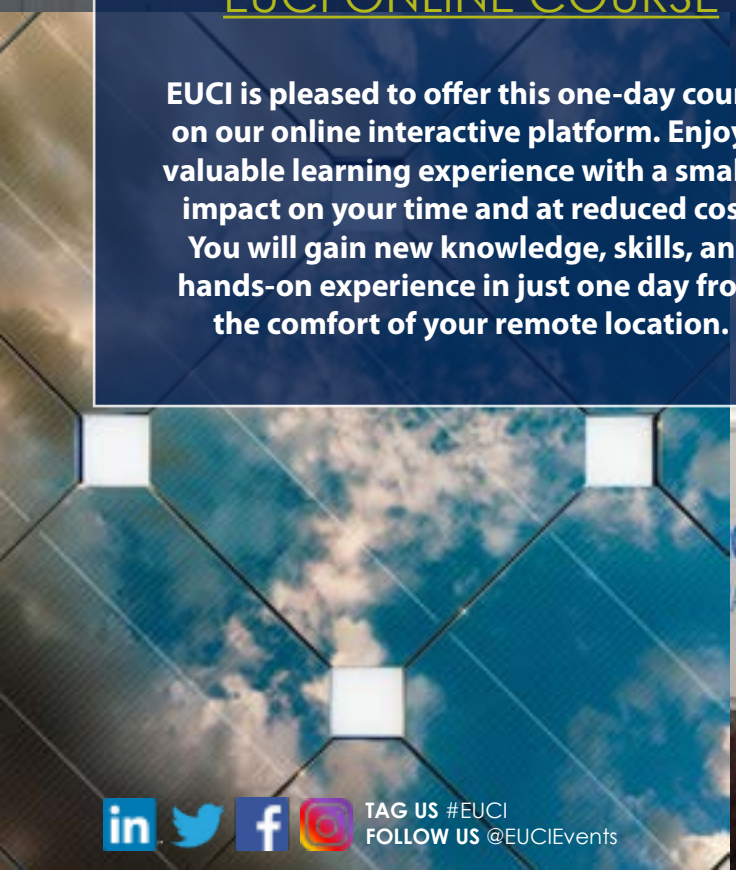
EUCI
ONLINE COURSE

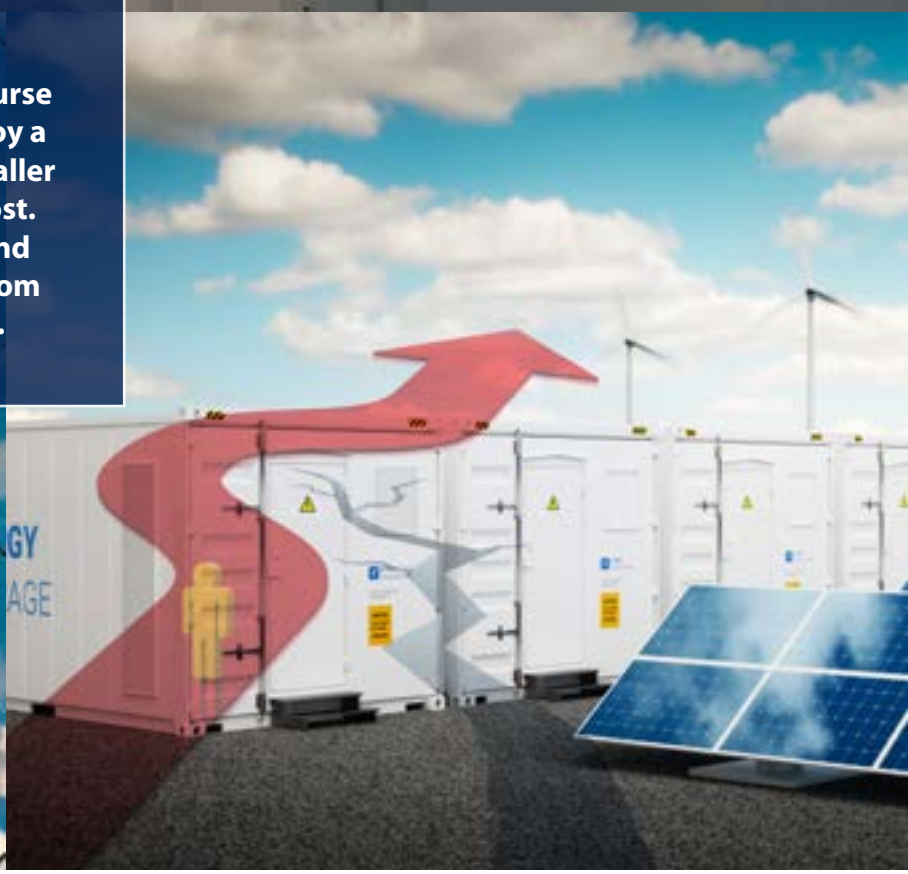
# SAFETY IN BATTERY STORAGE

**September 14, 2020**
**Online | Central Time**

## EUCI ONLINE COURSE

**EUCI is pleased to offer this one-day course on our online interactive platform. Enjoy a valuable learning experience with a smaller impact on your time and at reduced cost. You will gain new knowledge, skills, and hands-on experience in just one day from the comfort of your remote location.**





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EUCI is authorized by IACET to offer 0.7 CEUs for the course

# OVERVIEW

Utilities across the country are rapidly deploying energy storage technologies. Battery energy storage systems (BESS) can be used for a variety of applications, including frequency regulation, demand response, transmission and distribution infrastructure deferral, integration of renewable energy, and microgrids. This storage technology is vital, as it turns power generated by non-dispatchable energy sources — such as wind and solar — into dispatchable ones, thereby improving grid reliability and allowing the integration of even more renewable capacity.

As storage emerges into the utility and power system mainstream, gaps in safety practices for energy storage technologies are coming to light. Concerns regarding large-scale energy storage facilities, especially those using lithium-ion batteries, are driving the requirements for improved knowledge of safety hazards and updating long-established standards to ensure the storage industry's integrity and future growth.

This course will provide an in-depth overview of the hazards and operating risks associated with battery storage. In addition, it will provide a brief review of the different battery types, new standards that help with safety, how to design and operate for safety, and testing standards.  Finally, it will also address the decommissioning removal and disposal protocols for batteries.

# LEARNING OUTCOMES

- Review the different types of battery storage
- Identify the different types of safety hazards for batteries
- Review the hazards associated with each type of battery
- Discuss the testing standards and certific  tions for safety
- Discuss how to design for safety and operating safely
- Examine installation measures for batteries
- Discuss decommissioning & removal practices

# INSTRUCTOR

## Doug Houseman

**Utility Modernization Lead, Burns & McDonnell**

Doug Houseman is a long-time industry veteran who is a member of the Gridwise Architecture Council (GWAC), chair of the IEEE Power & Energy Society (PES) Intelligent Grid and Emerging Technology Coordinating Committee, and a NIST Resiliency Fellow. He has been working on storage issues since 1980, when he was involved with several DOD projects.

# AGENDA

MONDAY, SEPTEMBER 14, 2020 - CENTRAL TIME

**8:45 – 9:00 am** **Log In**

**9:00 – 9:15 am** **Overview and Introductions**

**9:15 am – 4:30 pm** **Course Timing**

**12:15 – 1:00 pm** **Lunch Break**

1. Quick Review of Battery Types
   a. Lead-Acid
   b. Lithium-Ion
   c. Other Non-fl w chemistries that are commercial
   d. Redox Flow batteries
   e. Organic Flow batteries
   f. Plating Flow batteries
2. Battery Safety Hazards
   a. Leakage and spills
   b. Stray voltage
   c. Off gassing
   d. Thermal run away
   e. Toxic fumes
   f. Hazardous waste
   g. Power quality
   h. Other
3. Battery Type vs. Hazard
   a. Which battery types have which hazards
   b. Variations in a chemical family (e.g. Li-Ion)
4. Standards That Apply to Safety
   a. NFPA 855
   b. NFPA (NEC) 70
   c. IEEE 1625
   d. IEEE 1725
   e. ISO/IEC 17025
   f. UN/DOT 38.3
   g. Other safety standards
5. Testing Standards and Certific tions
   a. UL 1642 Lithium Cell
   b. UL 2054 Safety Requirements for Household and Commercial Batteries
   c. UL 2580
   d. UL 1989 Standby Batteries
   e. UL/CSA/IEC 60950 (may be evaluated in conjunction with UL 2054)

# AGENDA

MONDAY, SEPTEMBER 14, 2020 - CENTRAL TIME (CONTINUED)

6. Designing for Safety
   a. Which standards apply to your project
   b. Which chemistry best fits our use case(s)
   c. Optimizing non-flow batteries deployment
      i. Siting considerations
      ii. Containment measures
   d. Civil and electrical infrastructure limits/issues/concerns
   e. Housing and other occupied structures around your site
   f. What comes "out of the box" from the battery manufacturer
   g. ALL hazards associated with specific chemistry chosen
7. General Installation Measures
   a. Fire suppression system
   b. The right firewalls/construction type
   c. Enough room to get emergency vehicles into the site
   d. Sources of water for emergency use
   e. Secondary containment
   f. Proper grounding
   g. Arc Flash prevention/safe distances
   h. Automated protection system(s) — electrical fire, off gassing -etc.
   i. Proper sensors for any hazard
   j. Etc.
8. Operating Safety
   a. Use case and the battery limits
   b. Maintenance
   c. Limits to operation
9. Decommissioning & Removal
   a. Batteries life and variations
   b. Design that incorporates decommissioning

*Throughout the discussion, to illustrate points, compare and contrast safety concerns, design issues, etc., two battery deployment examples will be used — a 1 MW/4 MWH Li-Ion battery setup and a 5MW/40 MWH flow battery

# IACET CREDITS

EUCI has been accredited as an Authorized Provider by the International Association for Continuing Education and Training (IACET). In obtaining this accreditation, EUCI has demonstrated that it complies with the AN-SI/ IACET Standard which is recognized internationally as a standard of good practice. As a result of their Au-thorized Provider status, EUCI is authorized to offer IACET CEUs for its programs that qualify under the AN-SI/IACET Standard.

**EUCI is authorized by IACET to offer 0.7 CEUs for the course.**

# INSTRUCTIONAL METHODS

Case studies and PowerPoint presentations will be used in this program.

# ONLINE COURSE DELIVERY & PARTICIPATION DETAILS

We will be using Microsoft Teams to facilitate your participation in the upcoming event. You do not need to have an existing Teams account in order to participate in the broadcast – the online course will play in your browser and you will have the option of using a microphone to speak with the room and ask questions, or type any questions in via the chat window and our on-site representative will relay your question to the instructor.

- You will receive a meeting invitation which will include a link to join the meeting.
- Separate meeting invitations will be sent for the morning and afternoon sessions of the online course.
  - You will need to join the appropriate meeting at the appropriate time.
- If you are using a microphone, please ensure that it is muted until such time as you need to ask a question.
- The remote meeting connection will be open approximately 30 minutes before the start of the online course. We encourage you to connect as early as possible in case you experience any unforeseen problems.

# REQUIREMENTS FOR SUCCESSFUL COMPLETION

You must be logged in for the entire presentation and send in the evaluation after the online course is completed.

# COURSE RECORDING

A recording of this program will be available for three days from either the end of the program (or three days from the date of purchase, if you purchase the recording after the session ends). It is presented in four-hour sessions and can be watched an unlimited number of times for three days (for the registrant). There is no additional cost beyond the registration fee.

## To Register Click Here,or

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# PLEASE SELECT

◯ **SAFETY IN BATTERY STORAGE ONLINE COURSE**
SEPTEMBER 14, 2020: US $795 (Single Connection)

◯ **PACK OF 5 CONNECTIONS:** US $3,575

◯ **PACK OF 10 CONNECTIONS:** US $5,965

### Online Course Delivery & Participation Details

*See page 5 for information*

How did you hear about this event? (direct e-mail, colleague, speaker(s), etc.)

Print Name | Job Title

Company

Address

City | State/Province | Zip/Postal Code | Country

Phone | Email

**CREDIT CARD INFORMATION**

Name on Card | Billing Address

Account Number | Billing City | Billing State

Exp. Date | Security Code (last 3 digits on the back of Visa and MC or 4 digits on front of AmEx) | Billing Zip Code/Postal Code

**OR** Enclosed is a check for $ _____ to cover _____ registrations.

Substitutions & Cancellations
Your registration may be transferred to a member of your organization up to 24 hours in advance of the event. Cancellations must be received on or before July 17, 2020 in order to be refunded and will be subject to a US $195.00 processing fee per registrant. No refunds will be made after this date. Cancellations received after this date will create a credit of the tuition (less processing fee) good toward any other EUCI event. This credit will be good for six months from the cancellation date. In the event of non-attendance, all registration fees will be forfeited. In case of course cancellation, EUCI's liability is limited to refund of the event registration fee only. For more information regarding administrative policies, such as complaints and refunds, please contact our offices .
EUCI reserves the right to alter this program without prior notice.