



Megawatt-Scale PV: Design Considerations and Case Studies

September 11th, 8am-4:30pm | Location: Delfino 4103, Level 4, The Venetian | Instructors: Amy Scher & Joe Villacci | NABCEP CE hours: 6.5

This advanced course provides an in-depth look into the design process and considerations for grid-connected megawatt-scale PV systems, with an emphasis on ground-mounted systems. The course will discuss the design process from pre-project planning to best practices in equipment selection, installation, quality control, and design strategies specific to large-scale PV systems. The course will use a project case study to highlight design considerations and choices for a ground-mounted single-axis tracker system. This course will be taught by instructors with real project experience in developing, designing, installing, and commissioning megawatt-scale PV systems, so come take advantage!

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PV System Operations and Maintenance (O&M)

September 11th, 8am-4:30pm | Location: Delfino 4101, Level 4, The Venetian | Instructors: Brian Mehalic & Alex Jahp | NABCEP CE hours: 6.5

As the solar PV industry grows and existing systems continue to age, the operations and maintenance (O&M) of PV systems has become a field unto itself. This course is for the field technician who will perform O&M duties, and for those in operations or asset management who want to know the nitty gritty details of keeping a PV system operating at peak performance. You will become familiar with a range of O&M tasks, including inspections and preventive maintenance, performance analysis, and troubleshooting. We will discuss advanced analytical tools, meters, and techniques such as insulation resistance testers, I-V curve tracers, and infrared cameras. The course covers all sizes of grid-direct PV systems including residential, commercial, and large-scale systems, but will not cover battery maintenance or medium voltage-specific O&M tasks.

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I-V Curves and Diodes Demystified

September 12th, 11am-12pm | Instructor: Brian Mehalic

I-V curves are the basic graphical representation of performance of PV cells, modules and strings, and they have a lot to tell; PV cells themselves are essentially diodes combined with a photocurrent source; and bypass diodes are fundamental components in silicon PV modules. In this presentation we will discuss I-V curves, how they aggregate, and what different curve shapes indicate, including proper operation – and failures of – bypass diodes. Become a better solar professional by learning how to “think like a PV module” through an understanding of I-V curves and diodes.

FREE

PV Installation Best Practices

September 12th, 12-1pm | Instructor: Amy Scher

The good, the bad, and the ugly: gain insight on how to do it right, save on installation time and labor, and avoid unnecessary call-backs and red-tags from your AHJ or utility. A fun-filled presentation on residential, commercial, and utility-scale PV systems that will make you groan, gasp, and, at the same time, have some “a-ha” moments.

FREE

2023 NEC® Changes Affecting PV and Energy Storage Systems

September 12th, 1-2pm | Instructor: Brian Mehalic

Join a voting member of Code Making Panel 4 for a discussion of changes in the 2023 NEC®. Regardless of the version of the National Electrical Code enforced in your jurisdiction, the Code drives industry-wide best practices and product development cycles of manufacturers; it is critical for installers, designers, manufacturers, engineers, developers, and building officials to stay current. This presentation will focus on critical updates and changes that impact PV system design and installation for all types of applications – including energy storage systems – ranging from off-grid, to interactive PV systems on buildings, up to utility-scale solar farms. There are some great updates that will help reduce system cost while maintaining safety - you need to know what they are to take advantage; there's also some updates that may end up adding cost – and you need to know the best ways to deal with them. Bring questions if you have them and be ready for a fun time talking Code.

FREE

PV System O&M: Tools and Techniques

September 12th, 3-4pm | Instructor: Brian Mehalic

This presentation highlights the theory behind – and safe and practical use of – field tools, equipment, and testing procedures for operation, maintenance, and troubleshooting of PV systems, including devices such as I-V curve tracers, thermal cameras, specialized PV tools, insulation resistance testers, and more. Additionally, relevant standards and codes that apply to these activities will be discussed.

FREE

Commercial Interconnection Options

September 12th, 4-5pm | Instructor: Amy Scher

Are you an experienced residential PV system designer, installer, project manager, or electrician looking to move into larger-scale systems? This presentation will introduce some of the important concepts you'll need to understand in order to successfully design and interconnect PV systems to a three-phase utility grid. We will review the most common three-phase utility configurations and cover what information is needed from a site in order to be able to complete a commercial system design. We will also look at different examples of commercial switchboards, and discuss methods for how and where to interconnect a PV system on larger commercial sites. Additionally, we will provide an overview of some different types of equipment that you are likely to be using. Join us for this hour-long presentation to get an overview of what you'll encounter when working on larger-scale PV systems.

FREE

PV + Storage Configurations for Non-fixed Rate Tariffs and Resiliency

September 12th, 5-6pm | Instructor: Alex Jahp

Changes to utility tariffs and several high-profile grid outages in recent years are dramatically increasing demand for residential, commercial, and industrial PV systems with energy storage that can provide both economic and resiliency benefits. In this presentation we will start with the basics of how solar, storage, and the grid interact to set us up to explore different system architectures that can address various utility tariff structures and backup power needs.

FREE

A Look at Lithium-ion Battery Types and Considerations

September 13th, 9:30-10:30am | Instructor: Alex Jahp

Lithium-ion battery technologies are advancing rapidly as their cost is dropping almost as quickly. In this presentation we'll review some of the common factors that need to be considered when comparing different types of lithium-ion batteries including some nuances of the technology. We'll finish by looking at the advantages and disadvantages of the most common types of lithium-ion batteries used with PV systems.

FREE

Thermography and PV Systems

September 13th, 10:30-11:30am | Instructor: Brian Mehalic

Both handheld and aerial thermography play large roles in PV system operations and maintenance (O&M), including preventative and reactive applications. So much can be easily – and quickly – learned about issues with PV arrays via aerial thermography, whether drone-based or fixed wing (of course it still takes on-site personnel to do anything about it!). And a thermal camera in hand is critical to verifying the integrity of electrical terminations and other equipment - plus they make a great troubleshooting tool. See why IR cameras have become the “go-to” tool for many PV system O&M activities.

FREE

Worker Safety! NFPA 70E

September 13th, 11:30am-12:30pm | Instructor: Amy Scher

Most of us are familiar with the National Electrical Code (NFPA 70), but did you know this document is part of a trilogy of standards - intended to be used together - to ensure maximum safety for electrical installations? In this one-hour course focused on worker safety, we will look into a different and perhaps lesser known part of this trio: the Standard for Electrical Safety in the Workplace (NFPA 70E). Using this standard as our guide, we will discuss how to identify and assess electrical hazards and risks, review the “Hierarchy of Risk Control Methods” to understand different strategies for hazard risk reduction, review lock-out-tagout principles, shock and arc flash boundaries, and we'll discuss how to select the right PPE for the task at hand.

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