

Building Operator Certification Pilot Impact Evaluation Report

Energy Efficiency Plan Program Year 2021
(1/1/2021-12/31/2021)

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Nicor Gas

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1. Introduction

This report presents the results of the impact evaluation of the 2021 Building Operator Certification (BOC) Pilot. Due to the pilot activity timeline that includes training and opportunity identification, planning, budgeting, and implementation, the pilot evaluation seeks to determine savings from measures implemented by participants from the *prior* calendar year. Thus, 2021 impacts are a result of activities undertaken by 2020 participants.

This report summarizes the total energy impacts for the pilot broken out by relevant measure and pilot structure details. The appendices provide the impact analysis methodology and details of the total resource cost (TRC) analysis inputs. Program Year 2021 covers savings from January 1, 2021 through December 31, 2021.

2. Pilot Description

BOC is a training and certification for commercial building operators. The curriculum teaches participants how to improve building comfort and efficiency by optimizing the building's systems. The curriculum has been offered for several years and is implemented throughout the region by the Midwest Energy Efficiency Alliance (MEEA).

Due to constraints imposed by the COVID-19 pandemic in 2020 and 2021, the national coordinator of BOC training, the Northwest Energy Efficiency Council, and MEEA changed their training delivery from a 6-day or 7-day, in-person experience to a virtual, online interactive platform. The development time for the online curriculum limited the 2020 course offerings to the last calendar quarter.

The BOC Pilot offers partial participant tuition-reimbursement for ComEd, Ameren and natural gas customers who complete the curriculum. The sponsoring utilities' goal is to have participants implement energy-saving practices at their facilities. BOC training has two curricula: BOC Level I and BOC Level II.¹ Both curricula require a time commitment of more than 60 hours for class training and assigned projects spread over several months. In 2020, the BOC training had seven participants from the Nicor Gas territory (see Table 2-1). Participants implement savings subsequent to their training over one or several years. The evaluation research in 2021 estimates savings from these activities.

Table 2-1. Number of Participants and Projects

Participation	2020 Count
Level I Participants	3
Level II Participants	4
Total Participants	7

Source: ComEd tracking data and evaluation team analysis

¹ Level I BOC Training is "Building Systems Maintenance" and Level II BOC Training is "Improving Building Operational Performance." One difference between Level I and Level II trainings is in the eligibility criteria; Level II training eligibility requires more years of operations and maintenance (O&M) experience, higher levels of education, or the completion of Level I BOC training. Source: <https://www.theboc.info/building-operator-training/boc-eligibility/>.

3. Pilot Savings Detail

Table 3-1 summarizes the incremental energy savings the BOC Pilot achieved in 2021. Due to the nature and length of the training and the target business sectors (commercial buildings), it takes some time for the expected behavior to manifest after the training. As a result, the evaluation team interviewed participants from 2020 to identify actions taken by trainees in 2021 and the savings from those activities².

Because the BOC training occurred in the final quarter of 2020 and facility 2021 annual budgets had already been prepared and approved before the building operators attended the BOC training, the evaluation team found that few energy projects had been initiated and completed in 2021. Most of those projects had been planned for several years, so BOC training was not a key driver of the savings. More detail on the methods and analysis is presented in Appendix A.

Table 3-1. 2021 Annual Energy Savings Summary

Program Path	Ex Ante Gross Savings (Therms)	Verified Gross RR	Verified Gross Savings (Therms)	NTG*	Verified Net Savings (Therms)
Nicor Gas BOC Participants	NR	N/A	4,434	1.00	4,434

NR = Not reported. Nicor Gas and MEEA did not report ex ante savings.

N/A = not applicable (refers to a piece of data that cannot be produced or does not apply).

* A deemed value. Available on the SAG web site: <https://www.ilsag.info/evaluator-ntg-recommendations-for-2021/>.

Source: ComEd tracking data and evaluation team analysis.

4. Pilot Savings by Measure

This pilot's savings are calculated using the TRM savings factor for the five participants who could not be reached for interviews. The TRM savings factor represents a weighted average of historical results from many Illinois past-participants and does not specify individual measures.

Two interviewed participants reported implementing three types of measures that generate custom savings estimates:

1. Changes to ventilation rates through the Building Automation systems, though one of these was an increase in ventilation for Covid-19 mitigation.
2. A new hot water heater, though it was planned and budgeted before BOC training and is standard efficiency.
3. More systematic tracking of energy use and benchmarking energy use.

² We attempted to contact all 7 Nicor Gas participants multiple times. Two responded and completed interviews.

5. Impact Analysis Findings and Recommendations

The evaluation team applied the Illinois Technical Reference Manual (TRM v10.0) based savings to five of the seven participants that did not respond to the interview, leveraging measure 4.8.24 Building Operator Certification measure. Guidehouse used information collected from the trainees and internet research to determine the inputs into the TRM algorithm. Custom savings estimates were developed for two of the seven participants that responded to the interview with measure implementation details.

The evaluation team developed two recommendations for ComEd and Nicor Gas based on findings from the 2021 evaluation.

Finding 1. Building operators and managers have a lengthy budget development process with budgets planned in the late summer and approved by the end of October for the following calendar year. Thus, participants who finish the BOC course after late summer have limited opportunities to plan and budget for projects to be completed the following calendar year.

Recommendation 1. Conduct pilot and evaluation research only with participants who complete the training prior to the end of June in the research year. Participants who complete training after June should be given 18 months after completion of the training before they are approached for future custom evaluations (i.e., updating the TRM measure).

Finding 2. The participant facility data captured from the BOC trainees did not provide a level of detail to support calculating impacts using the TRM v10.0 algorithm. Guidehouse researched online sources and confirmed facility details including square footage. ComEd and the ComEd evaluation team developed a tool to collect supplemental data from future participants. The evaluation and pilot teams have agreed to emphasize the importance of gathering the supplemental data to participants.

Recommendation 2. Require BOC participants to provide the completed BOC information template³ to be reimbursed for the training tuition. This will ensure the evaluation team has sufficient information to determine verified savings for each participant.

³ Guidehouse provided the BOC trainee information template to Nicor Gas on May 20, 2022.

Appendix A. Impact Analysis Methodology

For the seven Nicor Gas participants, the evaluation applied the TRM v10.0 algorithm to estimate savings. The savings coefficients from the TRM are shown in Table A-1 and they are used in Equation A-1 to estimate electric and gas energy savings and electric demand. Savings are capped at 500,000 square feet per participant equivalent.

Table A-1. Researched Gross Savings by End Use and Per Participant

Savings Type	Variable Name	Value	Unit
Electric Energy	C _e	0.34200	kWh/sqft/participant
Electric Demand	C _d	0.03840	W/sqft/participant
Natural gas	C _g	0.00316	therm/sqft/participant

Source: TRM v10.0

Equation A-1. Annual Pilot Savings

$$\text{Attributable annual participant savings} = C_x \times \text{Minimum of (participant sqft or 500,000 sqft)}$$

Guidehouse determined verified savings for seven Nicor Gas participants who took the BOC training. The savings for each participant, as well as building area, is shown in Table A-2.

Table A-2. Participant-level Savings

Site ID	BOC Level	Total Square Footage per Participant (Reported or Estimated) *	Total Square Footage per Participant (TRM Capped) †	Verified Gross Savings (Therms)	Method	NTG	Verified Net Savings (Therms)
A	1	250,950	250,950	284	Custom	1.00	284
B	2	77,750	77,750	704	Custom	1.00	704
C	1	1,800,000	500,000	1,580	TRM	1.00	1,580
D	1	13,684	13,684	43	TRM	1.00	43
E	2	18,038	18,038	57	TRM	1.00	57
F	2	58,698	58,698	185	TRM	1.00	185
G	2	590,000	500,000	1,580	TRM	1.00	1,580
Total		2,809,120	1,419,120	4,434		1.00	4,434

*TRM path assumes the one address associated with the participant since no additional data were proffered.

† Area capped at 500,000 ft² per participant, per TRM v10.0.

Source: TRM and evaluation team analysis

Appendix B. Total Resource Cost Detail

Table B-1 shows the Total Resource Cost (TRC) cost-effectiveness analysis inputs available at the time of producing this impact evaluation report. Additional required cost data (e.g., measure costs, program level incentive and non-incentive costs) are not included in this table and will be provided to the evaluation team later. Guidehouse will include annual and lifetime water savings and greenhouse gas reductions in the end of year summary report.

Table B-1. Verified Cost Effectiveness Inputs

Program	Units	Quantity	Effective Useful Life	Ex Ante Gross Savings (Therms)	Verified Gross Savings (Therms)	Verified Net Savings (Therms)
BOC	Participants	7	13.0	NR	4,434	4,434

NR = Not reported. Nicor Gas and MEEA did not report ex ante savings.

Source: ComEd and Nicor Gas tracking data and Guidehouse evaluation team analysis.