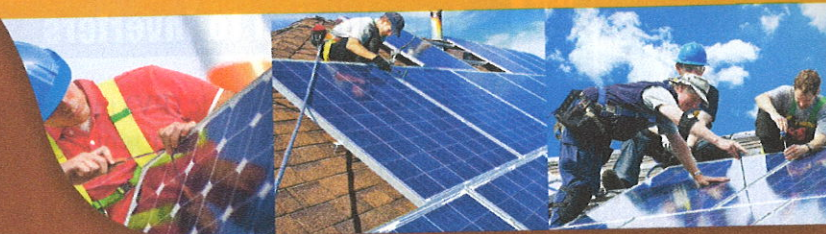


CHAPTER 8

Inverters



Solar cells in photovoltaic modules produce direct current (DC) electricity. Batteries used in stand-alone PV systems or as backup power in a grid-tie system also produce DC electricity. With very few exceptions, electrical loads in residential and commercial buildings use alternating current (AC) electricity. Inverters are used to convert the DC electricity produced by modules and batteries to usable AC electricity. In this chapter, we take a detailed look at the purpose and operating principles of inverters. The different inverter types and features are covered. A comparison of grid-tie inverters and stand-alone system inverters is presented, and coverage of microinverters is included.

Glossary of Terms

bimodal inverter An inverter type that can operate as either a grid-tie or stand-alone inverter.

grid-tie inverter An inverter type that is connected to, and works in parallel with, the electric utility grid.

microinverter A small inverter that is installed at each PV system module to change the module-produced DC electricity into AC electricity.

power conditioning unit (PCU) Equipment that can perform electrical power processing and control functions, as well as perform as an inverter.

stand-alone inverter An inverter type that is connected to the PV system batteries and operates independently of the PV array and the utility grid.

Objectives

Upon completion of this chapter, the student should be able to

- ▶ Demonstrate an understanding of inverter operating principles.
- ▶ Identify different types of inverters.
- ▶ Demonstrate an understanding of common inverter features.
- ▶ Demonstrate an understanding of inverter ratings and specifications.
- ▶ Demonstrate an understanding of how to select an inverter.