power into AC electricity, so use a trained professional. It's also wise to get bids from more than one contractor.

In Pennsylvania, solar contractors are registered through the attorney general's office. Find a list of registered solar contractors at <https://pasolarcenter.org/qualified-solar-developer-directory>

Check out available funding. Although solar panels have fallen in price, a solar array is still a significant investment. A federal investment tax credit is available, and state grants may also help with the up-front expenses of purchasing and installing solar. For a list of financial incentive programs for solar and other clean renewable energy, see our related handout, "Funding for Your Energy Projects," at www.dep.pa.gov/agricultureenergy.

Note: Some companies will install a system for you at no cost, but they typically require you to purchase the electricity the system produces for a certain number of years. Afterward, you may own the system or be able to buy the system at a lower price, much like a "rent to own" proposition. This is ultimately a more expensive way to own an on-site solar system, but if cash flow is tight, it might be an acceptable long-term arrangement.

Leasing Land for Utility-Scale Solar

Utility-scale solar, also called grid-scale solar, refers to a large solar facility that feeds solar power into the electrical grid to supply a utility with energy for its customers.

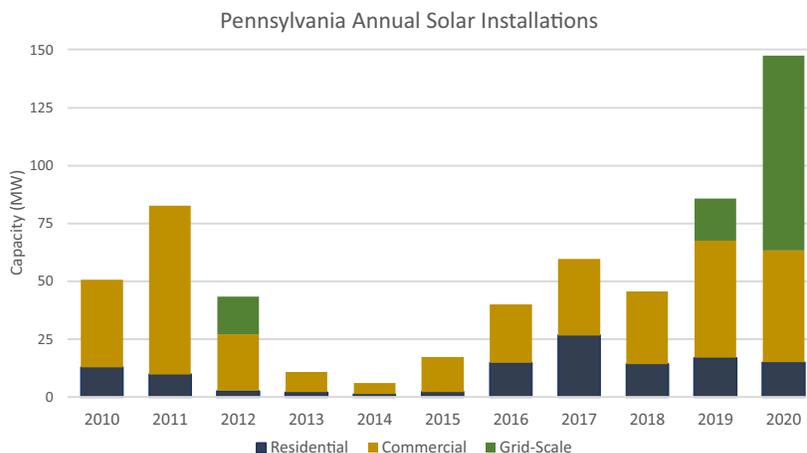
Many farmers and other rural landowners are being approached by solar developers looking to lease land. Lease agreements are generally for 20-25 years, with options to renew, and lease rates per acre of land can vary. There are many other factors you need to consider, such as whether agrivoltaics (see front) are an option and whether local township or government ordinances have restrictions on land use. The installation of a solar array is reversible and the property utilized can be returned to farming in the future if proper decommissioning of the array is planned for. It's advisable to consult an attorney before signing a lease agreement.



Utility-scale solar array on a farm in Franklin County.

DEP provides links to numerous materials that are helpful to landowners who are considering leasing: <https://www.dep.pa.gov/Citizens/solar/Pages/Landowner-Resources.aspx>

Penn State Extension also offers some helpful materials on solar land leasing: <https://extension.psu.edu/landowner-leasing-for-utility-scale-solar-farms>



More Resources

DEP Solar Energy Resource Hub
<https://www.dep.pa.gov/solar>

This one-stop shop provides resources for farmers, businesses, and other landowners in Pennsylvania who want to determine whether solar is right for them, what the process is to lease land to a solar developer, and more.

PV Watts

<https://pvwatts.nrel.gov/pvwatts.php>

Use this tool from the National Renewable Energy Laboratory to estimate how much electricity is produced by a solar panel system. Installed costs for solar systems are around \$2,000 per kilowatt, so you can estimate what a system might cost.

Solar Renewable Energy Credit Market

<https://www.sretrade.com/>

For every 1,000 kilowatt hours your system produces, you can earn a Solar Renewable Energy Credit. Check this website for recent values (be sure to select Pennsylvania at the top of the chart).

