
5-Day Solar PV Workshop

Description

This workshop is designed to provide participants with the theoretical and technical knowledge of designing and installing both off-grid and grid-tie solar PV systems. There is one day of hands-on training included in this workshop.

Day 1 9:00 Am – 4:30PM

Electrical Basics

Voltage, Current, Resistance, Power & Energy. Overview of Ohm's Law
Series & Parallel Connections

Photovoltaics

Photovoltaic effect, mono & poly-crystalline & Amorphous comparisons.
Module specs, IV Curve, Module Degradation, Effects of Solar Radiance &
Temperature

Solar Resource

Sun-chart, Solar Azimuth & Altitude, Zenith, Solar Noon, Solar Window,
Insolation

Site Evaluation

Why people go solar. Tools required for site assessment, Magnetic
Declination, Solar Path Finder Shading Analysis, Site Efficiency Report

DAY 2 8:30 AM – 4:30 PM

Grid-Tie Inverters

What's an inverter? Central, string and micro-inverters. Advantages of each.

String Sizing

What is a "string"? How do we properly size strings taking into account temperature.

Methods of Attachments

Ballast mount, Flush mount & Pole mounts. Single and Dual Axis Trackers

BOS (Balance of System)

Lightning Arrestors, Combiner Boxes, Disconnect switches, Fuses & Breakers, Wire, System labels & Single Line Drawing

Wire and Over-current Sizing

PV source circuit & output circuit wire sizing. Over-current protection. Environmental effect, 80% rule, Voltage Drop, De-rating for temp & conduit fill.

Day 3 8:30 AM – 4:30 PM**Grounding**

Why do we ground? What is bonding? Techniques & Terminology.

Shading Effects LAB - on Day 3 or 4 weather permitting.

Batteries

Types of batteries, battery specification & capacity. Battery maintenance and battery safety. Battery banks, battery boxes.

Charge Controllers

Function of a charge controller. What is multi-stage charging. Choosing the proper size controller. What is MPPT? What is Equalization. What is Sulfation?

Off-Grid Inverters

Pure Sine & Modified Sine Inverters. Choosing the proper inverter & size. How can inverters charge batteries?

Load analysis

Examples covering AC loads, DC loads, load runtimes. Calculating daily watt-hrs System Sizing looking at Days of Autonomy, Depth of Discharge, Battery Bank Sizing, Solar Array Sizing. Charge Controller & Inverter Sizing.

Day 4 8:30 AM – 4:30 PM**Safety**

Electrical Safety, Falling and Tripping Hazards, Choosing Proper P.P.E, WHMIS over view, Working outdoors.

Hands-On LAB

Students will install modules on a mock roof. They will learn the proper techniques as well as “tricks of the trade”. Students will work with micro-inverters for the grid-tie portion of the hands-on learning and also install a roof mounted combiner box.

Students will then install an off-grid inverter, combiner box, charge controller, battery bank and wire up the system. The instructor will commission the system being sure to highlight the required steps and safety.

Day 5 8:30 AM – 3:30 PM**Course Review**

Final Exam – 3 hours allowed. A small part of the test is closed book. The majority of the test is open book.

Exam is optional however no certificate will be awarded if exam is not passed. (A mark of 70% is a pass)

Please note that 97% of students pass the exam getting over 70%.

Homework is given out each day. It will be taken up in class the next morning. The exam is very similar to the assignments.