**Basic Electricity**

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| **Electrical Energy:**  is delivered by tiny charged particles called  electrons, typically moving through a  wire.  Example: Electrical energy is stored in a cell phone and in a car battery. It also travels through power lines and into your home | **Radiant Energy:**  is electromagnetic energy that travels in waves,  including visible light, radio waves, xrays and gamma rays.  Example: Sunshine is radiant energy, provides warmth and fuel that makes all life on earth possible. |
| **Electricity**:has its own set of units. The three most basic in electrical systems are voltage, current, and resistance. A Multi-meter is an instrument used to measure electrical quantities. | **Circuits:**  are how electricity travels in closed loops. It must have a complete path before theelectrons can move. If a circuit is open, the electrons cannot  flow. When we flip on a light-switch,we close  a circuit. The electricity flows from an electric wire,  through the light bulb, and back out another wire. |
| **Watts:**  are units of power. (1000 watts = 1 kW)  Volts x Amps = Watts | **Amperage:**  or current is the amount of electrical flow.  Measured in amperes (amps) |
| **Voltage:**  is the measurement of the "push" of electric current. Rate at which energy flows. Measured in volts. | **Kilowatt hour:**  is a unit of energy equal to 1000 watt hours. It is unit commonly used by electric utilities to bill consumers. (1kWh=1000 watt-hour |
| **Electron:**  is a stable subatomic particle with a charge of negative electricity found in all atoms. Acts as the primary carrier of electricity in solids. | **Neutrons:**  are subatomic particles of about the same mass as a proton but without an electric charge. Present in all atomic nuclei except those of ordinary hydrogen |
| **P–N Junction:** such as a solar cell  is the area where electricity is first generated in a semiconductor. More specifically, it is the  boundary between p-type and n-type materials in a semiconductor device and functions as a rectifier, or conversion space, for electrical generation | **Protons:**  are a stable subatomic particle occurring in all atomic nuclei with a positive electric charge equal in magnitude to that of an electron, but of opposite sign |
| **Atoms:**  are the basic units of a chemical element | **Photon:**  are basic unit of light. A photon carries energy but has zero rest mass |

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| **Image result for photos of thomas edison** | Thomas Edison  discovered  Direct Current (DC)  where the flow of electricity is in one direction only  and substantially  constant in value.  Direct current  runs though battery powered devices, solar cells, and LED  lights. | **Image result for photos of nikola tesla** | Nikola Tesla discovered  Alternating Current (AC)  where the electric charge  periodically reverses direction at regularly  recurring intervals  and is transmitted to  customers by a transformer.  Alternating  current runs through  car motors, radio  signals and appliances |

Solar Design Orientation Guide

Designing a solar energy system starts with calculating the amount of energy you would like to have the system produce.

A solar energy engineer/designer will match a system’s energy output to a variety of important solar components like solar panels, batteries, charge controllers, inverters, and breakers.

