



Solar PV - 101

1. What is a Solar “PV” system?

- “PV” stands for “Photovoltaic,” (i.e. voltage from light). A Solar Photovoltaic (PV) system generates electrical power by converting the light energy from the sun into electricity that you can use in your home.

2. Basic PV system components.

- **Solar Module:** Glass-encased collection of solar cells that create direct (DC) electrical current. Solar Modules used on homes are commonly about 3’ wide and 5’ tall.
- **Solar Array:** A group of solar modules installed at a particular location.
- **Inverter:** The device that converts the DC current produced by the solar module to the AC current that your home can use.
- **Conductors:** The wires that carry the electricity from the solar modules to the inverters and from the inverters to your electrical service panel (i.e. breaker panel, or distribution panel).
- **Racking:** the structure on which the solar modules are mounted.

3. Roof-mounted vs. Ground mounted solar arrays.

- **Roof-mounted** solar arrays are anchored to the roof of an existing structure and are popular when the roof is not shaded and it is pitched in the desired direction.
- **Ground-mounted** solar arrays are anchored directly to the ground and are popular when the roof does not provide the desired orientation, is shaded, or is too old.

4. Basic vocabulary

- **Grid-tied PV:** This type of PV system is connected to the local utility grid. It allows extra power to be sent back to the grid if it is not needed in the home. The energy that is sent back to the grid can be used, for free, at a later time. This feature is called “net-metering.” Almost all homes today with a solar array have a “grid-tied” PV system. When a PV system is grid-tied, it will shut down automatically when the utility grid goes down, and will not re-start until the utility grid is back up. This is a safety feature that is required by the Electrical Code. Only with a “battery backup” (see below) is it possible for a grid-tied PV system to continue to operate while the Utility Grid is down.
- **Grid-tied PV with battery backup:** With the addition of an energy storage system (batteries), the solar array can continue to power certain loads in the home even when the utility grid goes down. Due to the expense of batteries, in most homes only selected loads are “backed-up” by the battery system. The selected loads are commonly the refrigerator, freezer, well-pump, selected lighting, certain appliances, etc.
- **Off-grid PV:** This is a PV system that operates independent from any utility grid. This system relies on batteries to provide power to all the loads whenever the sun is not shining.