

## BETTER BUILDINGS WORKFORCE ACCELERATOR

From 2020 to 2023, NEEC participated as a partner in the [Better Buildings Workforce Accelerator](#) (BBWA). The BBWA is a Department of Energy (DOE) initiative seeking to raise the level of building science and energy efficiency knowledge in the nation's building-related workforce. Through the BBWA, DOE engaged industry partners in activities that build interest and awareness, streamline pathways, and improve skills for people pursuing green building careers.

The Northwest Energy Efficiency Council (NEEC) partnered with Northeastern University and Washington State University to expand its Building Operator Certification<sup>®</sup> (BOC) training to emphasize grid-interactive efficient buildings and occupant-centric controls with a focus on an entry- and pre-entry-level workforce.

### About the Partner

[NEEC](#) is a business association for the energy efficiency and building decarbonization industry. NEEC's mission is to remove all carbon emissions from building energy use through market-based thought leadership, education, and advocacy.

NEEC's programs include the [Smart Building Center \(SBC\)](#), a multi-functional energy efficiency hub that delivers training programs, showcases industry-leading projects, and connects stakeholders through hosting and participating in smart building events. The Smart Building Center offers a [Tool Lending Library](#) that loans a wide spectrum of diagnostic tools for building owners and managers as well as energy service professionals in Washington State and Oregon. NEEC also operates a technical assistance helpdesk for Washington State's Clean Building Performance Standards.

Additionally, NEEC administers the [Building Operator Certification<sup>®</sup> \(BOC\)](#), a national leading competency-based training and certification program for building engineers and maintenance personnel. Throughout the levels of training—Fundamentals of Energy Efficient Building Operations Certificate and Building Operator Certification Levels I and II—participants are taught how to make a building more comfortable and efficient by making its systems work better together and identifying low-cost and no-cost energy efficiency improvement opportunities.

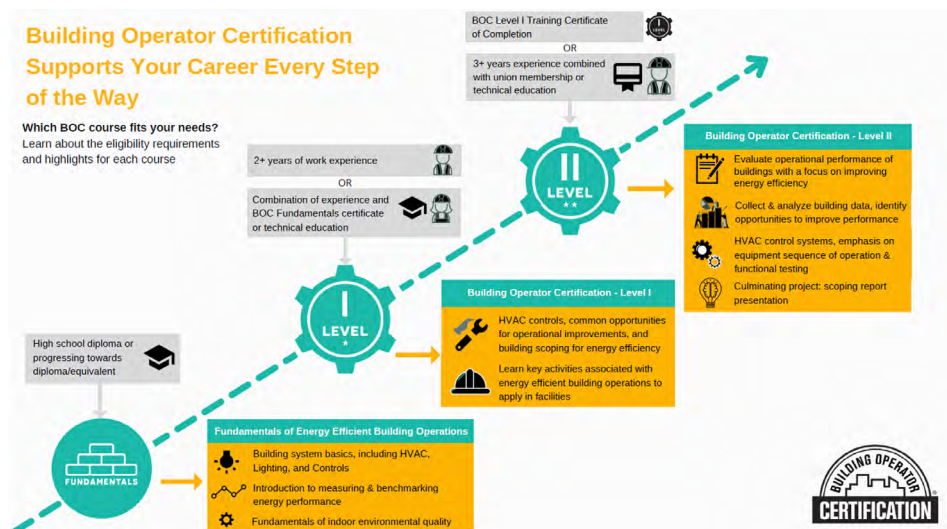
### About the Project

A team led by Northeastern University (NEU) in partnership with Washington State University (WSU) Integrated Design + Construction Lab (ID+CL) and NEEC developed new curriculum in the form of Building Operators: Grid and Occupant (BOGO) Training to expand and enhance the BOC.

[The \\$750k project is funded by the Department of Energy Building Energy Efficiency Frontiers & Innovation Technologies \(BENEFIT\) funding opportunity.](#)

### AT A GLANCE

- ▶ **Partner:** Northwest Energy Efficiency Council
- ▶ **Project:** Building Operators: Grid and Occupant Training (BOGO)
- ▶ **Program Location:** Boston, MA
- ▶ **Technology:** Grid-interactive efficient buildings; occupant-centric controls; building operations emulator
- ▶ **Audience served:** K12 Students; Incumbent Workforce
- ▶ **Better Buildings Workforce Focus Area(s):** Build Interest and Awareness; Improve Skills



The project will develop a formal 14 hour supplemental curriculum to the BOC program for pre-entry level building operators that improves their literacy of grid-interactive efficient buildings (GEBs) and occupant-centric controls (OCC). The goal is a curriculum scalable to vocational-technical high schools and community colleges nationwide.

A key component of the project is the development of the Building Operation Emulator (BOEm). The real-time building energy simulation features an interactive dashboard that can be used for teaching both building automation system (BAS) fundamentals and BAS decision making skills that can affect occupants' comfort and energy use, building costs, and consequences for the grid.

## Challenges

The development of the BOGO project and curriculum was motivated by research conducted through the [International Energy Agency \(IEA\) Annex 79, Occupant-Centric Building Design and Operation](#). As part of the Annex, an international survey of 72 building operators was conducted and found the following trends:

- ▶ An aging building operator workforce
- ▶ A diversity of backgrounds within the building operator workforce including those with a facility management background and those with engineering experience

- ▶ Major changes in building technology, including grid-interactive technology
- ▶ Changing expectations related to occupant comfort and occupant interaction with the building

## Solutions

The BOGO curriculum is designed to target a younger, entry- and pre-entry-level workforce through partnership with Boston Public Schools and illustrates the career paths available within the building operator field.

The curriculum educates those of all experience levels on grid-interactive efficient buildings (GEB) and the optimization of energy consumption. This represents a shift from efforts solely focused on energy efficiency and demand reduction.

GEB technologies, like smart building automation, can dynamically adjust energy consumption but can also pose challenges to occupant comfort, satisfaction, and health if not managed by trained professionals. The BOGO program aims to provide a humanistic approach to training the next generation of building operators using GEB technologies and concepts. The program will hasten the rollout of GEB technologies, decreasing stress on the electric grid and lowering building carbon emissions.

## Lessons Learned

Challenges faced during the development of the program included creating curriculum applicable to all levels of high school and community college, building a foundation for those with little background in building operations, and utilizing real-world examples.

NEEC's pre-existing Building Operator Certification Fundamentals Program targets an existing workforce that can return to their workplaces and practice in a real building. To transfer the curriculum to a pre-entry level workforce, the BOGO program relies on case studies, virtual reality walkthroughs, and a virtual simulator in the form of the Building Operation Emulator (BOEm). Virtual reality walkthroughs help students practice activities like checking thermostats and demonstrate the interaction between building operations and occupants. The emulator runs a real-time building simulation for students to practice tasks like reducing peak power on hot days and understanding how temperature variations affect occupants.

## Outcomes & Impact

The Building Operators: Grid and Occupant (BOGO) Training will be continuously improved through a three-year, 75-student trial before rolling out nationwide in 2025 as a professional credential as part of NEEC's BOC Fundamentals Program.

Currently, NEEC's BOC courses can be taken virtually in the United States and Canada. In-person classes are offered in 40 states and administrated by NEEC and 14 training partners.

Since 1997, NEEC has recorded more than 20,000 graduates for BOC Level I and more than 3,500 graduates for BOC Level II. The BOGO curriculum will build on highly successful training and expand the reach and audience of the BOC program nationwide.

*This case study was developed with content from [NEEC's website](#), the [BOC website](#), [Northeastern University](#), and [IEA's Annex 79](#).*

