# 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 twenty (20) 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 2000-2018**

| | 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 10.57 cents a kWh, January 2020.

[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.

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[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

Ten 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 2018**

| STATE | PUBLIC UTILITY COMMISSION | SAVINGS ASSUMPTIONS |
|---|---|---|
| Idaho | Idaho Public Utilities Commission | 119,000 kWh/credentialed operator/yr (Based on NEEA study) |
| 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<br>2.69 kW/ credentialed operator/yr<br>1,564 Therms/credentialed operator/yr |
| Minnesota | Minnesota Public Utilities Commission | 0.237 kWh/sf and 0.0134 therms/sf net savings. |
| 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 CREDENTIALED OPERATOR | % ELECTRIC USE SAVED | KW SAVED PER CREDENTIALED OPERATOR | THERMS PER CREDENTIALED 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 if 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 | 2011 | 0.06 | – | – | – | – |
| The Illinois Dept. of Commercial and Economical Development (DCEO) | Program Year 3 DCEO Building Operator Certification (BOC) | 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 | 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 | – | – | – | – |
| Northwest Energy Efficiency Alliance (NEEA) | 2016 BOC Program Dataset Analysis | 2016 | 0.32 | – | – | – | – |
| Northwest Energy Efficiency Alliance (NEEA) | 2018 BOC Program Dataset Analysis | 2018 | 0.32 | – | – | – | – |
| Northwest Energy Efficiency Alliance (NEEA) | 2019 BOC Program Dataset Analysis | 2019 | 0.32 | – | – | – | – |
| **TOTAL AVERAGES** | | | **0.28** | **100,480** | **2.4%** | **14.4** | **1,410** |

8.4.2020