

Glossary of Solar Related Terms

Photovoltaics (PV) - A method of generating electrical power by converting sunlight (solar radiation) into direct current electricity using semiconductors that exhibit the photovoltaic effect

Direct Current (DC) - The unidirectional flow of electric charge. Direct current is produced by such sources as batteries, thermocouples, and solar cells. Direct current may flow in a conductor such as a wire, but can also be through semiconductors, insulators, or even through a vacuum. The electric charge flows in a constant direction, distinguishing it from alternating current (AC).

Alternating Current (AC) - In alternating current, the movement of electric charge periodically reverses direction. AC is the form in which electric power is delivered to businesses and residences.

Semiconductor - A material that has an electrical conductivity due to flowing electrons. Devices made from semiconductor materials are the foundation of modern electronics, including radio, computers, telephones, and solar cells.

Photovoltaic Effect - Involves the creation of a voltage (or corresponding electric current) in a material upon exposure to electro-magnetic radiation. In most photovoltaic applications the radiation is sunlight and for this reason the devices making use of the photovoltaic effect to convert solar energy into electrical energy are known as solar cells.

Solar Cell - A solar cell is a device that converts the energy of sunlight directly into electricity using the photovoltaic effect. Assemblies of cells are used to make solar panels.

Solar Panel - A packaged, interconnected assembly of solar cells also known as a solar module. It is used as a component in a larger photovoltaic (PV) system to offer electricity for commercial and residential applications. A single solar panel can only produce a limited amount of power, so most installations contain several panels, known as a solar array.

Solar Array - A linked collection of solar panels. Also known as a photovoltaic (PV) array.

Inverter - An electrical device that converts direct current (DC) into alternating current (AC). Inverters are commonly used to supply AC power from DC sources such as solar panels or batteries.

Micro Inverter - A device that converts direct current (DC) from a single solar panel into alternating current (AC). Unlike a central or string inverter that aggregates and converts the power generated by the entire array of solar panels, a micro-inverter converts the power from a single solar module. Micro-inverters were invented to address some of the challenges associated with standard central inverters, including the effect of dust, debris and shade on a solar array. The use of micro-inverters allow solar panels to be installed in parallel, so issues with any one panel will no longer affect the output of rest of the solar array. Other advantages include less complex rooftop wiring (lower voltages), and per-panel performance monitoring capability.

String Inverter - A device for converting DC to AC power which is designed for high voltage DC inputs. Using a string inverter, the solar array is wired in series, rather than in parallel. The advantage of this approach is generally lower cost. However, drawbacks may include more complex rooftop wiring (higher voltages), a central point of failure and an increased negative effect of dust, debris and shade on the solar array.

STC vs. PTC Rated Panels - STC is an acronym for 'Standard Test Conditions', which is 1000 watts per square meter solar irradiance, 1.5 Air Mass and 20 degrees Celcius. These are not real world conditions. PTC is an acronym for 'PV USA Test Conditions', which were developed at the University of Davis, California. PTC rating is a more accurate reflection of real world conditions. Therefore, when comparing panel ratings, one should ensure that PTC ratings are used.

Power Tolerance - This specification pertains to range within which a solar panel will overperform or underperform. For instance, a 180 watt PTC rated panel with a power tolerance of +/-5 could actually produce anywhere from 175-185 watts in optimal real world conditions. Therefore, when comparing panels for your project you should limit your selection to panels with only positive and/or very small negative power tolerance ratings.

