Canadian Solar Institute

Contact: 866-804-4625 www.solarinstitute.ca info@solarinstitute.ca

5-Day Live On-Line Solar PV Design and Installation Training

Description

This course is designed to provide participants with the theoretical and technical knowledge of designing and installing solar PV systems. References to Section 64 of the CEC is made throughout the workshop.

Day 1

Course Overview
Grid-Tie systems (Net-metered and Feed-in-Tariff)
Off Grid Systems
AC & DC Coupled Systems (Grid-tie with Battery Backup)

Module 1: Electrical Basics
Voltage
Current
Resistance
Power - Watts
Energy - Watt-hours
Ohm's Law
DC & AC Voltage
Series & Parallel Connection

Module 2: Photovoltaics
Photovoltaic effect
Mono-crystalline
Poly-crystalline
Amorphous
Module components & Specs
Module Efficiency
IV Curve
Module Degradation
Effects of Solar Radiance & Temperature
Power Tolerance
Warranty
Shading & Bypass Diodes

Day 2
Take up homework

Module 3: Solar Resource
Sun path chart
Solar azimuth
Solar altitude
Solar Noon

Solar Window
PV Potential
Grid Tie System Sizing with PV Potential

Module 4: Site Evaluation
Why people go solar?
Tools required for site assessment
Magnetic Declination
Solar Path Finder Shading Analysis
Site Efficiency Report

Module 5: Grid Tie Inverters & String Sizing
Central Inverters
String Inverters
micro-inverters
Optimizers
What is a "string"?
How do we properly size strings?

DAY 3
Take Up Homework

Module 6: Methods of Attachments
Ballast mount
Flush Mount
Ground Mount
Pole mount
Trackers

Module 7: BOS (Balance of System)
Lightning arrestors
Combiner boxes
Disconnect switches
Fuses
Breakers
Wire
System labels & Single Line Drawing

Module 8: Wire And Overcurrent Protection Sizing
PV Source Circuit
PV Output Circuit
The Environmental Effect
The 80% rule
Overcurrent Protection
Voltage Drop
De-rating for Temperature
De-rating for Conduit Fill

Day 4
Take up homework

Module 9: Grounding
Why do we ground?
Bonding of Equipment

Techniques
Terminology
WEEBs

Module 10: Batteries
Types of batteries
Battery specification
Maintenance & Safety
Battery Banks
Battery Boxes

Module 11: Charge Controllers
Choosing and sizing a Charge Controller
What is MPPT?
Charging Stages- Bulk, Absorption, Float and Equalization
What is Sulphation?
Set points for Max Bulk Charge, Absorption, Float, End Amps etc…

DAY 5
Take Up Homework

Module 12: Off-Grid Inverters
Sine Wave & Modified
Choosing the proper inverter
Charger component of Inverters
Programming Inverters
Generator backup
Low Voltage Disconnect

Module 13: Off Grid System Sizing
Load Analysis (AC & DC loads)
Days of Autonomy
Depth of Discharge
Battery Banks Sizing
Inverter Sizing
Charge Controller Sizing
Solar Array Sizing

Safety
Hazards a PV Installer Might Encounter
Safety Gear
Fall Arrest & Restraint
PPE
WHMIS
Arc Flash
Lock & Tag-out

Please note that there are no pre-requisites for this course however basic math skills are essential.

The course is presented with the help of Power Point Presentations. There is also a fair amount of teaching using a white board.