CONSTRUCTION CRAFT TRAINING CENTER

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a solid foundation

SOLAR INSTALLER PROGRAM

Green Construction

Introduction to Solar — *36 Classroom Hours*
Wind Turbines — *36 Lab Hours*
Electric Charging Stations

72 Hours Total
Tuition Cost: $1,295.00
Start Date: November 18, 2010
Start Time: 8:00a.m. – 4:30p.m.
Thursdays, Fridays & Saturdays

What is Solar / How does it work:

What is a photovoltaic system?
Is Solar Electricity right for you?
Wondering how it works and what it costs?
Rebates, tax credits, solar electric technologies and the benefits.

Working Safely with PV Systems:

Safety Hazards of Operational and Non-Operational PV Systems
Safety Hazards, Maintenance Practices and Protective Equipment during PV System Installation and Troubleshooting.
Basic electricity; conductors, semiconductors, insulators,
Ohm's law, resistors and diodes; basic circuit concepts
(series parallel, current, voltage and power); introduce solar cell and solar module as a completed circuit.
Operation of PV cells, rating cell and module performance, motion of the sun and cloudiness, effect of angle, time of day, variability of sunlight, and trackers rating power vs. energy generated.

Conducting a Site Assessment:

Basic Solar Terms
True South from Magnetic South given a declination Map and Compass
Basic Solar Movement & Effect of Earth Tilt
Predict Solar Position using Solar Path Diagrams
Angular Effects on the Irradiance of Array
Factors that reduce/enhance Solar Irradiation
Use of Solar Pathfinder or Sun Charts

Selecting a System Design:

Stand-Alone PV systems: components; system sizing; batteries; AC vs. DC efficiency, hybrid options.
Relationship between Array and Battery size for Stand-Alone systems

Grid tied distributed generation, the "Utility" experience with larger PV systems, peak power matching, electrical aspects of Building Integrated Photovoltaic (BIPV).

Calculate Array, Battery and Inverter size for Stand-Alone Systems
Solar thermal-to electric systems
Small scale PV (single module, battery, controller, 3 CF lights).
Currently developing PV technologies, and no-technical barriers.

Adapting the Mechanical Design;

The Relationship between Row spacing of Tilted modules and Sun Angle
The Mechanical Loads on a PV Array and roof structure, evaluating integrity or roof due to weight of panels and wind loading. Mounting of PV panels on roof rack mounts, dealing with steel and aluminum issues

Adapting the Electrical Design:

Photovoltaic systems and the National Electrical Code
Suggested Practices

Installing Components and Subsystems:

Interaction of Typical Loads
Load Demand for Stand-Alone and Grid-Interactive Service
Typical System Electrical Output Derating Factor
Calculate Estimated Peak Power Output (AC and DC)
Calculate Array and inverter Size for Grid-Connected Systems
Calculate Estimated Monthly and Annual Energy Output of Grid-Connected systems

Performing System Checkout and Inspection:

Performance Analysis & Troubleshooting
Typical System Design Errors
Typical System Performance Problems
Associated Performance Problems with Typical causes
Equipment Needed for Typical System Performance Analysis
Compare Actual System Power Output to expected Output
Typical Locations for Electrical / Mechanical Failure