Solar Systems and Battery Storage

1 Day, 0.7 CEUs

Course Overview

This course will provide a fundamental understanding of the energy storage systems being employed in today's solar-plus-storage systems for commercial and utility-scale applications. This course will include different system configurations, battery chemistries, use-cases, safety hazards, along with where to find electrical and fire code requirements for solar storage systems installations.

Lab and Classroom Attire

AVO is committed to the personal safety of each participant and requires safety glasses, long pants, and ANSI rated "safety-toe" work shoes for lab activities. Lecture courses may involve a tour of a work or shop area and for this reason open-toe shoes and shorts are not considered appropriate attire for the classroom.

Learning Objectives

To receive 0.7 CEUs, participants must attend 1 day of class (7 contact hours) and attain a minimum grade of 80% on the final exam. Upon completion of this course the participants will demonstrate that they are able to:

- Outline energy storage systems (ESS) components, functions, system configurations, and diagrams
- Identify common commercial and utility-scale ESS applications
- Summarize key terms and concepts related to ESS technologies and specifications
- Explain different types of ESS chemistries and understand the pros and cons of each
- List which 2020 NEC articles and sections apply to systems employing energy storage
- Interpret key fire code requirements and equipment listings for systems employing energy storage
- Evaluate safety hazards for different types of energy storage chemistries

SCOPE

Day 1* (7 contact hours)

I. Introduction

II. Understanding Energy Storage Systems Components, Functions, and System Configurations
   A. Batteries
   B. Inverters
   C. Charge Controllers
   D. Energy Management Systems
   E. Balance of System Components and Enclosures
   F. System Configurations

III. Utility-Scale Energy Storage Systems Applications
   A. Grid Support
   B. Investment Deferral
   C. Renewable Energy Services
   D. Microgrid Applications
   E. Demand Response

IV. Key ESS Terms, Concepts and Specifications
   A. Power vs. Energy Ratings
   B. Capacity, C-Rates
   C. Cycle Life
   D. Voltage
   E. Grid Following vs. Grid Forming
   F. Listings
   G. Example Products

V. ESS Chemistries
   A. Lead-Acid
   B. Lithium
   C. Others

Day 2* (7 contact hours)

VI. Common Energy Storage Systems Configurations
   A. Stand-Alone PV System
   B. Interactive PV System
   C. DC-Coupled System
   D. AC-Coupled System
   E. Multimode/Microgrid Systems

VII. 2020 NEC Articles and Sections
   A. Article 690
   B. Article 706
   C. Article 705

VIII. Key Code Requirements and Listings
   A. IFC & NFPA 1
   B. NFPA 855
   C. UL 9540

IX. Safety Hazards for ESS Chemistries
   A. Lead-Acid
   B. Lithium-Ion

X. Conclusion
   A. Review
   B. Exam

*Class scheduling times may vary based on discussions and size of class

AVO Training Institute is accredited by the International Association for Continuing Education and Training (IACET) and is accredited to issue IACET CEUs

STANDARD EQUIPMENT LIST

SOLAR SYSTEMS AND BATTERY STORAGE Course 605

Course 605

REVISED: 1/27/23 BY: R. Stansbury DAYS: 2 Days

NOTE: All items indicated with an asterisk (*) must be supplied by the client on On-Site courses

TEXT (PER 1 STUDENT)
SOLAR SYSTEMS AND BATTERY STORAGE AVO BOOK - Course 605, January 2023

MATERIALS NEEDED (PER CLASSROOM)	
*1	PROJECTOR OR TV WITH PROJECTION CAPABILITIES
*1	DRY ERASE BOARD WITH MARKERS AND ERASER
*10	STUDENT TABLES
*10	STUDENT CHAIRS

FOR VIRTUAL CLASSES:
CONTENT MATERIAL WILL BE PROVIDED IN DIGITAL FORMAT