Solar Energy Glossary

- **Active systems —** Active solar systems operate on the same principles as passive systems except that they use a fluid to absorb the heat. For example, a solar collector positioned on the roof of a building heats the fluid and then pumps it through a system of pipes to heat the entire building. Small systems are used to provide electricity for heating and cooling systems in homes and other buildings.

- **Joules (J) —** International System of Units (SI) unit of energy that is equivalent to the work done by one newton of force when its point of application moves one meter in the direction of the force.

- **Net metering —** An arrangement through a utility company, where a utility customer who produces excess electricity can sell it back to the company. A utility customer can produce electricity in a variety of ways, but net metering is more commonly used with renewable energy systems. The process of net metering requires the use of a smart meter to track the customer's energy use and production.

- **Solar thermal energy —** The sun emits three forms of electromagnetic (EM) energy: ultraviolet, visible, and infrared. The majority of energy emitted is in the form of light within the visible EM spectrum, and heat within the infrared EM spectrum. Solar thermal energy is the heat generated from the sun.

- **Passive systems —** A passive solar system does not involve mechanical devices or the use of any considerable, conventional energy sources. Fundamentally, the objective of both active and passive systems is to redistribute the solar energy collected. Thermal energy redistributes according to a fundamental law of thermodynamics, which states that heat moves from warm to cool areas. The simplest method of transferring the heat from passive solar collectors is through convection. A passive solar system typically relies on windows as collectors to capture solar energy, although some systems may also use supplemental PV panels. Examples of basic, passive solar structures include greenhouses and sunrooms.

- **Photovoltaic (PV) —** The photovoltaic effect is a physical phenomenon where electric current is generated by free electrons, sunlight, and semiconducting material. A PV panel has two layers of semiconducting material that are usually composed of silicon. Free electrons within the silicon sheets are energized by sunlight to move between the layers, which then generates an electromagnetic field. This movement within the electromagnetic field results in direct electrical current.

- **Unit prefixes —** The prefix (letter) that comes before a unit (Watts, Joules, etc.) represents the magnitude of the numerical value.
  - **Exa (E) = 10^{18}**
  - **Giga (G) = 10^{9}**
  - **Kilo (k) = 10^{3}**
  - **Mega (M) = 10^{6}**
  - **Tera (T) = 10^{12}**

- **Watts (W) —** International System of Units (SI) unit of power that is equivalent to one Joule per second. It is the rate at which energy is generated or consumed. Electricity use is generally represented in kWh (kiloWatt hour) by utility companies. For example, **you can use this equation to determine the annual electricity consumption of an appliance in kWh**.

$$annual\ kWh_{appliance} = rated\ Watts_{appliance}\ x\ \frac{hours\ of\ use}{day}\ x\ \frac{1\ kWatt}{1000\ Watts}\ x\ \frac{365\ days}{1\ year}$$

For a television rated at 125 W:

$$annual\ kWh_{Television} = 125\ W_{Television}\ x\ \frac{4\ hours}{day}\ x\ \frac{1\ kWatt}{1000\ Watts}\ x\ \frac{365\ days}{1\ year} = 182.5\ kWh/year$$