

Solar Energy in Agriculture

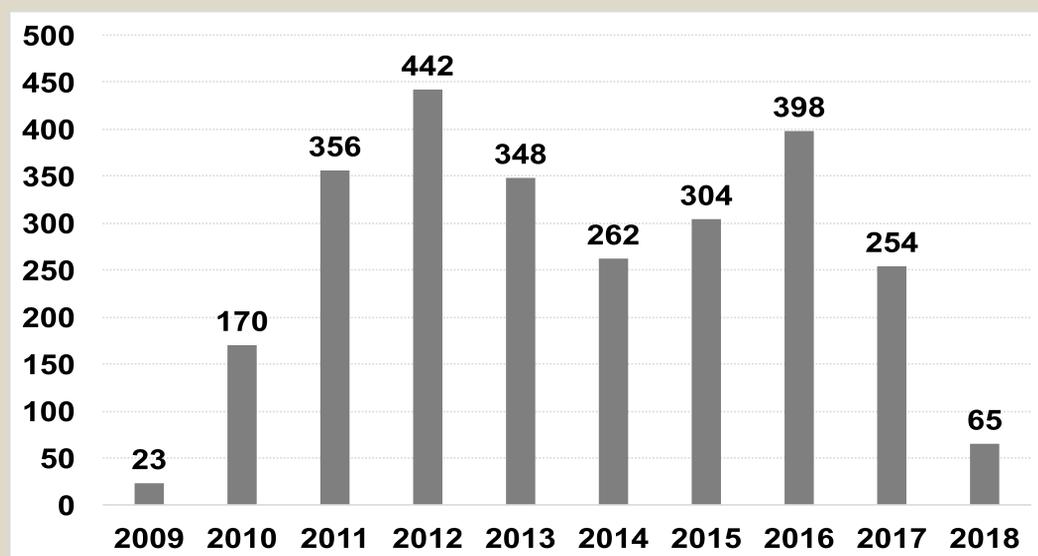
Considerations for Investing in Photovoltaic Solar Systems

The national average cost for electricity in the industrial sector (including agricultural and irrigation) is projected to increase from 6.4¢ per kWh in 2013 to 12.8¢ per kWh in 2040 (USDOE/EIA, 2013). This increase will generally raise the prices of agricultural products and reduce farm income. To stabilize energy input cost and maximize profitability on the farm, many producers are now considering investments in energy efficiency and on-farm solar electric generation.

Photovoltaic Solar Energy Trends

Advances in technology and policy mandates that require the installation of photovoltaic (PV) solar have contributed to the reduction of costs. The average installed solar price for mid-sized systems (between 10 kW and 100 kW) has dropped from more than \$10 per DC/watt in 2000 to \$1.85 per DC/watt in 2017 (NREL, 2017). As a result, PV panels are an increasingly common sight on farms and rural properties across Ohio.

Number of Ohio Certified PV Solar Facilities



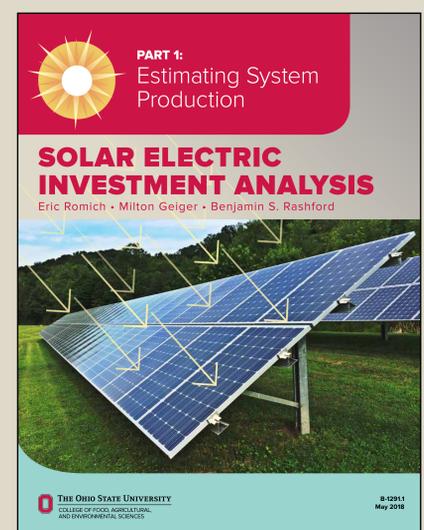
Source: Public Utilities Commission of Ohio. Report reflects approved cases through May 7, 2018.

Questions to Ask Before Investing in Solar

1. Is shading, orientation, angle, and temperature included in production estimates?
2. Does the lifetime production include annual declines from panel degradation?
3. Can I easily identify the direct and indirect cost of the system?
4. What is the installed cost per watt?
5. Are the operations and maintenance costs included and defined in the proposal?
6. Is the value of electricity based on an average utility rate, or are fixed fees, demand charges, and energy charges evaluated separately?
7. What is the energy escalation rate used to calculate energy savings in future years? Is it real or nominal?

Solar Electric Investment Analysis Bulletin Series

Evaluating an investment in solar requires consideration of system costs, the value of production, and operation and maintenance costs. Unfortunately, some proposals are hard to understand, making it difficult to make informed investment decisions. A six-part bulletin series was developed in collaboration between the University of Wyoming and The Ohio State University to increase knowledge of PV solar energy development and the financial considerations to guide decision-making with future investments. The bulletin can be found at energizeohio.osu.edu/farm-solar-energy-development.



Sources: United States Department of Energy, Energy Information Administration (USDOE/EIA). (2013). *The Annual Energy Outlook 2013 (AEO2013)*.
Fu, R., Feldman, D., Margolis R., Woodhouse, M., and Ardani, K. (2017). *U.S. Solar Photovoltaic System Cost Benchmark: Q1 2017*, National Renewable Energy Laboratory (NREL)

