

Solar Energy

Solar Electricity System Basics

System Components

A residential solar system consists of many different components working together to generate and supply electricity from sunlight. The following are a list of common components of a residential solar photovoltaic (PV) system. The numbers in parentheses correspond to the numbers in the system image.

Solar Cells (1)

Solar Cells are the basic components of a PV panel. Cells generate electricity when exposed to sunlight. The production of electricity is directly related to how much sunlight exposure the cells receive. On cloudy days or under shade, cells produce less electricity than if the cells are exposed to full sun. Electricity is not produced when there is no sunlight exposure, such as at nighttime.

Solar Modules or Panels (1)

Solar Cells are connected to form panels. These panels are connected to form arrays. The panels make the design and installation of PV systems more efficient. The number of panels needed for your system will depend on your electricity requirement and the available space (with sufficient sunlight exposure) to install them.

Wiring for Electrical Connections (6, 7)

The various components of the PV system are interconnected using appropriate wiring to collect, transport and distribute the electricity generated by the system.

Batteries-Optional (4)

Batteries can be used to store excess power and configured to meet a variety of needs, such as back-up during power outages.

Balance of System (BOS) Equipment (2, 3, 5)

The electricity generated by the PV system is direct current (DC) and needs to be converted to alternating current (AC) before it can be used at home. This conversion is done using a piece of technology called the inverter.

Other BOS equipment such as ground-fault protection, overcurrent protection, surge protection, disconnect devices and other equipment may be used in your PV system.

Sizing the System

Correct sizing of the system is key to its effectiveness and usefulness in providing optimum power.

Use the following tool to estimate system size based on your annual electric usage and system design: [PVWatts® Calculator](#)

Financing the System

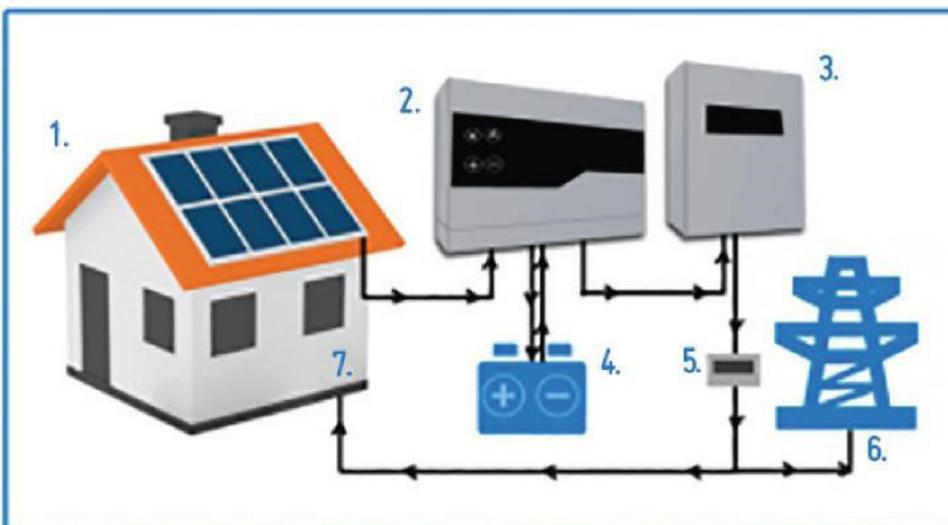
The following video and fact sheet introduce the three common methods of financing your solar system, namely loans, leases and power purchase agreements.

[Rooftop Solar Financing 101 Video](#)

[Solar Purchase and Financing Options Fact Sheet](#)

Additional Information

www.energy.gov using solar electricity at home



Pennsylvania Public Utility Commission

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