

# **Economics Logistics Planning Solar PV 1**

## **Learning Objectives**

- Prepare a Scope of Work for solar system installations.
- Identify the components, configurations, and different types of photovoltaic systems to solve energy demands.

## **Job Task Analysis**

- Identify major components of PV system
- Identify types of PV systems
- Identify panel types and characteristics

## **Introduction to Photovoltaics**

### **History**

- Identify Historical figures involved in PV research
- Summarize evolution of PV technology and special turning points

### **Industry**

- Identify the concept of grid parity
- Describe a distributed energy system

### **PV cells**

- Identify major types of PV cells and how they are manufactured; monocrystalline, polycrystalline, amorphous, concentrating
- Identify key chemical components Boron, Cadmium, CIS, Gallium, Gallium Arsenide, Hydrogenated amorphous silicon, indium oxide
- Describe PV cell characteristics; semiconductor, p-n junction, band gap, insulator, doping, diodes.
- Distinguish between a blocking diode and bypass diode
- Define PV panel terms; I-V curve,  $I_{mp}$ ,  $V_{mp}$ ,  $V_{oc}$ ,  $I_{sc}$ , mpp, NOCT, STC, Nominal Voltage, Temperature Coefficient, Cell Temp, Ambient Air Temperature.

### **Explain PV System Terms**

- B.O.S.
- Integrated PV tech; roof and wall
- Hybrid systems
- Grid tied
- Stand alone
- Small PV applications

### Explain sizing economics of energy use

- Declining price effect on distributed systems
- Renewable Energy and Utility incentives
- Depreciation schedules
- Modified Accelerated Cost-recovery system (MACRS)
- Net Energy Metering

### How the Grid Works

- Utility pricing
- Time-of-use rates
- Demand Charges