



Energy Savings for the Building Operator Certification (BOC®) Program

The Building Operator Certification (BOC®) program has consistently produced positive documented energy savings and has proved to be cost effective. Since 2000, a number of BOC program sponsors have engaged independent third-party evaluators to assess and document the BOC's energy savings impacts. This factsheet (FAQ) summarizes the electricity and fossil fuel savings from the studies published in this body of work. With increased reliance on energy efficiency as a resource and more utilities claiming energy savings for their BOC programs, the energy savings continue to be rigorously scrutinized.

Energy Savings Results

BOC credentialed operators save electricity and fossil fuel in the buildings they manage while reducing electrical demand. As shown in **Table 1** below, the BOC program on average saves roughly 100,500 kWhs of electricity per credentialed operator per year. Converted to dollars, this represents a savings of \$10,500 annually for a 5 year period.¹ For the building owner, these savings cover the tuition and labor cost to send a building operator to BOC more than 3 times over, making BOC a highly cost-effective investment. In addition to electricity savings, BOC-credentialed operators save on average 14.5 kW in electric demand and 1,400 therms annually.

Table 1 summarizes seventeen (17) of the most recent and relevant BOC impact evaluation studies. It is important to note that the studies use different methodologies, assumptions and adjustments to generate results, making it not possible to have a true apples-to-apples comparison.²

Table 1 provides savings data reported for each of the most common metrics used across the studies: per credentialed operator, per square foot managed, and percent savings per credentialed operator. Where results were reported in a range, the most conservative number was used for this summary. When there was no consistency across reported results, no conclusions appear on the table. Given the wide range of results, this information is a rough estimate of the BOC program's potential impacts.

TABLE 1. Summary of BOC Energy Saving Evaluation Results from 2000 – 2015**

RESULTS ACROSS ALL EVALUATION REPORTS	kWh	kW	Therms
Average Annual Savings Per Credentialed Operator	100,500	14.5	1,400
	Range 28,600 – 181,000	Range 9 – 37	Range 36 – 3,104
Average Savings Per Square Foot	0.30	*	–
	Range 0.02 – .50	Range –	Range –
Average % Energy Savings Per Credentialed Operator	2.5%	–	–

¹ Using EIA's US national average commercial rate of 10.58 cents a kWh, March 2015.

² The evaluation studies report energy savings in various ways that impact the resulting savings including:

- All savings (gross) influenced by the BOC training program
- BOC attributable savings (netting out actions not directly caused by the BOC program)
- BOC savings net of utility rebated projects
- BOC Operations and Maintenance (O&M) savings
- BOC savings adjusted for results from on-site inspections to validate survey findings

NOTES:

* Few studies calculated kW per sq. ft. and the results varied widely so no conclusions were drawn.

** These savings figures represent the most conservative numbers reported (e.g. after all adjustments were made).

The full analysis can be found on page 3 of this document. The original evaluation reports are located on the BOC website at <http://www.theboc.info/w-energy-savings.html>.



Other Savings Factors

- **Cost Effectiveness**

The cost effectiveness of the BOC Program was calculated in a few of the evaluation reports. While the approaches and the tests used may have differed, the BOC program always passed the cost effectiveness tests and in some cases was found to be extremely cost effective.³

- **Persistence**

Most studies used the assumption that energy savings from BOC graduates would last a period of 5 years. The NEEA 2003 study set a measure life of 5.7 years. The NEEA 2014 study suggested that savings persisted beyond 5 years yet did not have enough supporting evidence to draw a firm conclusion.

- **Water Savings**

The Northeast Energy Efficiency Partnerships 2005 study calculated water savings of 113,660 gallons of water saved per enrollee and .14 gallons per square foot.

³ BOC program cost effectiveness tests results were reported in the following four evaluation reports: Illinois-Program Year 3 DCEO Building Operator Certification (BOC) Program Evaluation (Societal Cost Test 1.11), Impact & Process Evaluation of the Northwest Energy 2007-2011 Demand Side Management Programs (Resource Cost Test 6.05, Societal Cost Test 6.65, Evaluation of AmerenEU's Building Operator Certification Program (Cost Benefit Analysis 12.4), NEEA Market Progress Evaluation Report, Building Operator Certification #7 (Cost Benefit Analysis 7.8).

Claiming Savings

Eleven Public Utility Commissions (PUCs) allow their regulated utilities to claim BOC energy savings toward annual conservation targets. BOC program sponsors evaluate their programs to determine the appropriate level of energy savings that most accurately represents BOC operators in their geographic region. **Table 2** provides savings assumptions accepted by state PUCs.

TABLE 2. State Public Utility Commissions That Accept BOC Savings as of Spring 2015

STATE	PUBLIC UTILITY COMMISSION	SAVINGS ASSUMPTIONS
Idaho	Idaho Public Utilities Commission	119,000 kWh/credentialed operator/yr (Based on NEEA study)
Iowa	Iowa Energy Center	0.18 kWh/sq ft and 0.71 therms/sq ft capped at 10% of annual usage by fuel.
Illinois	Illinois Commerce Commission	Based on annual evaluation reports.
Maine	Maine Public Utilities Commission	217,000 kWh/credentialed operator
Massachusetts	Massachusetts Department of Telecommunications and Energy	Utilities have filed 215,000 kWh/credentialed operator (NEEP Study)
Michigan	Michigan Public Service Commission	23,535 kWh/credentialed operator/yr 2.69 kW/credentialed operator/yr 1,564 Therms/credentialed operator/yr
Minnesota	Minnesota Public Utilities Commission	0.237 kWh/sq ft if the customer has participated in other programs 0.721 kWh/sq ft if they have not.
Missouri	Missouri Public Service Commission	Variable
Montana	Montana Public Service Commission	119,000 kWh/credentialed operator (Based on NEEA study)
Oregon	Oregon Public Utility Commission	119,000 kWh/credentialed operator (Based on NEEA study)
Washington	Washington Utilities and Transportation Commission	119,000 kWh/credentialed operator (Based on NEEA study)



TABLE 3. BOC Program Energy Evaluation Study Results Since 2000

REPORT SPONSOR	STUDY TITLE	REPORT DATE	KWH SAVED/ FT2/YR	KWH SAVED PER CREDENTIALLED OPERATOR	% ELECTRIC USE SAVED	KW SAVED PER CREDENTIALLED OPERATOR	THERMS PER CREDENTIALLED OPERATOR
Northwest Energy Efficiency Alliance (NEEA)	Regional Building Operator Certification Market Progress Evaluation Report	2000	.50	28,600	2.5%	–	–
Northwest Energy Efficiency Alliance (NEEA) (ID, MT, OR, WA)	Market Progress Evaluation Report, Building Operator Certification #7	2001	.50	177,500	–	–	–
Northwest Energy Efficiency Alliance (NEEA)	Retrospective Assessment of Northwest Energy Efficiency Alliance	2003	.50	–	–	–	–
Northeast Energy Efficiency Partnerships (CT, MA, ME, NH, RI, VT)	Impact and Process Evaluation, Building Operator Training and Certification Program	2005	0.18	140,183	–	–	2,846
AmerenUE, Midwest Energy Efficiency Alliance (MEEA) and the Missouri Department of Natural Resources' Energy Center	Evaluation of AmerenEU's Building Operator Certification Program	2007	0.06	–	–	–	–
Kansas City Power & Light	Evaluation of Kansas City Power & Light's Building Operator Certification Program, KCP&L	2009	0.02	43,600	–	10.7	523
Midwest Energy Efficiency Alliance (MEEA) & Minnesota Office of Energy Security	Evaluation of MN BOC Training	2011	0.24	42,936	–	11	2,276
Northwest Energy Efficiency Alliance (NEEA)	Long Term Monitoring and Tracking Report on 2010 Activities	2011	.042	119,273	–	–	–
Consumers Energy	Summary of Building Operator Certification Program Evaluations	2011	0.06	–	–	–	–
The Illinois Dept. of Commercial and Economical Development (DCEO)	Program Year 3 DCEO Building Operator Certification (BOC) Program Evaluation	2012	0.37	181,000	–	37	557
Northwest Energy Efficiency Alliance (NEEA)	Long Term Monitoring and Tracking Report on 2011 Activities	2012	.42	119,000	–	–	–
Northwestern Energy	Impact & Process Evaluation of the Northwest Energy 2007-2011 Demand Side Management Programs	2013	0.24	–	–	–	–
Northwest Energy Efficiency Alliance Pacific Northwest - (ID, MT, OR, WA)	BOC-Expansion Initiative Market Progress Evaluation Report #1	2014	0.32	136,272	2%	–	3,104
California Public Utility Commission	Impact Evaluation of the California Statewide Building Operator Certification Program	2014	–	32,000	3%	4.5	525
Northwest Energy Efficiency Alliance (NEEA)	BOC-Expansion Initiative Market Progress Evaluation Report #2 (Idaho & Montana)	2015	0.32	–	2%	–	–
Focus on Energy	Focus on Energy MEEA Training Program Evaluation	2015	–	84,911	–	–	36
National Grid	Comprehensive Review of Non-Residential Training and Education Programs, with a Focus on BOC	2015	0.364	–	–	–	–
TOTAL AVERAGES			0.30	100,480	2.4%	14.4	1,410

