

## BOC 1014 Instructor Notes & Metrics

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### Overview of BOC and Instructors' Role

One major program goal of the BOC is to increase learners' ability to identify areas for reductions in energy and natural resource consumption and to design projects to accomplish this. The competency basis of the Building Operator Certification adds responsibilities to the instructors to ensure appropriate material coverage and effective delivery so that participants are successful on the test and any related project assignments (see below). To the degree possible, instructors should encourage and maintain an interactive classroom environment to enable learners to learn from each other and apply the information to their facilities. Metrics are defined for Class Exercises, Project Debrief, and Proctorship of BOC Tests to ensure quality of program delivery. You should familiarize yourself with these metrics and seek assistance from the BOC program administrator or the BOC office, if questions arise.

### What is the purpose of BOC 1014 Electrification and Building Operations?

Buildings are significant sources of energy consumption and greenhouse gas emissions. Brought about by an environmental movement to move away from fossil fuels, many states are now adopting aggressive climate action plans that include renewable energy, energy efficiency, and phasing out fossil fuel-based equipment altogether by replacing it with electricity-based equipment. Thus, electrification is increasingly a part of a building operator's responsibility. This class explores the drivers behind decarbonization policies and provides an overview of the fundamentals of electrification technologies, including implementation benefits and barriers, as well as maintenance and troubleshooting of key assets and systems. It reviews applicable best practices, standards and incentives that are moving buildings away from the use of fossil fuels and to 100% electric equipment.

### Class Objectives:

1. Understand the motives for and measure for electrifying buildings
2. Demonstrate a fundamental understanding of how electrification influences building performance, safety, and operations and maintenance by discussing the technological, environmental, and utility perspectives
3. Explain how electrification impacts the role of building operators
4. Identify benefits and barriers to electrification
5. Execute basic maintenance on electricity-powered mechanical systems

### Who is the audience?

Learners are building operating engineers and maintenance personnel with responsibility for optimizing building operations, maximizing cost savings, or are involved in energy management or sustainability programs to improve their building's performance. Increasingly, they may be responsible for helping to bring their buildings into compliance with performance standards or emission reduction mandates and/or

completing required documentation to do so. They may also be responsible for long-term planning for end-of-life equipment replacement. Recognizing that the bulk of the existing building stock consists of older buildings with various types of systems, including fossil fuel-based equipment, learners need to understand about the benefits of and considerations for moving toward decarbonization in their own buildings.

### **Preparation**

Review the class outline, suggested activities, and checklist. They provide criteria for effectively engaging learners, promoting discussion on key topics, and helping learners review and check for understanding. Since class activities are a required component of BOC training, determine if you will be implementing activities suggested or equivalent (objective, method and time) activities of your choice. In making your decision, remember that the ultimate goal is to facilitate the learning by adults who prefer experienced-centered and problem-centered instruction.

Speak with your BOC program manager to determine who is sponsoring the BOC course. The BOC program helps connect participants to local resources including utility programs that can assist them with their energy efficiency and/or electrification projects. Check the [www.dsireusa.org](http://www.dsireusa.org) website. DSIRE is a comprehensive source of information on state, local, utility and federal incentives and policies that promote renewable energy and energy efficiency. Research and become familiar with utility rebate and incentive programs, state energy office initiatives, and local energy efficiency trends and initiatives relevant to the class subject matter. Use the research to supplement discussion and tailor/adapt BOC curriculum to support sponsor interests. For example:

1. Describe how the BOC sponsor's EE initiative and/or DSM program benefits building owners.
2. Provide one or more examples of how their initiative/program relates to the topic you are teaching. What would a building operator need to know about this relationship? How would you tailor the instruction to share this information with the participants?

### **Curriculum Materials**

Each BOC class curriculum is comprised of the following components. Instructors are encouraged to review all of the materials in preparation for teaching. Questions or concerns, if any, about the content or application of the curriculum should be addressed with your course manager two or more weeks in advance of your scheduled teaching date.

- Outline
- Instructor notes
- Slide presentation

- Glossary (if applicable)
- Appendices (if applicable)
- Learner activities
- Test booklet, answer sheet and key
- Supplemental reading (if applicable)
- Student handbook

The curriculum materials listed above complement the Student Handbook to help you prepare learners for the tests and exercises. We encourage you to enhance the slides with your own teaching aides provided these do not confuse coverage of the basic materials nor create any ambiguity in the minds of the learners. These aides might include additional slides), case studies, demonstration props and specialty equipment, videos, and in-class exercises. If adding slide content, make sure to note to students that the content isn't in their handbook, to avoid confusion. Instructors are also encouraged to note current changes and developments in the topic they are presenting. See the suggested props/specialty equipment in the checklist below.

### **Learner Materials**

Learners receive a Student Handbook that complements the presentation slides. The handbook may contain pages, illustrations, tables, charts, and other documents that support activities. Instructors should reference the handbook during class and refer participants to specific pages when giving instructional cues. A PDF version of the handbook is available to instructors on the BOC Instructor Materials Repository.

### **Class Activities**

**Metric:** integrate a minimum of 1 hour of non-lecture, participant-centered activity into the training day.

### **What is activity-based learning?**

Class activities led by the instructor enable learners to practice skills and concepts taught. The average retention rate for lecture mode of instruction is 5% compared to 50% for discussion group and 75% for practice by doing. Additionally, activities break up a long day of presentations and offer participants an opportunity to network with and learn from each other's experiences. Most classes in BOC Level I and II have several suggested in-class exercises for the instructor to administer.

### Special notes for BOC 1014 PPT slides and activities:

**Safety Message:** BOC is now including a "Safety Message" slide prompt in each class going forward. Instructors can check with their course sponsor/administrator, Course Manager, and the BOC repository for safety topic ideas. This can be a quick discussion (1-3 minutes).

**Videos:** There are three videos included in 1014. An additional video that is not included but is an option to show if time allows is a video from “This Old House” on Affordable Geothermal (link below):

[https://youtu.be/IMO9jvwIHFg?si=FISdLTu55U\\_I4JLG](https://youtu.be/IMO9jvwIHFg?si=FISdLTu55U_I4JLG)

Instructors have two options for showing the videos. 1) Use the link imbedded in the slide so that you can run without the Internet, or 2) Use the Internet if available. Test the imbedded link before you teach the class – at least a week before. If teaching in person, make sure to bring speakers to provide adequate amplification of sound. If teaching via Zoom, make sure that when you share your screen you check the options for sharing audio and optimizing the sound. Contact your course manager if you need help making the video work.

### **Review of Heat Pump Types**

Many of the different types of heat pumps covered in BOC 1014 were introduced in BOC 1001, so this section may feel like a review to some students. It may be helpful to preface this section as such. This class provides an opportunity for a deeper dive into the uses, benefits, and considerations of various types of heat pumps and related equipment.

### **Project Assignment**

**Metric:** allot a minimum of 10 minutes of class time facilitating a debrief on the project assignment from the class taught before yours (if applicable, depending on the order of classes in your course).

Successful completion of all project assignments is required for the Level I certificate credential. It is therefore important to ensure participants understand the assignment and are comfortable completing it. Participants return the completed projects to the following class where it is reviewed and graded by the training coordinator.

Review the Project Workbook to familiarize yourself with the project assignments. Review the project specific to the class taught before yours (see BOC schedule from your administrator). Develop three questions you would use to facilitate the discussion keeping in mind the goal of providing participants with the opportunity to share their experiences and create action steps for implementing energy efficiency improvements.

*Note:* there is no project associated with the Electrification and Building Operations class, as it is a supplemental class for Level I courses.

Review the Test and Answer Key documents prior to teaching the class and ensure that each question is covered adequately in the lecture and/or activities during the class. **(However, explicit coaching of participants about material that appears on the test is not permitted during instruction of BOC classes. Directing participants to highlight**

**or put post-it notes at specific points in the Participant Handbook is also not permitted.)**

### **BOC Test Proctor Procedure**

**Metric:** follow the BOC test procedure.

The BOC test is designed as an assessment of a participant’s grasp of the material and it is essential that the integrity of the test be maintained. The following test procedure maintains the integrity of the test by preparing participants to be successful in the absence of coaching to the test.

**TEST PROCEDURE:** The instructor is responsible for administering the test and will be present throughout the test to answer questions. The instructor is permitted to clarify the questions, if needed, but may not provide the answers to any questions under any conditions.

Note: For classes held virtually, the test will be administered through a learning management system (LMS) or similar online platform. In this case, instructors should remain available (via the virtual class session, by email, and/or by phone) to provide assistance to students taking the test.

At the beginning of the class session, the instructor will review the day’s agenda, including the timing of the test and general points concerning its administration. The instructor will review the test procedures and restrictions with participants prior to taking the test.

The exams are open-book and any notes or handout materials may be used as a reference. A period of one hour is available for the test, but it will not be strictly timed.

Coaching of participants about material that appears on the test is not permitted during instruction of BOC classes. Directing participants to highlight or put post-it notes at specific points in the Participant Handbook is also not permitted.

The instructor is responsible for ensuring a quiet test environment, which includes no use of cell phones and no unnecessary conversation of any kind while the test is underway.

When finished, the TEST BOOKLET and the COMPLETED ANSWER SHEET should be turned in to the instructor or the site coordinator, as appropriate (or submitted electronically in the case of virtual classes where the test is administered via an LMS or similar platform).

Test takers finish at much different times. A test review after the test isn't generally practical. We recommend instructors review the test with learners at the start of the next class day in the course.

### **Evaluation**

At the end of class, all participants will complete a *Class Evaluation* form after taking the test. The evaluation is designed to collect information about the class content, instruction, and future interest in topics. The information is used by NEEC to make improvements to the curriculum, to share with instructors, and to plan future classes offered in the BOC program.

### **How to Start the Class Day**

- **Room Set Up**

Instructors will need to give some thought to arranging the classroom to maximize group activity. Also, they need to come up with an effective strategy to mix up the groups to get people working with others they don't know.

- **Review the Schedule**

The instructor is responsible for scheduling breaks and lunch with input from the class. The instructor may adjust break points and timing based on how the material is progressing. Every class is different.

- **Set the Context**

BOC 1014 is one of the supplemental class options for the Level I course series, and is typically offered after completion of the core classes. Students will likely have already met and interacted with each other in the several classes held prior to coming to this class. We encourage instructors to provide students the opportunity to deepen their relationships with each other.

An introductory activity is provided to follow the instructor's introduction of themselves. The purpose of the introductory activity is to give students the opportunity to remind their fellow students about their own background and to introduce themselves to the instructor by name and job responsibility, and to share something about themselves (e.g., what they hope to learn in the class, what they have in common with their seat mate, a personal hobby, etc.) You may use an introductory activity of your choice to achieve this learning outcome.

**Instructor Checklist (some items N/A for virtual classrooms)**

- Number of people expected: \_\_\_\_\_
- Classroom set-up confirmed?
- Instructor(s) bio
- Learner IDs
- Sign-up sheets and pens
- Evaluation forms
- Student handbooks
- Test booklets
- Test answer sheets
- Duct tape
- Extension cord
- Laptop speaker for in-class video presentations
- Props: \_\_\_\_\_

**Be sure to review with participants all of the material covered on the test.  
Forward all test booklets and answer sheets to NEEC within two weeks of the class.**

**Collect these evaluations at the end of the class and return the completed  
evaluations to the training coordinator.**