Inverters

- Inverters are used in PV systems to convert direct current (DC) power from batteries or PV arrays into alternating current (AC) power.
- The first inverters/converters used motor-generator sets, but were costly, heavy and inefficient.
- Modern inverters use solid-state designs and microprocessor controls to produce high quality AC power very efficiently.

Rotary Converter

TEMco

Solid-State Inverter

SMA

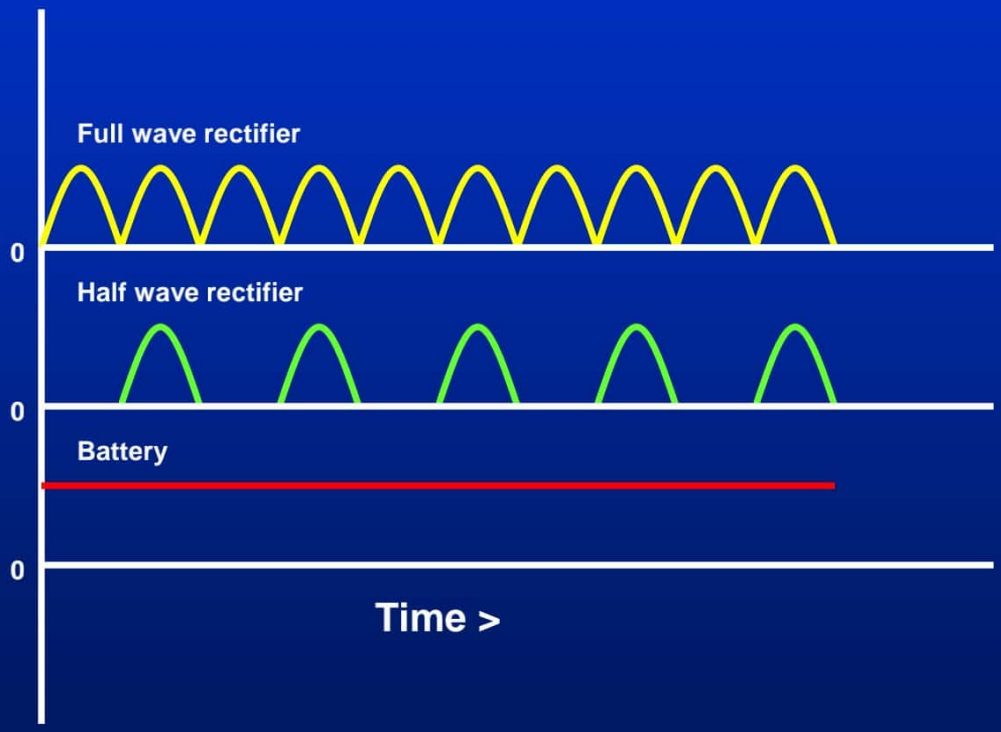
Electrical Properties

- **Basic electrical properties and principles are fundamental to understanding how inverters are designed and operate, including:**
  - Direct current and alternating current
  - Waveform types and parameters
  - Power and energy
  - Ohm's law
  - Single-phase and three-phase power
  - Resistive and reactive loads
  - Real, apparent and reactive power
  - Power quality

Direct-Current (DC)

- **Direct current (DC) is a unidirectional flow of electrical charge that does not vary in polarity between positive and negative values over time.**
- **Solar cells and batteries are examples of DC devices.**
  - Most electronic circuits also operate on DC power.
- **DC circuits are defined by a positive and negative polarity, or poles. Electrons flow in one direction.**

DC Waveforms



AC Waveforms