



Megawatt-Scale PV: Design Considerations and Case Studies

September 9th, 8am-4:30pm | 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 first half of the course will discuss the design process from pre-project planning to best practices in installation, quality control, and commissioning. The second half of the course will use project case studies to highlight design considerations and choices for a variety of system configurations. 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!

PAID

Operations and Maintenance (O&M) of PV Systems

September 9th, 8am-4:30pm | 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, and the once seemingly widespread belief that PV systems, with few-to-no moving parts, are “plug and play, set it and forget it” has fortunately receded. This course is for the field technician who will perform O&M duties, as well as those in operations or asset management who want to know the details of keeping PV systems safe and operating at peak performance. You will become familiar with best practices for performing a range of O&M tasks, including inspections and preventive maintenance, testing, and troubleshooting, as well as standards, such as NFPA 70B, providing guidance for program structure and procedures.

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I-V Curves and Diodes Demystified

September 10th, 10:30am-11:25pm | 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

Large-scale PV and Storage System Configurations

September 10th, 2:30-3:25pm | Instructor: Amy Scher

In this presentation, we will discuss the common configurations for utility-scale PV and PV+ storage system configurations. These include PV systems featuring string inverters, which utilize one of several different DC wiring configurations: integrated combiner boxes, external combiner boxes, and combiner boxes with wiring harnesses. Next are central inverter configurations, including options with combiner boxes, harnesses, and external or integrated DC disconnects. Finally we'll cover PV systems coupled with battery energy storage, highlighting both DC-coupled and AC-coupled configurations, including DC-to-DC converters.

FREE

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

September 10th, 3:30-4:25pm | Instructor: Alex Jahp

Changes to utility tariffs and recent high-profile grid outages have dramatically increased demand for 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 before exploring design approaches and system configurations that can meet this demand.

FREE

2023 NEC® Changes Affecting PV and Energy Storage Systems

September 11th, 10:30-11:25am | Instructor: Brian Mehalic

Join a voting member of Code Making Panel 4 for a discussion of changes in the 2023 NEC® (and a sneak peak at some likely 2026 changes!). 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 and is critical for installers, designers, manufacturers, engineers, developers, and building officials to stay current. This presentation will focus on updates and changes that impact PV and storage system design and installation for all types of applications, 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

Commercial Interconnection Options

September 11th, 2:30-3:25pm | 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.

FREE

Thermography and PV Systems

September 11th, 5:00-6:00pm | Instructor: Alex Jahp

Handheld and aerial thermography both play significant 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

Building a Scalable O&M Technician Training Program

September 12th, 10:30-11:25am | Instructor: Brian Mehalic and Alex Jahp

The number of operational PV systems continues to grow each year and proper operations and maintenance (O&M) is essential for maximizing system uptime; as a result, O&M has become the fastest growing sector of the industry. This rapid growth has created significant challenges for owners and operators as there is a shortage of qualified technicians that can safely and effectively perform the work. In this presentation we will explore this challenge and how workforce development initiatives, codes and standards, and improved training programs can help the sector to scale up.

FREE

Safety First! NFPA 70E

September 12th, 12:00-12:55pm | 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, and we will review the “Hierarchy of Risk Control Methods” to understand different strategies for hazard risk reduction. We will also review lockout-tagout principles, shock and arc flash boundaries, and we'll discuss how to select the right PPE for the task at hand. There are many strategies and opportunities for reducing hazards and maintaining a safe working environment for employees, and understanding NFPA 70E is the key to creating safe working areas.

FREE



Opciones Comerciales para Interconectar FV

10 de septiembre, 5:00-6:00 pm | Instructors: Carlos Oreamuno

¿Eres un diseñador, instalador, administrador de proyectos o electricista con experiencia en sistemas fotovoltaicos residenciales y quieres pasar a sistemas de mayor escala? Esta presentación te introducirá en los conceptos importantes que deberás comprender para diseñar e interconectar con éxito sistemas FV a una red eléctrica trifásica. Repasaremos las configuraciones trifásicas más comunes y veremos qué tipo de información se necesita de un sitio para poder completar el diseño de un sistema comercial. También veremos distintos ejemplos de dispositivos comerciales y debatiremos métodos sobre cómo y dónde interconectar un sistema FV en grandes instalaciones comerciales. Además, ofreceremos una visión general de los distintos tipos de equipos que probablemente se vayan a utilizar. Acompáñenos en esta presentación de una hora de duración para obtener una visión general de lo que se encontrará cuando trabaje en sistemas FV a gran escala.

FREE

Configuraciones de Sist FV y de Almacenamiento de Energía a Gran Escala

11 de septiembre, 3:30-4:25pm | Instructors: Alejandro Mora

En esta presentación, hablaremos de las configuraciones habituales de los sistemas FV y FV+ de almacenamiento de energía a gran escala. Entre ellas se incluyen los sistemas FV con inversores de cadena, que utilizan una de las distintas configuraciones de cableado de CC: cajas de combinación integradas, cajas de combinación externas y cajas de combinación con arnés de cables. A continuación veremos las configuraciones de inversores centrales, que incluyen opciones con cajas de combinación, arnés de cables y desconexiones de CC externas o integradas. Por último, trataremos los sistemas FV con almacenamiento de energía en baterías, destacando las configuraciones acopladas en CC y CA, incluidos los convertidores de CC a CC.

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