PV101: Grid-Tie Solar Electric Design and Installation: June 4-8
PV203: Battery-Based Solar Electric Design and Installation: June 11-15
ST 101: Solar Hot Water Design and Installation: June 25-29
WP 101Wind Design and Installation: July 16-20
Hooper Bay AK Wind Turbine Installation: Dates TBD in August

Location: TBD in Anchorage

Description: Solar Energy International, considered the premier energy trainer in the lower 48, is coming to Alaska and will be offering 4 week-long trainings based in Anchorage this summer. The training will focus on Solar PV grid-direct, Solar PV Battery-Based, Solar Hot Water and Small Wind Power. Participants will receive a nationally recognized certificate of completion and 40 credit hours toward the NABCEP certification. Space is limited; applications are available at the website below.

Fee: This course is normally $1,080 per person. IT IS BEING OFFERED **FREE** FOR ALASKAN RESIDENTS THROUGH A GRANT FROM THE AK DEPT OF LABOR. Contact YRITWC for information about travel scholarships.

This is an Equal Opportunity training program; auxiliary aids and services are available upon request for individuals with disabilities

Trainings are Organized by the Yukon River Inter-Tribal Watershed Council

Visit our website to register
www.yritwc.org

For Application e-mail dpm@yritwc.org or visit: www.yritwc.org
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SOLAR ENERGY INTERNATIONAL

PV 101: Solar Electric Design and Installation- Grid Direct

PV101 Description: This training will provide an overview of the three basic PV system applications, primarily focusing on grid-direct systems. The goal of the course is to create a fundamental understanding of the core concepts necessary to work with all PV systems, including: system components, site analysis, PV module criteria, mounting solutions, safety, and commissioning. The course will also cover the basics of sizing a residential grid-direct system, wire sizing, overcurrent protection, and grounding.

Students who complete the PV 101 training will be able to perform the following:

- Differentiate between various renewable energy sources and types of systems
- Perform power and energy calculations
- Perform a load analysis for a grid-direct system and evaluate utility bills and rate plans
- Implement electrical efficiency measures to reduce system size
- Analyze net metering and other incentives that effect the final cost of a PV system
- List the pros and cons and draw a block diagram of the following systems: DC direct, stand-alone, grid-direct, and grid-tied with battery back-up
- Diagram an array in series and parallel configurations
- Obtain and apply module specifications for a given module and determine a module's performance given various environmental conditions
- Determine performance of an array/system based on irradiance changes or for array orientation and tilt angle at a given site
- Determine the magnetic declination, find the orientation and altitude angle of the sun, and evaluate the shade potential for a given site
- List the pros and cons of different mounting structures (ground, pole, roof, and trackers)
- Read equipment specification sheets to determine the critical information needed in system design
- Size a residential grid-direct system including the inverter, array, PV source and inverter output circuit conductors (basic), and overcurrent protection
- Determine the number of modules that can fit on a given roof space
- Identify the following wires and components on a three-line diagram of a residential grid-direct system: the array, disconnects, inverter, the equipment grounding conductors, ungrounded conductors, grounded conductors, the grounding electrode(s), and the system grounds
- List the order of commissioning and decommissioning, as well as potential safety hazards, for a grid-direct system

Class Materials: This class comes with SEI's PV Design and Installation Manual and a notebook of Power Points, quizzes and exercises.

PV 203: Solar Electric Design (Battery-Based)

PV 203 Description: This course will build upon the core concepts from PV101, with a specific emphasis on battery-based system design. Students will work through step-by-step design process for battery-based applications, including stand-alone (off-grid), grid-tied with battery back-up, and hybrid systems. Topics such as load analysis, component selection, battery safety, voltage drop, and commissioning procedures will be presented. In addition to sizing exercises and calculations, students will explore additional design considerations unique to battery-based systems.

This course is ideal for people looking to design and install battery-based systems, and for solar professionals who have been working in the grid-direct market and need to learn about battery-based systems in preparation for the NABCEP Solar PV Installer Certification Exam.

Prerequisites: PV101

Students who complete the workshop will be able to perform the following:

- Diagram a battery bank in series and parallel configurations
- Identify the proper safety protocols for working with batteries
- Draw a three-line schematic of a residential battery-based system, including the array, controller, batteries, inverter, disconnects, overcurrent protection, and grounding (including the equipment grounding conductors, ungrounded conductors, grounded conductors, the grounding electrode(s), and the system grounds)
- List the pros, cons, and applications of hybrid and AC and DC coupled systems
- Define depth of discharge, days of autonomy, equalization, and efficiency of a battery
- Create a maintenance schedule for batteries
- Calculate maximum charge rates for batteries and determine state of charge
- Identify the pros and cons of using valve regulated lead acid (VRLA) verses flooded batteries in specific system designs
- Specify either a PWM or MPPT charge controller depending on system parameters
- Specify a battery-based inverter given electrical load and surge requirements
- Evaluate a client's electrical load and size a stand-alone system (including inverter, controller, battery bank, and array)
- Perform sizing calculations for their battery-based system
- Size a grid-tied with battery back-up system (including inverter, controller, battery bank, and array)
- Calculate voltage drop for all circuits in a system
- Calculate and diagram appropriate series fusing for a battery-based system
- Identify appropriate disconnect and overcurrent protection placement
- Provide all NEC required labeling for a battery-based system
- List the order of commissioning and decommissioning, as well as potential safety hazards, for battery-based systems

Class Materials: This class comes with 2008 National Electric Code and a notebook of Power Points, quizzes and exercises.

ST101: Solar Hot Water Design and Installation

Course Description: Participants in this workshop will learn the theory, design considerations and installation strategies necessary to install and maintain a solar domestic hot water system. Passive solar water heaters, drainback systems, antifreeze systems, and photovoltaic powered systems are discussed in depth, as well as an introduction to pool and space heating systems. The workshop will include some hands-on labs and tours of solar hot water systems.

Topics Include: • Collectors • Different Types of Solar Hot Water Systems, including: - Passive Batch Water Heaters - Thermosyphon Systems - Drainback Systems - Closed-loop Anti-Freeze Systems - PV Powered Pumped Systems • Components • OG 100 and OG 300 • Solar Site Analysis • Design and Sizing • Installation How-tos • Mounting Strategies • Codes and Safety • Space Heating • Radiant Floor Heating • Pool Heating • Commercial Systems • Maintenance • Lessons Learned • Tours of Working Systems

Class Materials: This class comes with a notebook of Power Points, quizzes and exercises and a textbook. This class also includes a lab kit.

WP101: Wind Design and Installation

Course Description: Participants in this wind power training workshop will learn design and install principles for residential wind systems that range from 10 to 70 feet in diameter and produce 1 to 100 kWh per day. The workshop will cover site analysis, system design, installation and safety issues, and hardware specification. Learn about the different available residential wind turbines, how they work, and the advantages and disadvantages of each.

Topics Include: • How residential wind generators work • Site analysis • Towers and tower economics • Grid-tied systems • Off-grid wind/PV hybrid systems • Wind system sizing • Legal issues and zoning • Installation and safety considerations

Hooper Bay Wind Turbine Install

Course Description: This is NOT an SEI listed course however interested individuals will be able to fly out to Hooper Bay, AK to participate in the installation of a 6 turbine wind-farm being installed by SeaLion corporation and Susitna Energy Systems. Priority will be given to residents of the Yukon Delta but participants interested in wind from around the state are encouraged to apply. THIS WILL BE A FULLY HANDS ON TRAINING WITH A SMALL CLASSROOM COMPONENT.

Topics Include: • How residential wind generators work • Site analysis • Towers and tower economics • Grid-tied systems • Wire Sizing and Deplotment • Yukon Delta Specific Foundation Systems • Skystream 3.7 wind turbine monitoring • Installation and safety considerations