

# **Building Operator Certification: A Market Transformation Venture Becomes Self-Supporting**

*Cynthia Putnam, Northwest Energy Efficiency Council*

*Jane S. Peters, Research Into Action, Inc.*

*Alan Mulak, Northeast Energy Efficiency Partnerships*

## **ABSTRACT**

Building Operator Certification (BOC) is the first market transformation venture funded by the Northwest Energy Efficiency Alliance (Alliance) to achieve market viability. This paper will discuss how Building Operator Certification has evolved from a utility-funded, government-sponsored training program to a self-supporting, market-based certification enterprise for public and private sector employers. Research-supported business and market planning has paved the path to success.

## **Introduction**

Building Operator Certification (BOC) is a professional development program for operators and employers of commercial buildings<sup>1</sup> emphasizing energy efficient O&M practices. BOC began life as a utility-funded training program led by two state agencies. Called building operator training (BOT), the program was launched in 1988 by the Washington State Energy Office (WSEO) in Washington and the Idaho Department of Water Resources (IDWR) in Idaho to increase the energy efficiency of commercial building O&M practices.

BOT training offered single classes on topics related to operation and maintenance of commercial buildings. Attendance grew in the early years to an annual high in 1994 of 800 operators; this represented a less than one percent of the estimated operator market in the two states. This demonstrated demand from the marketplace created interest in developing the training into a certification. In 1994 the Idaho program began to offer a certification through the Idaho Building Operators Association (IBOA)<sup>2</sup> while the WSEO in Washington convened an advisory group that supported exploration of the idea.

## **Training and Certification**

Interest in certification was based on the concept that professional certification for building operators offered a product of greater value to the commercial buildings marketplace than a single topic training approach. Unlike single topic training, certification identifies a coherent body of knowledge and set of skills operators need to perform their jobs effectively. Testing and in-facility project assignments verify competency; the certification

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<sup>1</sup> Commercial buildings is defined broadly as buildings used for the following functions: offices – government and private sector, schools, health care, lodging, and manufacturing such as assembly of electronic equipment.

<sup>2</sup> IBOA changed their name to the Northwest Building Operators Association (NWBOA) in January 1999.

offers a credential that identifies those who are successful. For employers, it identifies staff with up-to-date skills. For operators, it provides a path for professional advancement and elevates the status of their work in the eyes of customers in the building.

While an established practice in many professions, certification was new to building operators and needed testing in the marketplace. WSEO set out to do that in 1995 by surveying some 5,700 building operators and managers in the region, (WSEO, 1995). The findings showed strong overall support for certification with almost all building managers saying it would be very or somewhat useful. The results gave WSEO sufficient confidence to convene an advisory committee to being the task of designing and piloting a certification program. In 1996, the Washington legislature eliminated WSEO. The Northwest Energy Efficiency Council (NEEC), a business association of energy efficiency companies, offered to take on the pilot program effort and applied to the Northwest Energy Efficiency Alliance (the Alliance) for funding of the pilot effort.<sup>3</sup>

## **Creating the Business Plan**

In 1997, with funding from the Alliance, NEEC set out to complete the pilot that WSEO had started. They developed a business plan for bringing the new product—Building Operator Certification—to market as a financially self-supporting enterprise in three years. Transformation of the marketplace would take longer; NEEC estimated 5-7 years.

The process of transformation involved creating a business plan for BOC and organizing the program to function as a business enterprise. NEEC took advantage of resources offered by the U.S. Small Business Administration to develop its business plan (SBA, 1996). The key elements of the BOC business plan included the following. Each is discussed further below.

- Legal Structure
- Management and Organization
- Products and Services
- Marketing Strategy
- Financial Statement

## **Legal Structure**

NEEC is a non-profit business association of some 70 energy efficiency companies in the Northwest. It saw BOC as a good fit with the organization's mission to expand market opportunities for energy efficiency products and services; however, NEEC required that it operate as a self-supporting<sup>4</sup> program. To achieve this, NEEC established BOC as a cost center in the organization with its own identity, management team, and budget reporting to the Executive Director and Board of Directors. The program name—BOC—was trademarked to

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<sup>3</sup> The Alliance and NEEC are two key players in BOC. Their names and acronyms are similar and often confused. The Northwest Energy Efficiency Council (NEEC) developed and administered BOC in Oregon and Washington. NEEC is a business association of the energy efficiency industry. The Northwest Energy Efficiency Alliance (the Alliance) funded development of BOC in Oregon and Washington. The Alliance is a non-profit group of utilities, government agencies, and business and public interest organizations supporting market transformation.

<sup>4</sup> NEEC defined self-supporting as the point where revenues from the sale of registrations covered the expenses of delivering the program. Profit was desirable, but cost recovery was sufficient as a first step.

give it a recognizable look and identity that would have an independent identity in the marketplace as it moved across geographic boundaries. Today, while NEEC holds ownership of the BOC trademark, it is used in ten states by three different administering organizations.

## **Management and Organization**

NEEC assembled a BOC project team to achieve the mix of expertise suited to the enterprise. This included expertise in management, curriculum development, training delivery, and marketing. The Alliance provided evaluation expertise to inform the team of market findings.

Another key resource for the team was a steering committee comprised of building operators, employers, facility associations, professional educators, and utility representatives to assist with curriculum development and marketing. Members of the steering committee also serve as the marketplace champions for the program, hosting course series and offering their endorsement of BOC. Among them were Boeing, U.S. Navy, Operating Engineers Union, Washington State General Administration, and WAMOA (a statewide school district O&M association).

## **Products and Services**

BOC products include instructor manuals, student handbooks, project workbooks, and exams for each topic within the two levels of certification – Level I and II. Level I emphasizes energy efficient building maintenance practices, while BOC Level II emphasizes equipment troubleshooting and maintenance. To achieve certification, participants must attend BOC classes, and complete written exams and in-facility project assignments. NEEC delivers classroom training in Level I and II topics in locations throughout Washington and Oregon.

Establishing ownership of BOC products was a key issue for BOC's long term success. Without established ownership, control of the curriculum and exam process was uncertain, leaving BOC open to anyone, qualified or not, wishing to run a certification program. As BOC curriculum was developed, NEEC registered materials with the U.S. Copyright Office to protect them from being used without permission. Today, NEEC owns the intellectual property for BOC products, and use of the materials by others is available through a license agreement that prescribes conditions for use by licensees to ensure quality control.

## **Market Strategy**

Not all components of the business plan are created equal. According to the Small Business Administration (1996), the market strategy and financial components of business planning deserve special care and attention; for NEEC, they constituted the core of the BOC business plan. The marketing strategy identified the targets in Table 2 for growing the program, and a strategy for promoting BOC with customers and stakeholders.

**Table 1. BOC Class Topics, Products and Services**

| <b>BOC Level I Topics</b> (56 hours of classroom training)  | <b>Products &amp; Services</b>   |
|---|--|
| BOC 101 – BUILDING SYSTEMS OVERVIEW<br>BOC 102 – ENERGY CONSERVATION TECHNIQUES<br>BOC 103 – HVAC SYSTEMS AND CONTROLS<br>BOC 104 – EFFICIENT LIGHTING FUNDAMENTALS<br>BOC 105 – MAINTENANCE AND RELATED CODES<br>BOC 106 – INDOOR AIR QUALITY<br>BOC 107 – FACILITY ELECTRICAL SYSTEMS   | INSTRUCTOR MANUALS<br>STUDENT HANDBOOKS<br>PROJECT WORKBOOKS<br>EXAMS<br>CERTIFICATES<br>LICENSE AGREEMENT |
| <b>BOC Level II Topics</b> (49 hours of classroom training)   | <b>Products &amp; Services</b>   |
| <u>Core</u><br>BOC 201 – PREVENTIVE MAINTENANCE AND OPERATIONS<br>BOC 202 – ADVANCED ELECTRICAL SYSTEMS DIAGNOSTICS<br>BOC 203 - HVAC TROUBLESHOOTING AND MAINTENANCE<br>BOC 204 - HVAC CONTROLS AND OPTIMIZATION<br><u>Electives</u><br>BOC 210 – INDOOR AIR QUALITY<br>BOC 211 – MOTORS | INSTRUCTOR MANUALS<br>STUDENT HANDBOOKS<br>PROJECT WORKBOOKS<br>EXAMS<br>CERTIFICATES<br>LICENSE AGREEMENT |

NEEC offered the first Level I BOC course series in Washington in 1997. The series filled quickly with 30 registrations. Since then, NEEC has offered more than twenty course series in locations throughout Oregon and Washington. Over 800 operators have enrolled in BOC, and NEEC has certified 230. The discrepancy between enrollees and certified operators is a result of several factors. A subset of enrollees (73%) actually register to take the BOC courses; of these, 48 percent successfully complete all of the coursework within twelve months of starting a course series. Higher rates of certification require persistent follow up by NEEC staff.

**Table 2. Three-Year Targets for Growing BOC**

| <b>Targets</b>        | <b>1997<br/>WA</b> | <b>OR<sup>5</sup></b> | <b>1998<br/>WA</b> | <b>OR</b> | <b>1999<br/>WA</b> | <b>OR</b> | <b>2000<br/>WA</b> | <b>OR</b> | <b>Totals<br/>WA &amp; OR</b> |
|-----------------------|--------------------|-----------------------|--------------------|-----------|--------------------|-----------|--------------------|-----------|-------------------------------|
| Enrollees             | 100                | 0                     | 150                | 60        | 175                | 80        | 200                | 110       | 875                           |
| Certified Operators   | 12                 | 0                     | 50                 | 8         | 80                 | 27        | 100                | 65        | 342                           |
| Course Series         |                    |                       |                    |           |                    |           |                    |           |                               |
| Level I               | 2                  | 0                     | 4                  | 2         | 6                  | 3         | 3                  | 4         | 24                            |
| Level II <sup>6</sup> | 0                  | 0                     | 0                  | 0         | 1                  | 0         | 1                  | 1         | 3                             |
| \$ Price/Series       | \$550              | NA                    | \$650              | \$650     | \$850              | \$850     | \$950              | \$950     | \$950                         |
| Revenue Forecast      | \$24K              | 0                     | \$50K              | \$12K     | \$100K             | \$21K     | \$115K             | \$51K     | \$373K                        |

<sup>5</sup> BOC was launched in Oregon in 1998, eighteen months after its start in Washington.

<sup>6</sup> Level II curriculum was completed in Fall 1999; until then, only Level I course series were offered.

The price of a certification course series is a critical component for BOC to be self-supporting. The building operator audience in the Northwest was accustomed to below market prices for training (\$35/course versus \$150/course), following years of utility subsidies. NEEC phased in price increases for registrations from a low of \$550 for a seven-course series to a high of \$950 over a three-year period.

To achieve the targets in Table 2, NEEC developed a focused, and consistent marketing effort built around five key strategies in Table 3 to build recognition and value for the program.

**Table 3. Five Key Marketing Strategies**

| <b>Marketing Strategy</b>         | <b>Implementation</b>   |
|-----------------------------------|---|
| Endorsements by Champions         | Influential employers such as Boeing, U.S. Navy, Washington State General Administration, WAMOA (a schools O&M association) endorse BOC as a valuable program.  |
| Accreditation                     | BOC curriculum is approved for continuing education credits by respected institutions such as the Department of Labor & Industry and community colleges.  |
| Facility Management Associations  | NEEC membership and participation in facility association meetings, annual conferences and trade shows to present BOC. Examples include local chapters of IFMA, BOMA, ASHE, and school/municipal facility associations. <sup>7</sup>  |
| Partnerships with Local Utilities | Local utilities host BOC informational meetings for commercial employer and operator customers to build awareness and enrollment. Over fifteen utilities and facility associations in Washington and Oregon have partnered with NEEC to offer BOC to their customers. Partnerships included cash and in-kind support such as training facilities, recruitment for registration, scholarships for students, and instruction of selected classes. |
| News Media                        | Profiles of BOC graduates are placed in facility association and employer newsletters. Course series schedules and lists of graduates also appear.  |

### **Financial Statement**

The financial statement in the BOC business plan focused on establishing a breakeven point for operating BOC, and projecting cash flow. NEEC worked with the following definitions of these terms (SBA, 1996).

- The ***breakeven point*** is the level of sales of BOC registrations needed to cover the fixed and variable costs of delivering the program. NEEC’s goal for 2000 was to operate the Washington BOC program at breakeven. Profit was desirable, but unrealistic at current pricing levels.
- ***Cash flow*** represents the movement of cash through the business operation over time. NEEC’s goal was to forecast cash needs and determine a cash reserve necessary to ensure payments could be made in a timely fashion.

NEEC established expense categories and closely tracked operating expenses for the program’s first three years. Primary expense categories are provided in Table 4.

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<sup>7</sup> International Facility Management Association (IFMA), Building Owners and Managers Association (BOMA), and American Society for Healthcare Engineering (ASHE).

**Table 4. BOC Operating Expense Categories**

| <b>Category</b>                | <b>% Total Operating Expenses</b> |
|--------------------------------|-----------------------------------|
| Instruction                    | 36%                               |
| Marketing                      | 14%                               |
| Site Coordination              | 9%                                |
| Registration and Certification | 9%                                |
| Materials                      | 9%                                |
| Research & Development         | 9%                                |
| Management, Overhead and Taxes | 14%                               |
| TOTAL                          | 100%                              |

At 2000 pricing of \$950/course series, operation of the program demands lean administrative overhead. NEEC sets a registration minimum for each course series, and seeks local partners to offset costs through contributions of cash and in-kind support such as training facilities, recruitment for registration, scholarships for selected students, and instruction of selected classes. To date, all but one course series have met their minimum registrations (with most exceeding), and all have had strong local partners contributing resources. NEEC expects to continue gradual price increases in the coming years to ease the pressure on operations. As BOC expands to other regions (covered next), the sale of license agreements is expected to provide revenue to support future anticipated R&D costs associated with keeping the curriculum up-to-date and effective.

### **Expanding Market Reach**

While NEEC was growing BOC in the Northwest, interest in operations and maintenance certification was forming in other regions of the country, most notably the Northeast and areas in the mid-west and southwest. Expansion of BOC to other regions was not part of NEEC’s business plan, but as interest grew, NEEC began to explore the concept. Expansion offered the benefit of increased recognition of the program enabling operators to carry the credential to other regions and have it recognized. It also offered a source of revenue for NEEC to maintain the vitality of the BOC curriculum. NEEC consulted with an intellectual property advisor to develop a licensing model to offer the use of the BOC program materials to others. The license is a contractual agreement between NEEC and a license partner that grants the partner the right to use, market and distribute the materials within a defined territory. The agreement also sets a fee for use of the materials.

In 1999, NEEC and Northeast Energy Efficiency Partnerships, Inc. (NEEP)<sup>8</sup> entered into a license agreement for BOC. NEEP saw BOC as a good fit with an initiative it had launched in the fall of 1999 called the Resource-Efficient O&M Initiative. The initiative was an outgrowth of an O&M practices assessment conducted by RLW Analytics, Inc. (RLW)<sup>9</sup> as well as recommendations from a NEEP-sponsored northeast regional workshop exploring

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<sup>8</sup> NEEP is a non-profit entity based in Lexington, MA supporting regional energy efficiency initiatives.

<sup>9</sup> In 1998, eight regional utilities (Boston Edison, Boston Gas, Commonwealth Energy, Eastern Utilities Association, New England Electric Systems, Northeast Utilities, Public Service Electric and Gas, and Unitol) sponsored a study by RLW to assess Operations & Maintenance (O&M) practices of commercial and industrial customers that affect energy efficiency.

options for a strategy to establish resource-efficient O&M as a sustained practice. The initiative will focus on a mix of different approaches or programs to reach key market segments including the following:

- Training and Certification through the BOC program.
- Information Programs through training hosted by utility and non-utility partners.
- Contractor Programs targeted at identified regional O&M deficiencies.
- Site-Specific Analysis via energy audits and assessments, perhaps in conjunction with the new EnergyStar® Buildings program.
- Control Strategies in cooperation with private industries such as Honeywell/DMC.
- Technology Focused Efforts involving recommissioning and chiller “tune-ups.”

The first major component of NEEP’s Resource-Efficient O&M Initiative is a training and certification program for which the BOC curriculum developed by NEEC will be used to as the initial offering. NEEP is serving as the administrator of BOC in the Northeast, and has set four year targets through 2003 for growing the program. They launched their first course series in Massachusetts in April 2000 which was fully subscribed; they expect to launch five more course series before the end of the year.<sup>10</sup> As the program grows, NEEP plans to add other products and services to work in conjunction with the BOC course.

## **Building A Better BOC**

Third-party evaluation played a significant role in NEEC’s development of the BOC program in the Northwest. As the program expands to other regions, the evaluation findings in the Northwest offer a good foundation for assessing opportunities elsewhere. This section summarizes the third-party evaluation of the NEEC BOC conducted by Research Into Action, Inc. under contract to the Alliance. Alliance evaluations are each designed to reflect the needs of the specific program. In the case of the NEEC BOC effort the evaluation therefore included market and process research components to identify market and program improvement opportunities, as well as impact evaluation components to assess market transformation..

The evaluation approach followed more of a business model than a traditional social program evaluation model. The evaluation was highly customer focused and included real time data collection and reporting. The real-time focus led to five evaluation reports between mid-1997 and the end of 1999, approximately every six months. The customer focus ensured that user responses to the BOC drove program enhancements. During the three-year period, the data collection process evolved to reflect the growth of the program resulting in fairly short standardized instruments by 1999. The Alliance and evaluation team hopes that NEEC and other organizations that adopt the BOC can use the data collection forms to conduct on-going assessments. This summary will focus on the cumulative results in the most recent evaluation report and a baseline survey of the four-state region conducted in 1998.

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<sup>10</sup> Course series locations in the Northeast include Boston, Worcester, Pittsfield, and Norwood, MA; Hartford, CT; and Providence, RI.

## **Evaluation Influence on NEEC BOC Program Implementation**

A baseline survey of the four-state region conducted in early 1998 (Peters, et al, 1999b) found that after less than two-years, 30% of building operators supervisors were aware of the BOC. The survey estimated that there are close to 140,000 building operations staff in the four-state Pacific Northwest region working in close to 7,500 facilities. The survey also found that supervisors were willing to pay, on average, \$700 for a comprehensive building O&M series. More than one-fifth of supervisors were willing to pay as much as \$950, NEEC's estimated "break-even" price. However, willingness to pay was lowest in the states with the most exposure to BOC (Idaho and Washington) whereas supervisors in Montana with no BOC offerings to date expressed the highest willingness to pay. Supervisors expressed high level of interest in competency-based training courses.

The results of the market baseline study led NEEC to increase their prices to comparable levels (~\$700-\$800) in 1999 and to continue to modify the curriculum. Certification for both efforts is now annual with a modest fee. Project requirements are woven into the curriculum to insure completion. As found throughout the evaluation, the fifth evaluation report (Peters, et al, 2000) demonstrated that students and employers express high levels of satisfaction with the course series. However, concern remains for the mixed level of students and the sense by some students that there is not enough time to cover the material presented in the series.

### **Cumulative Results at the End of 1999**

The fifth evaluation report (Peters, et al, 2000) provided a cumulative assessment of responses by students and employers to the course series by summarizing data across previous studies. As can be seen in Table 5 student satisfaction with the course series increased from 1997 to 1998. With 70% extremely satisfied or satisfied in 1997 and 85% providing those ratings in 1998. This change in satisfaction levels tracks well with the improvements made to the curriculum discussed above. However, higher levels of satisfaction will likely require that the BOC address student concerns about the amount of material and the mixed levels of students in classes.

Interviews with employers also demonstrate that the employers are willing to pay for the course series and willing to recommend the course series to other supervisors. Supervisors also indicate that they plan to look for the BOC on resumes of potential employees. The responses of supervisors of students for courses in 1997 and 1998 combined are shown in Tables 7, 8, & 9. In general there is little difference between private and public sector employers supporting findings from the market survey that private sector and public sector employers are both equally interested in BOC training. The challenge for BOC is reaching private sector employees and employers, who tend to have less involvement in operations related organizations, which have proved to be effective marketing and recruitment targets.



**Table 5. Student Satisfaction with BOC by Year (N=103)**

| LEVEL OF SATISFACTION              | FREQUENCY (PERCENT) |               |           |               |            |               |
|------------------------------------|---------------------|---------------|-----------|---------------|------------|---------------|
|                                    | 1997                |               | 1998      |               | TOTAL      |               |
| Extremely Satisfied                | 9                   | (30.0%)       | 20        | (27.4%)       | 29         | (28.2%)       |
| Satisfied                          | 12                  | (40.0%)       | 42        | (57.5%)       | 54         | (52.4%)       |
| Neither Satisfied Nor Dissatisfied | 8                   | (26.7%)       | 9         | (12.3%)       | 17         | (16.5%)       |
| Not Satisfied                      | 1                   | (3.3%)        | 1         | (1.4%)        | 2          | (1.9%)        |
| Not At All Satisfied               | 0                   | (0.0%)        | 1         | (1.4%)        | 1          | (1.0%)        |
| <b>TOTAL</b>                       | <b>30</b>           | <b>(100%)</b> | <b>73</b> | <b>(100%)</b> | <b>103</b> | <b>(100%)</b> |

Not surprisingly as Table 6 shows, most students plan to put the BOC on their resume when they have one.

**Table 6. Student Plans to Put BOC on Resume by Business Type (N=77)**

| PLACE BOC ON RESUME | FREQUENCY (PERCENT) |               |           |               |               |               |           |               |
|---------------------|---------------------|---------------|-----------|---------------|---------------|---------------|-----------|---------------|
|                     | PUBLIC              |               | PRIVATE   |               | UTILITY/OTHER |               | TOTAL     |               |
| Yes                 | 48                  | (94.1%)       | 17        | (100.0%)      | 9             | (100.0%)      | 74        | (96.1%)       |
| No                  | 3                   | (5.9%)        | 0         | (0.0%)        | 0             | (0.0%)        | 3         | (3.9%)        |
| <b>TOTAL</b>        | <b>51</b>           | <b>(100%)</b> | <b>17</b> | <b>(100%)</b> | <b>9</b>      | <b>(100%)</b> | <b>77</b> | <b>(100%)</b> |

**Table 7. Employer Willingness to Pay by Business Type (N=56)**

| AMOUNT WILLING TO PAY FOR EMPLOYEE | FREQUENCY (PERCENT) |               |          |               |               |               |           |               |
|------------------------------------|---------------------|---------------|----------|---------------|---------------|---------------|-----------|---------------|
|                                    | PUBLIC              |               | PRIVATE  |               | UTILITY/OTHER |               | TOTAL     |               |
| More than \$800                    | 17                  | (58.6%)       | 5        | (62.5%)       | 2             | (66.7)        | 24        | (60.0%)       |
| \$601-\$800                        | 10                  | (34.5%)       | 1        | (12.5%)       | 1             | (33.3%)       | 12        | (30.0%)       |
| \$25-\$600                         | 2                   | (6.9%)        | 2        | (25.0%)       | 0             | (0.0%)        | 4         | (10.0%)       |
| <b>TOTAL WITHOUT "DON'T KNOW"</b>  | <b>29</b>           | <b>(100%)</b> | <b>8</b> | <b>(100%)</b> | <b>3</b>      | <b>(100%)</b> | <b>40</b> | <b>(100%)</b> |
| Don't know                         | 10                  |               | 4        |               | 2             |               | 16        |               |

**Table 8. Employer Willingness to Recommend BOC by Business Type (N=54)**

| RECOMMEND BOC TO OTHERS | FREQUENCY (PERCENT) |                  |                 |                  |
|-------------------------|---------------------|------------------|-----------------|------------------|
|                         | PUBLIC              | PRIVATE          | UTILITY/OTHER   | TOTAL            |
| Yes                     | 38 (97.4%)          | 10 (100.0%)      | 5 (100.0%)      | 53 (98.1%)       |
| No                      | 1 (2.6%)            | 0 (0.0%)         | 0 (0.0%)        | 1 (1.9%)         |
| <b>TOTAL</b>            | <b>51 (100%)</b>    | <b>17 (100%)</b> | <b>9 (100%)</b> | <b>54 (100%)</b> |

**Table 9. Employer Plans to Look for BOC on Resume by Business Type (N=38)**

| LOOK FOR BOC ON RESUME | FREQUENCY (PERCENT) |                 |                 |                  |
|------------------------|---------------------|-----------------|-----------------|------------------|
|                        | PUBLIC              | PRIVATE         | UTILITY/OTHER   | TOTAL            |
| Yes                    | 26 (96.3%)          | 6 (75.0%)       | 3 (100.0%)      | 35 (92.1%)       |
| No                     | 1 (3.7%)            | 2 (25.0%)       | 0 (0.0%)        | 3 (7.9%)         |
| <b>TOTAL</b>           | <b>27 (100%)</b>    | <b>8 (100%)</b> | <b>3 (100%)</b> | <b>38 (100%)</b> |

The evaluation team also conducted a follow-up survey with students and employers for courses completed at least one year earlier. The following tables show the staying power of the BOC course series. Table 10 shows, over 80% of the students reported saving money or improving the comfort of building occupants as a result of information they learned in the BOC series.

**Table 10. Student Ability to Save Money & Improve Comfort (Long Term Follow Up) (N=34)**

| BENEFIT                                  | NUMBER    | PERCENT     |
|--|-----------|-------------|
| Both Saved Money and Improved Comfort    | 18        | 52.9%       |
| Saved Money                              | 5         | 14.7%       |
| Improved Occupant Comfort                | 5         | 14.7%       |
| Neither Saved Money nor Improved Comfort | 6         | 17.6%       |
| <b>TOTAL</b>                             | <b>34</b> | <b>100%</b> |

Similarly, for those BOC students who had changes in their job after the BOC, close to 50% attributed these changes to the BOC, see Table 11.

**Table 11. Student Job Changes and Role of BOC (Long Term Follow Up) (N=34)\***

| JOB CHANGES                | YES | PERCENT OF SAMPLE | CREDIT GIVEN TO BOC | PERCENT OF THOSE CHANGING |
|----------------------------|-----|-------------------|---------------------|---------------------------|
| Change in Job Title        | 5   | 14.7%             | 1                   | 20.0%                     |
| Increased Responsibilities | 16  | 47.1%             | 9                   | 56.3%                     |
| Increased Compensation     | 17  | 50.0%             | 9                   | 52.9%                     |
| Change in Job Location     | 2   | 5.9%              | 0                   | 0.0%                      |

\* Multiple responses allowed.

Results from the interviews with employers also support the value of the course series. As shown in Table 12 over 80% reported that the training was useful to their employees and over 50% reported that they had observed differences in the way the employee did their job after the course series. Comments from the employers on these issues tended to be very positive, praising their employees improved job performance and job commitment following the course series.

**Table 12. Employer Assessment of Series Usefulness and Impact (N=16)**

\*Totals less than 16 indicate that some employers did not respond.

| BOC HAS BEEN USEFUL                           | FREQUENCY (PERCENT) |           |           |
|---|---------------------|-----------|-----------|
|   | YES                 | NO        | TOTAL*    |
| Training Has Been Useful to Employee          | 13 (86.7%)          | 2 (13.3%) | 15 (100%) |
| Observed Differences in Way Employee Does Job | 6 (46.2%)           | 7 (53.4%) | 13 (100%) |

## Summary

BOC has accomplished what it set out to do in its business plan. It established itself as a cost center within NEEC, protected its intellectual property, achieved recognition and value for BOC products and services, and established a pricing structure to operate at or above breakeven. The evaluation results demonstrate that the BOC curriculum is effective and useful, the market is increasingly aware of the product and responding to it, enrollment, registration and certification targets have all been met or exceeded, and employers and students ascribe value to the training for future job prospects. Given the positive benefits that have been identified by past students, we have confidence that BOC will also lead to changes in O&M practices by certified operators.

NEEC's plans for the future are focused both in region and out. In Washington and Oregon, it will continue to work towards market transformation, some two to four years off by its own estimate. It will continue to increase the price point for BOC to move the program from breakeven to a profitable venture. Outside of the region, it will support its partnership with NEEP while working to establish partnerships in other regions.

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