EMPOWERED

Education Materials for Professional Organizations Working on Efficiency and Renewable Energy Developments

Awardees: Interstate Renewable Energy Council, New Buildings Institute, Southface Energy Institute, National Fire Protection Association, International Association of Fire Fighters

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Project: DE-EE0009455

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Project Summary

Objective and outcome

Reduce barriers to widespread deployment of distributed energy resources (DERs), including PV, energy storage systems (ESS), electric vehicles, and grid-interactive efficient building technologies (GEB), by providing research-supported, industry validated education and resources.

Stats

Performance Period: April 2021 - March 2024
DOE budget: $2.1M Cost Share: $126K
Milestone 1: 24 educational resources
Milestone 2: 4+ hours online training
Milestone 3: 30,000 users

Team and Partners

International Association of Electrical Inspectors (IAEI)
International Code Council (ICC)
National Association of State Fire Marshals (NASFM)
Pacific Northwest National Laboratory (PNNL)
Slipstream, Inc.
Southeast Energy Efficiency Alliance (SEEA)
UCF: Florida Solar Energy Center (FSEC)

Problem

The nation's 118 million homes, 5.6 million commercial buildings, and 270 million vehicles represent a significant opportunity to **unlock energy savings or enhance energy resilience through efficiency improvements and new distributed energy resources (DERs)**—notably solar; energy storage; electric vehicles; and grid-interactive efficient building technologies.

Building, fire, and safety officials (code officials) play a critical role in enabling the safe, widespread, and rapid deployment of DERs. Yet these **emerging technologies have outpaced codes and existing educational resources,** creating an urgent need for up-to-date guidance for this audience.

Building owners and managers need to understand and manage the new technologies and practices.

IREC Project Goals

- **Increase knowledge** of emerging distributed energy resource (DER) technologies.
- **Provide job-specific skills** to code officials who inspect PV, energy storage, grid-interactive efficient building technologies, and electric vehicle supply equipment.
- **Provide resources** that respond to the changing audience needs and evolving technology over the 3-year period.
- Drive **diverse audiences** to a shared website.

Impact - Code Officials

When equipped with fact-based information about the safety and efficacy of GEB, ESS, EV, and PV technologies, **CODE OFFICIALS** can

- More efficiently inspect structures equipped with the technologies.
- Decrease permitting and inspection (P&I) time, therefore decrease P&I costs born by the consumer.
- Ensure the safe installation of emerging clean energy technologies.
- Improve working relationships with system integrators/installers.

Alignment with BTO Goals

- Increase building energy efficiency and resilience.
- Accelerate building electrification (reducing onsite fossil fuel based emissions).

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Impact - Building Managers & Owners

When equipped with fact-based information about the safety and efficacy of GEB, EV, ESS, and PV technologies, **BUILDING MANAGERS** and **OWNERS** can

- Invest in cost-effective DER.
- Increase demand for emerging technologies.
- Decrease energy usage and operating costs.
- Help utilities manage grid operations and lower system costs.

Alignment with BTO Goals

- Increase building energy efficiency
- Accelerate building electrification
- Increase building demand flexibility and improve resilience

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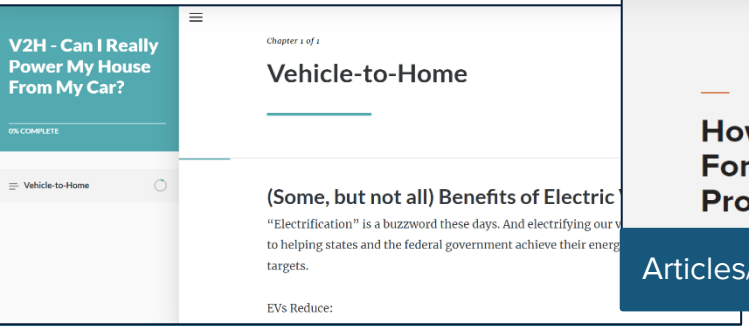
Where We've Been

Slow, expensive, inconsistent

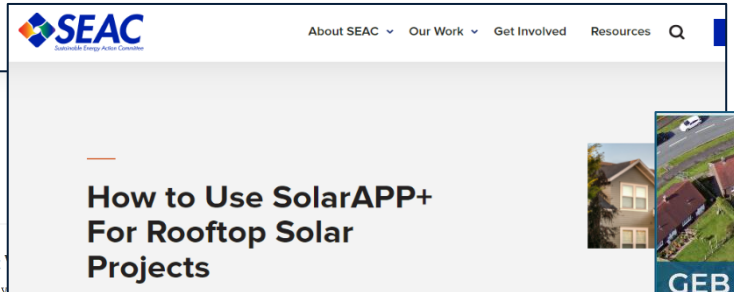
Where We're Going

Accessible, educated, empowered

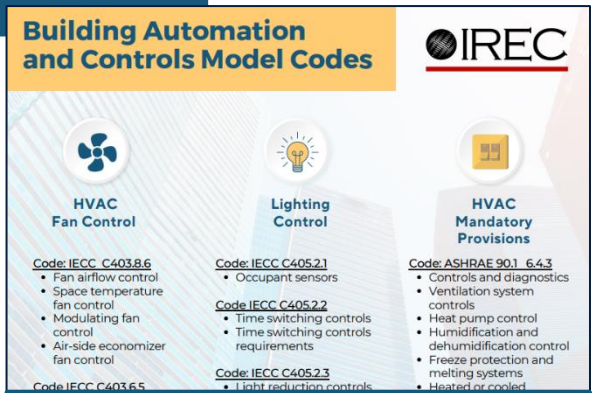
Educational Resources: CleanEnergyClearinghouse.org



Interactive lessons - Vehicle-to-Home



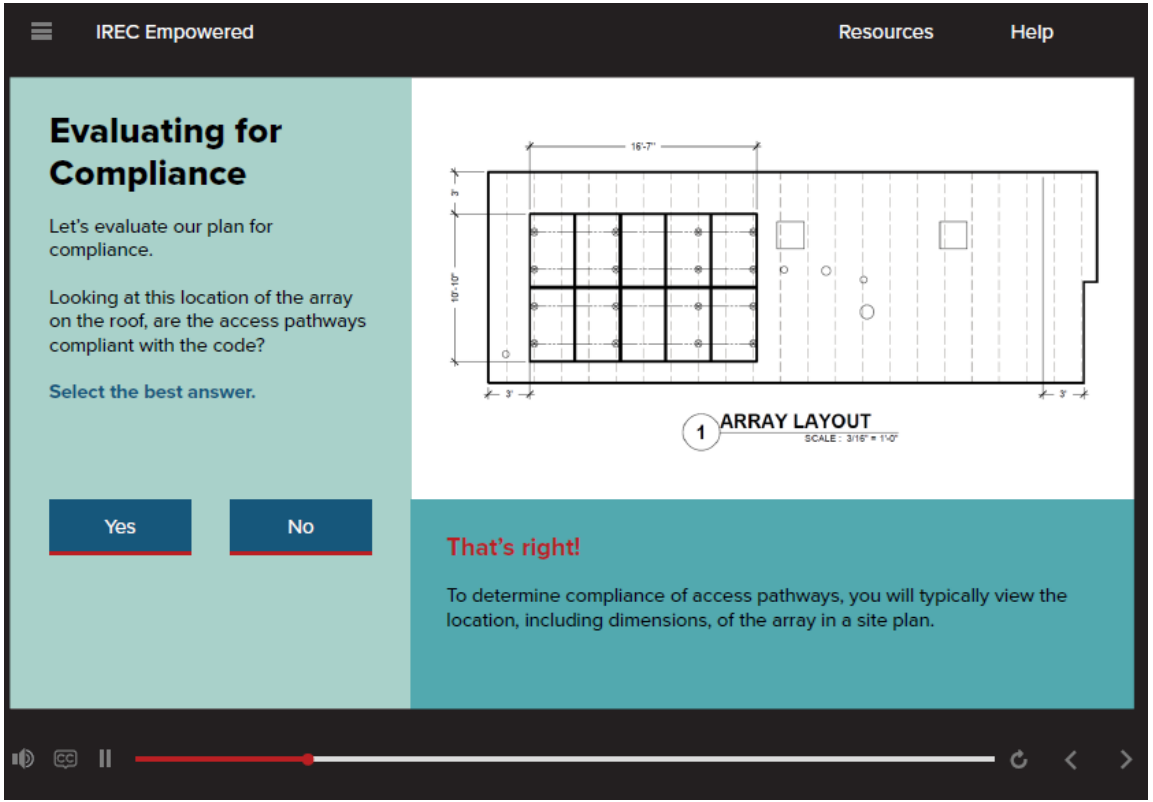
Articles/ blog posts - Design validation



Infographics - *Model codes*

Downloadable checklists - PV

Job-Focused Training: CleanEnergyTraining.org



Challenges and Innovation

The project will tackle several unique challenges:

- The evolving needs of those on the front lines of DER adoption.
- The ability to cost-effectively reach a national audience.
- Establishing the relevance of efficient and renewable technologies.
- Reaching a wide enough audience.
- Creating accessible education.
- Avoiding duplication of effort and competing information.

Innovation. Deliver dynamic educational materials online and drive complementary stakeholders to a central clearinghouse website. Users can access resources on their own schedule and return frequently to deepen their understanding. In this way, IREC and our partners are poised to help code officials and building professionals contribute to the widespread adoption of distributed energy resources.

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Accomplishments – 1st 2 years

- 2 active websites
  - 24+ resources (CleanEnergyClearinghouse.org)
  - 30 courses (CleanEnergyTraining.org)
- 75,000 unique visitors to the websites
  - Project Goal = 30,000
- 4,000 user accounts created (CleanEnergyTraining.org)
- 7,200 course registrations
- 1,000 webinar attendees (7 webinars, 2000 registrations)

EMPOWERED Awardees

Topic 1. Emergency Response & Resilience Planning

NFPA®

Topic 2. Safe DER Building Integration: Building, Fire, and Safety Department Officials

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INTERSTATE RENEWABLE ENERGY COUNCIL

Southface

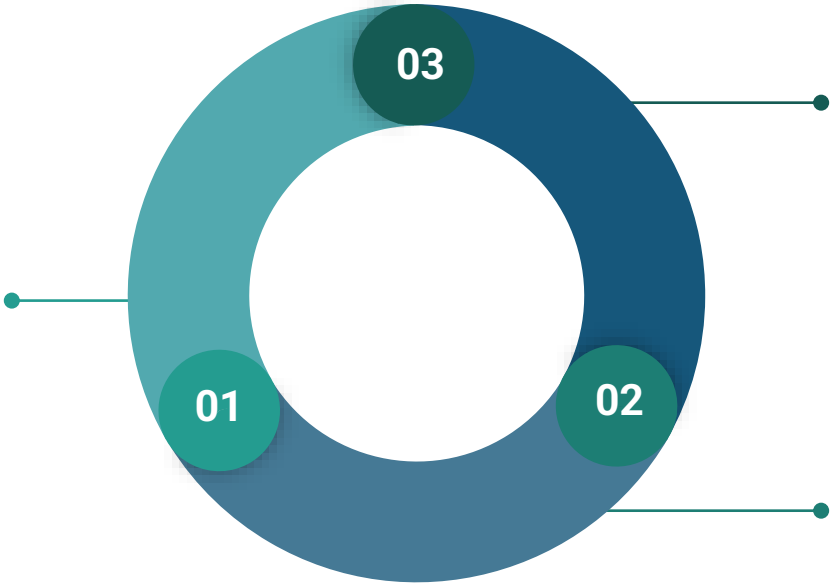
nbi new buildings institute

Collaboration: Examples

- Webinars that feature other awardees.
- Resources that direct users to awardees' work.
- Complementary, not duplicative products.
- Extended outreach: Promotion of each awardee's material.
- Educational products that build on other awardees' work.
- Monthly meetings with same-topic awardees.

Collaboration: Safe DER Integration – Example

New Buildings Institute
Produce Permitting & Inspection Guidelines for residential energy storage systems based on SolSmart's document.



Southface Energy Institute
Develop interactive diagrams to illustrate concepts in the guides.

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Develop training to encourage adoption, customization, and use of guidelines.

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Collaboration: Awardees Topics 1 & 2

Plans for a future webinar featuring all of the EMPOWERED awardees to showcase training developed during the project.

Featuring Sean DeCrane, IAFF

Featuring Alexi Miller, New Buildings Institute

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Residential ESS Project Introduction

Large-scale burn experiments involving renewable energy components:

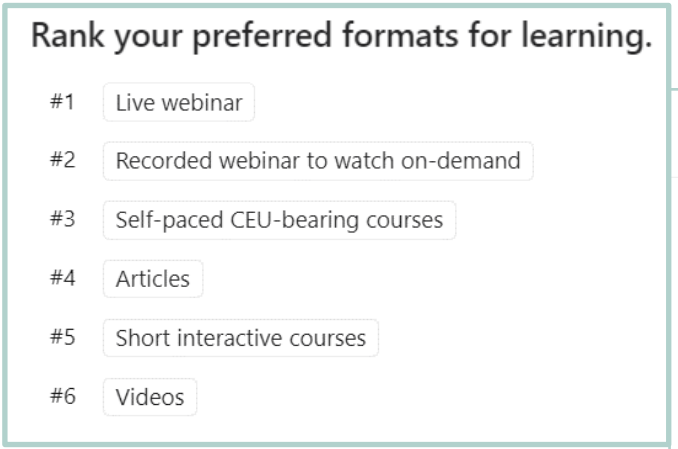
- Part 1: Full-scale vertical flame spread of new residential cladding materials
- Part 2: Potential impact of li-ion residential ESS on incident response

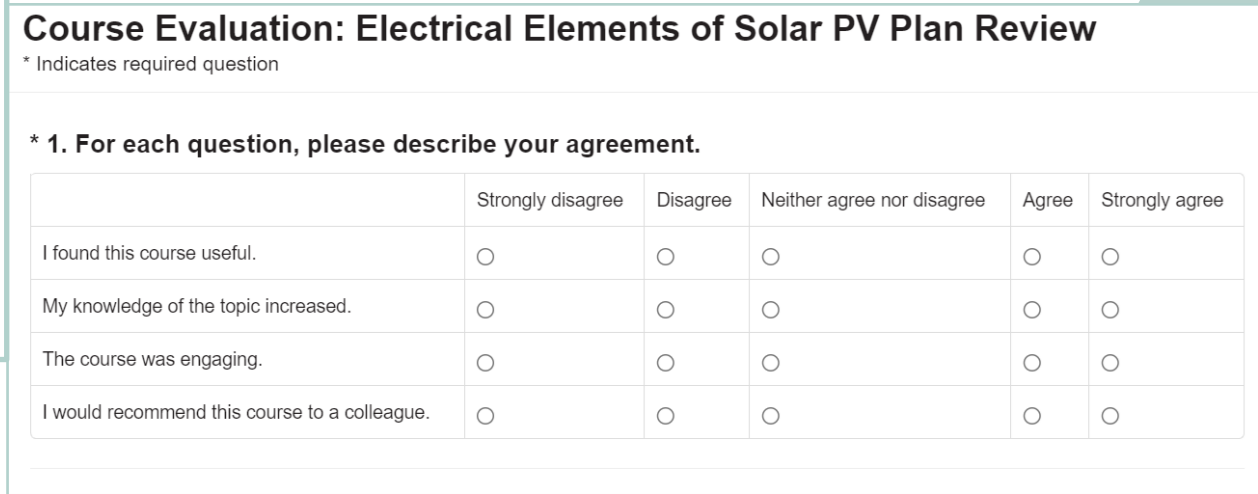
Objectives:

1. Determine whether li-ion battery gas impacts compartment fire dynamics.
2. Develop size-up and tactical considerations for first responders to li-ion residential energy storage system fire incidents

Metrics & Data Collection

- End of course evaluations for CEU-bearing courses
- Mid-webinar polls to gauge usefulness
- Partner-issued questionnaires





Course Evaluation: Electrical Elements of Solar PV Plan Review

* Indicates required question

*** 1. For each question, please describe your agreement.**

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree
I found this course useful.	○	○	○	○	○
My knowledge of the topic increased.	○	○	○	○	○
The course was engaging.	○	○	○	○	○
I would recommend this course to a colleague.	○	○	○	○	○

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Lessons Learned – Educational Delivery

- Online education is scalable and responsive.
- Basic education is still in demand.
- A variety of formats is attractive.
- Live webinars are popular.
- Shorter, less technical information captures attention.
- Real-world examples and “hands-on” learning can be supported in online formats.
- Learners learn best when you build on what they know.
- An essential part of successful training and education is identifying the learner’s motivation.

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Lessons Learned – Outreach

- Reaching a high volume of potential learners is critical.
- Just-in-time learning is great, as long as people can find it when they need it.
- Cultivate the desire to learn about new technology and what is in it for the learner.
- Relate the available resources to what the learner needs.

Lessons Learned – Collaboration

The Interstate Renewable Energy Council (IREC) @IRECUSA · 11m

A key element will be collaboration: we need diverse stakeholders from employers & training providers to community-based organizations to align on needs and solutions to prepare the #CleanEnergy workforce that is needed now. irecusa.org/programs/the-n... #NetZeroNow

nbi New Buildings Institute @NewBldgsInst · 12m

Q8: How can we prioritize workforce development to reach a #CleanEnergyFuture within the built environment? #NetZeroNow

June 13, 2022

Net Zero Buildings: 18 Industry Recommended Ways to Start Learning

Fact-based, industry-vetted, educational resources supporting a clean energy future.

The Interstate Renewable Energy Council (IREC), New Buildings Institute (NBI), and Southface Institute are working in concert under the U.S. Department of Energy (DOE)'s EMPOWERED program and unite almost 20 clean energy organizations as additional collaborators. The following list of resources were curated by project partners as part of our joint participation in Net Zero Buildings Week.

Check out the links below to access fact-based, industry-vetted educational resources on a variety of topics related to clean energy, energy efficiency, building technologies and more!

- Clean Energy Training and Workforce Development
  Interstate Renewable Energy Council
  CEU bearing training courses and educational resources for clean energy and allied professionals, including code officials, AHJs, building safety officials, facility managers, installers and others.
- Net Zero Energy and Decarbonization Toolkit
  International Code Council
  Comprehensive resource for states, tribes, local jurisdictions, and other organizations interested in developing and implementing advanced energy efficiency and carbon reduction goals for a net zero future.
- Understanding How Building Controls Can Save Energy
  Slipstream
  This guide demonstrates how smarter use of building controls could improve energy savings by up to 30 percent. Implementing energy efficiency measures in buildings is a key step in meeting clean energy goals.
- Evolving Technologies
  International Association of Electrical Inspectors
  IAEI Magazine articles that include technical details of evolving technologies such as renewable energy systems including PV, Wind, fuel cells, and energy storage devices.
- Affordable Housing and Existing Home Retrofits
  FSEC Energy Research Center
  Energy efficiency and building science measures for safety, durability, and indoor

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Cross-Office Collaboration is Valuable

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A Holistic Approach to Education Advances Goals

Increase Consumer Demand

Accessible, fact-based education about efficient heating & cooling and DERs.

Improve Planning & Zoning

Technical assistance and resources about getting buildings ready for solar, energy storage, and EVs.

Decrease Permitting & Inspection Time

Permitting & inspection guidelines and practice using them.

Get Buy-In from First Responders

Accurately-informed first responders pose fewer barriers to DER.

Improved Building Efficiency & Reduced GHG Emissions

Consumer demand for efficient and renewable technology met with DER-friendly zoning policies supported by efficient and cost-effective permitting practices and educated inspectors and first responders.

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Future Work – Year 3

- Increase cross-award collaboration.
- Permitting & Inspection Guides pilot in AZ and MA (NBI).
- Training on P&I Guides (IREC and Southface).
- IAFF and NFPA will develop training based on research.
- EMPOWERED Awardee webinar showcasing available training for all of the audiences.
- Experiment with different outreach methods.

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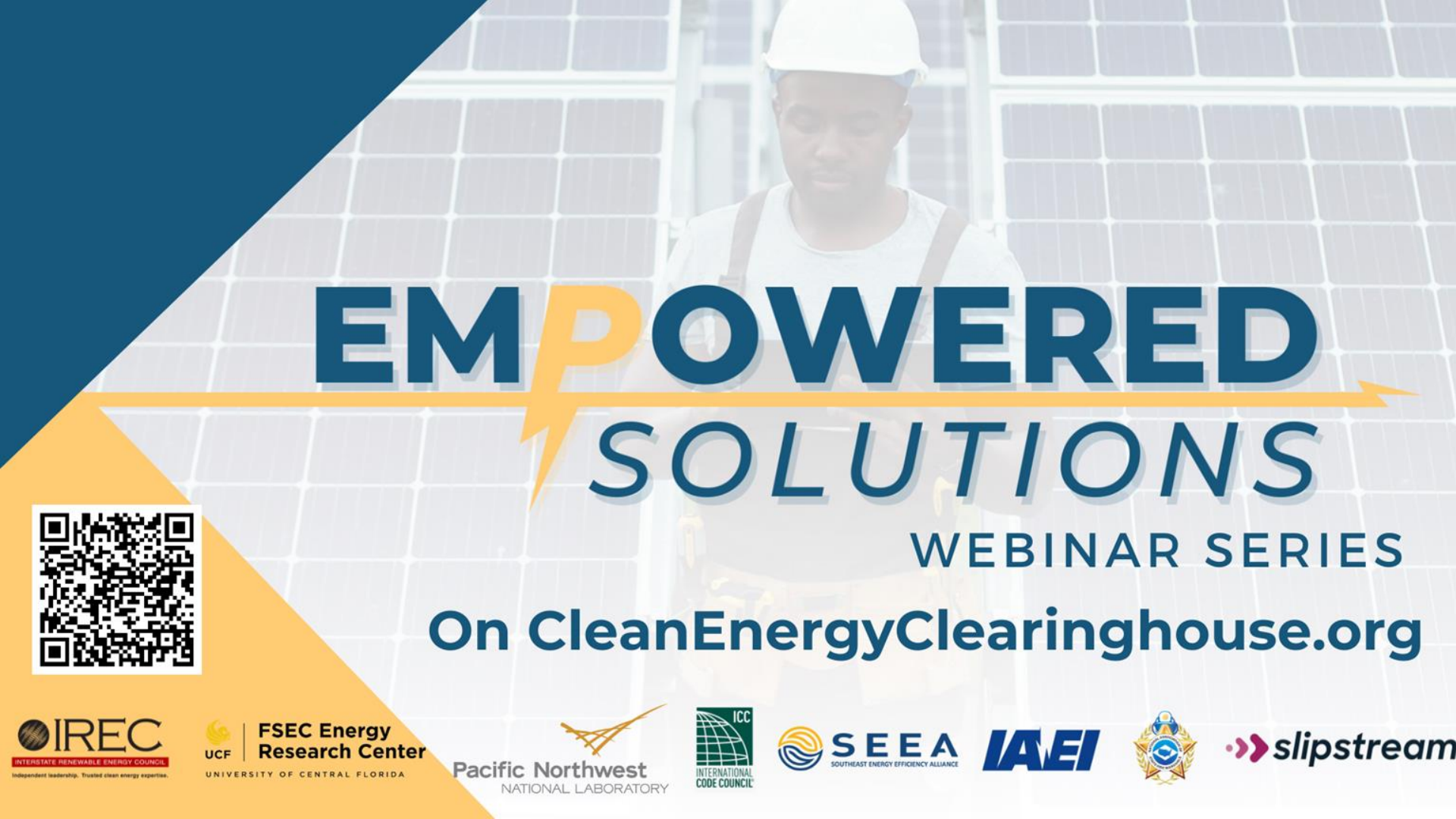
EMPOWERED
SOLUTIONS
WEBINAR SERIES
On CleanEnergyClearinghouse.org
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Independent leadership. Trusted clean energy expertise.
UCF
FSEC Energy Research Center
UNIVERSITY OF CENTRAL FLORIDA
Pacific Northwest
NATIONAL LABORATORY
ICC
INTERNATIONAL CODE COUNCIL
SEEA
SOUTHEAST ENERGY EFFICIENCY ALLIANCE
IAEI
slipstream

Scalability, Replicability, Impact

- Well-maintained and frequently added to website encourages repeat visitors.
- Users from multiple facets of the industry can view the same information to align view points.
- Engaging online training can cost-effectively reach a nationwide audience, while still allowing for regional customization.
- **Active collaboration** among resource creators results in more complementary resources that reinforce a consistent message.

IREC builds the foundation for rapid adoption of clean energy and energy efficiency to benefit people, the economy, and our planet.

Suggestions welcome

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EERE/BTO goals

The nation's ambitious climate mitigation goals

Greenhouse gas emissions reductions

50-52% reduction by 2030 vs. 2005 levels

Net-zero emissions economy by 2050

Power system decarbonization

100% carbon pollution-free electricity by 2035

Energy justice

40% of benefits from federal climate and clean energy investments flow to disadvantaged communities

EERE/BTO's vision for a net-zero U.S. building sector by 2050