# THE MARKET FOR OPERATIONS AND MAINTENANCE TRAINING IN NEW JERSEY

## *Final Report*

***Prepared For:***

**Public Service Electric and Gas of New Jersey**
**and**
**Conectiv Power Delivery**

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# Table of Contents

# Executive Summary

This report was commissioned by Public Service Electric and Gas of New Jersey (PSE&G) and Conectiv Power Delivery (CPD) to assess the options for utility assistance for operations and maintenance (O&M) training. The utilities wished for Pacific Energy Associates, Inc. (PEA) to evaluate whether support for training could help increase the efficiency of O&M. This study follows up on a preliminary reconnaissance of O&M training offerings (Hinge, 1999) that included New Jersey, and an O&M baseline study conducted by RLW Analytics, Inc. (Ledyard, Barbagallo, and Lionberger, 1999) that included PSE&G.

Commercial and industrial operations and maintenance (O&M) personnel, contractors, association representatives, consultants and experts were interviewed to assess the need for additional training and/or certification. Different training and certification options were discussed with respondents. These included marketing and enhancements for training that ise currently available, as well as new types of courses. Respondents assessed the importance of certification as a tool for building the demand for trained building operations personnel. Interviews covered office, school, state, and industrial building types.

## Overall Market Structure

The RLW Analytics baseline study found that the largest potential New Jersey market (about 70% of load among offices, industry, and retail) consisted of relatively sophisticated purchasers, called "O&M Proficient" customers. These customers have mean annual energy use of 4,200 average MWh, and average 132,000 square feet of floorspace, but rarely have an Energy Management System (EMS). They are a large minority of health care, manufacturing, and office facilities. These customers appear to have some limited O&M capability and the potential to learn more. They have reasonable staffing and excel at problem detection, but lag in energy bill tracking and in interest in O&M. They think they are doing a good job, but focus very little on energy issues. They are very receptive to help from utility programs but, like most customers, think of these programs in terms of rebates.

Just as previous studies have found great diversity in the way that customers operate and maintain their buildings, PEA found significant diversity in their receptiveness to specific options for O&M training and

certification. Some customers do not want more training. Some favor existing training and certification efforts, some favor new courses and certifications, and some don't think certification is important.

The previous RLW baseline study used cluster analysis to segment customers by their proclivity to perform efficient O&M. The results of the interviews reported in this report do not fit neatly into those market segments. Nevertheless, we attempted, based on the responses PEA received, to identify the RLW market segments that building/ownership types discussed in this study belong to *most often.*. The results are presented in *Table ES-1*. The percentages shown are from the RLW baseline study and are based on only the building types covered by that study (office, industrial, health). In *Table ES-1*, we do not provide strict definitions of size because our qualitative research does not support such findings.

**Table ES - 1: Mapping of Training Study Building Types with Baseline Study Market Segments**

| |
|---|
| **O&M EXPERTS – *10% of PSE&G customers, 13.2% of load***<br>• The most sophisticated large industrial customers<br>• A handful of property managers and schools. |
| **O&M PROFICIENT – *32.7% of PSE&G customers, 72.1% of load***<br>• Medium-sized (e.g., 1-5 MW) and some large industrial customers<br>• Many owner-occupied offices<br>• Some offices run by property managers<br>• A minority of schools (but many of them)<br>• A small handful of state facilities |
| **INTERESTED AMATEURS – *16.3% of PSE&G customers, 6.8% of load***<br>• Some schools<br>• Many medium-sized offices |
| **PASSIVE UNDERACHIEVERS – *20.4% of PSE&G customers, 2.7% of load***<br>• Some schools<br>• Small industrials<br>• Many smaller office property owners<br>• Many large property managers on fixed fees |
| **RUN 'TIL IT BREAKS – *20.4% OF CUSTOMERS, 5.2% OF LOAD***<br>• Very small customers of all types<br>• Most state agencies |

Like the RLW baseline study, PEA's interviews covered manufacturing, office, and state health facilities. In contrast to the baseline study, PEA's

interviews did not cover other health facilities, but did cover primary and secondary school districts and non-office state facilities. Schools and state buildings (the building types not studied in RLW) have significant representation in the bottom three market segments in *Table ES-1* Thus, for all building types combined, the percentages in *Table ES-1* probably understate the proportion of buildings and loads in the bottom three market segments, and overstate buildings and loads in the top two segments.

## The Need to Build the Market for Good O&M

Respondents told PEA that most customer organizations, including many large ones, could benefit from more O&M training, and could reduce energy bills as a result. However, respondents pointed out that many customers, including some large ones, have a more fundamental problem: building, financial, and upper managers do not understand the financial benefits of good O&M. They need to see convincing evidence that good O&M is a significant potential "profit center," as well as help in understanding how to improve their operations.

To achieve these ends, utilities could pursue energy accounting with large customers, and also develop and market case studies. The case studies must show the bottom line benefits, and demonstrate how managers achieved them. The actions that can lead to good O&M include training, but also creating appropriate internal systems of accountability, organization, staffing, compensation, contracting, and data management and analysis. In some cases (e.g., many government and school buildings), good equipment operation is only possible once old broken-down equipment is replaced.

Evaluation of training programs (and other utility pilots) could provide some of the ammunition for this campaign. Marketing avenues could include:

- Existing training courses for managers (BOMA, IFMA, IREM, Buildings and Grounds associations, etc.)
- Direct discussions with high-level state officials
- School district association meetings, including but not limited to the Buildings and Grounds Association

- Local economic development organizations, breakfast meetings and industry associations to reach small industrials

## The Current Market for Training

While management understanding needs to be improved, training and other activities can proceed now for portions of the largest markets indicated in the RLW study, as well as for some more modest markets. There are many customers who prefer training options not currently available, and some who might attend existing vehicles if they were endorsed and promoted by utilities.

The most attractive targets (within the studied building types) for near-term efforts include:

- Property management firms with performance incentives in their contract
- Owner-occupant large offices
- School districts who are motivated, but have done limited training to date
- A small number of state properties where staff are internally motivated to perform good O&M
- Small industrial facilities[1]

The targets where a change in management mind-set is most important to encourage training include:

- Some large property management firms (it is unclear how many)
- The State of New Jersey
- Many less forward-looking and smaller school districts

[1] Small industrials are best addressed with breakfast meetings and training videos more than for classes.

There are customers who do not seem to have as great a need for O&M training:

- For large industry, utility help is still desired, but may need to be more specialized and narrower in focus (e.g., Energy Management System operation training). This information comes from contacts in "white collar" industries, and may not apply to heavy industry.

- There are also some office owner-occupants, property managers, and schools that appear to excel at O&M and have no major training needs. These are few in number, and largely the product of exceptionally capable and motivated managers.

Respondents unanimously agreed that the best personnel targets for practical O&M training are lead technicians, called O&M technicians, foremen, electricians, etc. in different facilities. In most organizations, these individuals train other staff.

A few respondents recommended further training of O&M managers in how to direct and contract for the O&M function. Such training exists for some sectors (e.g., courses for school district Buildings and Grounds managers and higher-level BOMA courses). However, many other managers still need training, and the energy-focus of the existing training could in some instances be improved.

## Specific Training Options

The RLW baseline study clearly identifies the "Proficient" market as the most important in terms of New Jersey load. Based on PEA's interviews, the following options appear to be the most attractive for customers of this type.

- Support BOMA marketing of the System Maintenance Technician (SMT) certification program (as described below).

- At the same time, offer the NEEC/NEEP Building Operator Certification Program (also described below), or one similar, with marketing coordinated with BOMA. BOMA is interested in this complimentary offering.

"Interested Amateurs" may be more interested in utility match funding for basic technical certifications.

For small industrial customers, training videos and presentation of case studies at breakfast meetings may be useful.

Recommissioning training is a good fit with "Experts," but may be overwhelming for others.

Unique efforts may be required to work with the State. There is a need to enhance their overall philosophy and organization with respect to building management. They currently "run it till it breaks," but may be motivated to improve practices if the right economic and political case can be put together.

Each specific option is discussed in more detail below.

### Additional Marketing for the Building Owners and Managers Institute's (BOMI) System Maintenance Technician (SMT) Course

Utility assistance in marketing would be welcomed by the New Jersey Building Owners and Managers Association (BOMA). BOMA's national educational arm, the Building Owners and Managers Institute (BOMI), runs a two-year night school course in New Jersey. While New Jersey is one of the most active areas for this course in the country, the market could be further expanded. However, the class is already reasonably well known among its best potential markets: office building and white-collar (e.g., pharmaceutical and semiconductor) industrial O&M personnel.

It is not likely to be a good "fit" with state and school district operators, who are not rewarded for, nor oriented toward, such extended and intensive training efforts. Furthermore, some respondents thought that, for hands-on O&M personnel, the course could be more effective if it had more information on hands-on troubleshooting, more energy focus, and included in-plant homework (practicum) to re-enforce paper lessons. A small number of respondents felt that it was focused too much at management-track personnel rather than operators.

### Building Operator Certification

There is significant support in schools and offices for a course similar to the Building Operator Certification (BOC) program, currently being run in the Northwest U.S. by the Northwest Energy Efficiency Council and in New England by Northeast Energy Efficiency Partnerships. This course involves eight days of training over seven months, covering major energy systems, bill tracking, codes, and air quality. Class attendance, successful completion of written tests and in-plant practice assignments are required to achieve a certification.

Respondents thought it could reach operators who:

- Did not want to do two years of night school under the SMT approach;
- Wanted more hands-on-oriented training; and/or
- Wanted a practice-based approach.

Supporters included the New Jersey Building Owners and Managers Association (BOMA) Chair, who is also a Building Owners and Managers Institute (BOMI) class instructor. He thought that offering the BOC course would complement efforts to further publicize the SMT course; the BOC course could serve as a refresher, get deeper into technical issues, and provide the hands-on practicum that is not part of the BOMI course. He did not believe that BOMI could focus on building these elements into their own coursework at this time, due to other priorities.

Some respondents favored more training, but preferred that a series like the eight-day course be offered a la carte (an option which is offered for the BOC course in the Northwest) because the entire course took too much time away from the plant. This was of particular concern among some government agencies, schools, and small businesses. Some also thought that the existing certification options (community college technical certifications, BOMA) were adequate.

Some respondents explicitly said that getting staff off-site for an eight day course would not be a problem. In fact, one school Buildings and Grounds manager suggested that the course be held over eight straight days to optimize retention.

### Utility Co-Pay for Basic HVAC, Boiler, and Refrigeration Certifications

These courses are run through community colleges and are certified through the State Board of Education. These certifications are legally required to run certain types of equipment, but not all building owners comply with this requirement. There was significant support for utility co-funding for attendance at these classes, but less than for some other options. Some respondents felt that these courses teach safe operation and maintenance, but do not teach operators how to look at buildings as a system, or how to optimize equipment operation and maintenance for efficiency.

A large, sophisticated user likes the idea of utility co-funding for these certifications because it increases their pool of job applicants, but they would likely pay for this training anyway. Utility co-pay may have its greatest impact among smaller and less sophisticated school districts, office owners, and industrials that may not comply with legal requirements for certifications. The main impact may be to enhance the credibility and prestige of lead technicians so that they take more initiative in addressing O&M problems and their managers pay more attention to their suggestions.

### Short Courses

Half-day to two-day courses were recommended by those respondents who felt that the BOMA or BOC options took too much time, but felt that the basic technical certifications didn't really teach good O&M practice. Some were looking for very basic training, others for more information for specific technical niches. Commonly suggested topics included:

- *"How to Interpret Energy Bills, Convert Energy Units, and Perform Trend Analysis of Energy Data*." This was the most frequent suggestion. More sophisticated users wanted information on metering included.

- *"The Importance of Keeping Blueprints – Identifying Energy-Using Equipment*."

- A technical course to help customers and vendors better understand the operation of energy management systems.

- *"New Technologies*."

It is notable that many of these suggestions are components of the BOC class, and to some extent are also covered in the BOMI SMT class.

### Building Tune-up (Recommissioning) Course

This was favored by fewer respondents overall, and more by consulting engineers than by building personnel. Some of the customers who were interested did not appear to have personnel with the basic technical skills and time to put this type of course to use. It may be most useful for the more competent building personnel and contractors. Negative comments pointed to this as a limitation, and questioned how long such a course could be sustained, and how profoundly and widely it would change current practice.

### Videos

Training videos on troubleshooting specific systems were recommended for small industrial plants where it is difficult for O&M staff to go off-site.

Large industrial firms also use videos to help train custodial staff to be entry-level O&M personnel. However, they already have access to such videos.

## Non-Training Options

While most respondents felt that training was a pivotal part of efforts to improve building operations and maintenance, there were also suggestions for several other types of initiatives. These included:

- Assistance with energy tracking and benchmarking
- Specifications for contracting-out maintenance
- A salary guarantee or other financial support for adding a Resource Conservation Manager to staff (for institutions)
- Rebates

- Lower rates
- On-site technical assistance
- Help with power factor (industrial facilities)
- Help with stepping up to higher voltage power (small industrial facilities)
- Help with identifying what equipment is on what meter (small industrial)
- Bulk purchase of equipment
- Training in simulation techniques
- Charge for cost of new T&D facilities

# I. Study Design

## Introduction

Pacific Energy Associates, Inc. (PEA) was contracted to provide this study by Public Service Electric and Gas (PSE&G) and by Conectiv Power Delivery (CPD). The purpose of the report is to provide information that would assist in choosing a direction for utility efforts in New Jersey to support training for efficient building operations and maintenance (O&M). A secondary purpose is to assess the way that training fits into a broader strategy for supporting efficient O&M.

This study builds on two pieces of prior research:

- A study of the overall market for efficient operations and maintenance practices in commercial and industrial buildings in PSE&G's service territory and New England, performed by RLW, Analytics, Inc. (Ledyard, et al., 1999)

- A limited reconnaissance of available O&M training and market needs performed for Northeast Energy Efficiency Partnerships (Hinge, 1999)

## Organization

This first section describes the objectives for the study, the targeted markets, the survey strategy, and the respondents. *Section II* provides a summary of findings by building type for the reader who wishes to consider the strategic direction of the initiative more specifically. *Section III* summarizes the responses from professional organizations. The next four sections (IV through VII) then provide detailed summary and analysis by building type. This detailed information may prove useful in program design. *Appendix I* provides the discussion guide used in the surveys, and *Appendix II* provides a comparative analysis of the findings from this report and the RLW baseline study (Ledyard, et al., 1999). Building type-specific comparisons to the RLW study are also provided for Office and Industrial buildings (the two building types for which this study and the RLW study overlap) in their respective chapters.

## Objectives

This study was designed to:

1. Gauge interest in Operations and Maintenance Training and (separately) in O&M certification among PSE&G and CPD Commercial and Industrial customers.

2. Assess whether a training focus should be a high priority for utility efforts to improve efficiency of O&M among customers.

3. Expand on information previously gathered regarding what training is already being offered and the best opportunities for synergies with existing providers.

4. Provide advice from customers and experts regarding the desired content and format for the training. Help identify the direction for training that would likely have the largest impact on the market.

5. Assess what training options provide the potential to impact the largest proportion of New Jersey building loads.

## Targeted Markets

Based on discussions with PSE&G and CPD personnel, this study primarily focused on school districts, state buildings, and offices. Additional interviews provided some limited information on industrial firms. An interview was attempted with an O&M contractor for retail chains, but was never completed

## Survey Strategy

Rather than a statistical survey, this was a series of structured interviews with experts (association representatives, consulting engineers, the director of an Industrial Assessment Center) and customers. The experts provided a broad overview based on their experience with many customers, and the customer interviews both filled in the gaps left by the experts and provided greater depth. Additionally, some of the selected customers had extensive experience with other customer organizations through associations or prior employment.

# I. Study Design

An extensive interview guide was developed *(Appendix 1)*, to serve as a tool for in-depth questioning in the training areas of greatest interest to the respondent. The interviews were held in a discussion format, often with the respondent leading the direction of the interview, but the interviewer tying back to key areas of concern.

Several specific training options were discussed with respondents. These are described below:

- There are **half-day to two-day seminars** offered by groups or vendors, with no "homework" and no certification.

- Community colleges offer **certifications in boiler, and HVAC operation and refrigerant management**, through a program managed by the State Board of Education. These are short, equipment-focused classes.

- The Northwest Energy Efficiency Council (NEEC) in the Northwest U.S., and Northeast Energy Efficiency Partnerships (NEEP) in New England offer a **Building Operator Certification (BOC) program**. Certification requires attendance at eight all-day classes over seven-months, which provide an O&M overview, classes on key systems, and a day each on codes and indoor air quality. Homework projects in the operator's building are also part of the requirements for certification.

- The Building Owners and Managers Institute (BOMI) franchises, with the Building Owners and Managers Association (BOMA) New Jersey Chapter offers, **a System Maintenance Technician (SMT) certification**. It requires two years of night school, and $6,000. It is all classroom work with no practicum, and covers a wide range of O&M issues.

- **Building tune-up (recommissioning) course.** Offer a one-week intensive course in monitoring and tuning up controls systems, and integrating user needs into control settings.

Some respondents suggested variations on these options, or entirely different approaches.

## Respondents

There were 20 respondents. Six were brief, and fourteen covered most of the major issues. Some represented both an organization and a building owner, or a contractor and a building owner in one case.

Eleven were customers, consisting of eight school districts, one large industrial/office facility, and two property management organizations (one larger and one smaller). Large property managers were a key target for this survey, but proved difficult to reach. The large industrial respondent was an on-site employee of an energy services firm.

Four respondents were consulting engineers with significant O&M experience. One was a consultant with a federally-funded Industrial Assessment Center who works with industrial customers. Efforts to reach an additional energy services firm proved fruitless.

Four represented associations: Refrigeration Service Engineering Society (RSES), State School Buildings and Grounds Association, New Jersey Building Owners and Managers Association (the respondent was a customer and also New Jersey Chair for BOMA), and the Association of Energy Engineers (AEE).

Additional contact was made with several national groups that are not active in New Jersey O&M training (e.g., IFMA). A business association with limited interest and perspective on O&M training was also contacted. They may be interested once a specific product is being marketed.

# II. Summary of Findings by Building Type

## Office

O&M training needs of office facility managers vary widely, based on the scale of operation, the ownership and occupant types, and the culture and organization of each firm. Thus, while this market may, in concept, provide the largest single target for O&M training programs, there is no "silver bullet" which will address the concerns of all office properties, or even most of them.

The large property management firms are difficult to address. Based on their limited response to our inquiries, we believe that at least some of these firms may need to better understand the benefits of O&M before they are candidates for more training. Some may need to reorganize staff and contracting to focus on O&M. Thus, the best places to start working with these firms may involve:

- Energy accounting and benchmarking
- Case studies showing bottom-line benefits and management strategies for good O&M

These types of efforts would benefit all office markets.

Medium-size property management firms (based on the single interviewee in this category and comments from engineers) may provide more accessible short-term targets. The one firm we talked with is highly motivated to perform quality O&M. While this one firm may be an outlier, the smaller organizational structure and greater accessibility of medium-sized property managers makes them easier short-term targets.

Our respondents described owner-occupants of offices as, on average, less entrepreneurial and motivated than the smaller property management firms. One very large, technically oriented, owner-occupant was cited as an exception. While lower energy costs directly benefit the firms, O&M personnel were described as buried at the bottom of a complex organizational chart, and often de-motivated.

Small, locally-owned offices may be the least likely to focus on O&M.

The BOMI SMT training and certification course is an important asset for office building operators. This course is offered in New Jersey by the Building Owners and Managers Association, but can be franchised to other organizations. BOMA would welcome any efforts to help publicize the course and the New Jersey Chair appears willing to work with utilities on these or any other issues.

Several respondents strongly supported developing an eight-day course similar to the BOC initiative as a compliment. One vocal supporter was the Chair of BOMA New Jersey who is also a BOMI course instructor. His comments are summarized in the overview portion of the executive summary. Other respondents suggested working for improvements in the BOMI class, but with the expectation that results would take a long time.

## Schools

For schools, there is significant interest in further staff training, and in developing materials to promote efficient O&M and training to administrations and boards. The best training targets are school districts that have some capability, but are not "at the top of their game" for O&M. The study could not quantify the number of districts in this category, but they probably represent a significant share of districts. Others might be interested in training once such a program met with some success.

While the priority target for training is the lead O&M technician, a few respondents felt that it was also important to train Buildings and Grounds (B&G) managers on how to plan, staff, and manage effective O&M and to train boards and administrators on the dollar benefits of good O&M. However, some Buildings and Grounds managers already feel empowered to justify and get funding for necessary training.

A training program for Buildings and Grounds managers already exists, and will soon be mandatory, but it provides only an overview of energy issues, and does not reach most lead technicians. Utilities could help improve these efforts. CPD is currently participating in the energy sessions of this training course. One respondent also mentioned awareness training for custodians (shut off lights, report broken equipment, etc.) as important.

Districts and experts differed significantly regarding the best format for training for schools. This in part reflects the different levels of

motivation, commitment, training budget, and staff time between districts. There may be significant markets for:

- A series of half-day or two-hour seminars
- A two-day course
- A BOC-type course
- Utility co-funding of boiler or HVAC certification through community colleges (although many districts fund this activity themselves)
- Training for HVAC system tune-ups (recommissioning). Some interest was expressed in this, however, based on the level of sophistication and staffing at the responding districts, the researcher wonders if they are capable of implementing the monitoring and analysis that this entails. Most districts seem to have more fundamental problems to solve.

## State Buildings

Based on a very limited set of interviews, it appears that state buildings currently provide a very difficult market for O&M training or certification, in spite of dire need. Both personnel policies and budgeting systems strongly discourage good O&M on the part of state agencies. The key interviewee recommended that utilities offer assistance to the most forward-thinking facility and O&M managers in developing O&M showcases. Key assistance in the short-term could involve:

- Understanding bills and tracking energy loads,
- Tune-up of complex systems,
- On-site engineering services, and
- Rebates and other financial incentives.

Once financial benefits are demonstrated, case studies and recommendations for reform may need to be taken to high levels in government to encourage policy changes. It may take a thematic approach

(e.g., *ENERGYSTAR*® Buildings) adapted at a high level in the State, with political visibility, to overcome existing inertia.

In the long run, our key respondent thinks matching scholarships for basic HVAC and boiler certifications are a good idea. He thinks that extended classes with certification might be useful once the motivational system is fixed. They should run in the afternoon or evening, because many facility managers will not let staff off-site for entire days of training.

## Industrial

For smaller industrial customers, the greatest needs are for:

- Individual help in understanding what equipment is on what meter.
- Case studies, presented at breakfast meetings, meetings of economic development groups, and in-person, to show "front office" managers the economic benefits and show "back-office managers" the how-to's for specific types of enhanced equipment O&M and troubleshooting.
- Training videos, focusing on troubleshooting and efficiency issues for specific classes of equipment, perhaps starting with compressed air.
- On-site audits.

For large industrial customers, there is significant training underway. There is some value in additional training:

- Specialized seminars on narrow technical issues would be most useful, particularly for staff and contractors who work with complex controls systems.
- Training in energy accounting and analysis would also be valued.

# III. Associations

Of the four interviews with association representatives, two were brief. The latter basically viewed utilities as a competitor in the training market and limited their input to asking the utilities to stay off their turf.

It is clear from other respondents that the products offered by these organizations leave significant "market gaps." Their training tends to focus more on high-end skills, with a focus on engineering and management of O&M. RSES may delve more into the technical aspects of O&M (we did not obtain copies of their course outlines), but does not appear to focus training on O&M technicians other than those with engineering skills. None of the customer respondents mentioned their courses.

The contact from BOMA (the New Jersey Chapter Chair) is highly motivated to work with utilities, and is strongly interested in a course similar to the BOC program as a complement to current BOMA offerings. He currently teaches Building Owners and Management Institute (BOMI) courses on behalf of BOMA New Jersey. He sees BOMI as pre-occupied with their existing products, and unlikely to incorporate valuable elements, such as deeper focus on some energy issues and the practicum, in the near term. He would recommend a course such as the BOC to members, but not at the same time that the staff takes the BOMI SMT course. He would use the BOC course as a "refresher" and an opportunity to get into some issues not covered in the SMT course. He emphasized the importance of working with BOMA to co-market, coordinate, and minimize opportunities for conflict.

The State Buildings and Grounds Association is involved in a training program for school B&G managers, which may become a requirement under pending legislation. According to members, it offers a good overview of O&M and systems, but doesn't go into much depth on troubleshooting, analysis, or other energy issues. More rebates would be preferred, but any additional training would be good as well.

# III. Associations

# IV. Offices

## Notes on Responses

The scope of our findings regarding offices is constrained by the limited response from large property management firms. This can be explained in part by their current focus on power purchase as their "energy issue." We were able to talk with a number of experts who have considerable experience in this sector, as well as with some customers. Responses included:

- Three consulting engineers with extensive office experience.
- One contractor employee in a large industrial/office plant with extensive industry experience in other facilities.
- The Director of the Industrial Analysis Center at Hoffstra, who has dealt with office properties of industrial firms.
- The VP for Operations Facilities Manager and on-site O&M person for a small property management firm. This VP is also a BOMI class instructor and Chair of BOMA New Jersey.
- An employee of one large property management firm who deals with O&M issues.

## Segmentation

Respondents described the following types of office customers:

- ***Buildings Managed by Large Property Managers/Developers.*** There are a handful of firms that develop, own, and operate much of the office real estate in New Jersey. From our limited contact (several would not return calls), these firms are focused on minimizing energy costs through power purchases. One firm contracts out separately for O&M, HVAC, plumbing, electrical, etc., and has no one on staff that thinks about building operations. One expert described outsourcing of building operations as "commonplace, but not prevalent."

- ***Medium-Sized Property Managers***. We talked to one such firm and heard of others. Those firms who manage on a fixed fee are likely not too motivated to improve efficiency of O&M. Those who are rewarded for minimizing costs and/or maximizing service, and those who own their properties, may be among the more accessible and motivated firms.

- ***Owner-Occupants.*** Many corporations own their offices and manage O&M internally, and/or by contracting out certain services. In New Jersey, the line between "industrial" and "office" is blurred, particularly in the semiconductor and pharmaceuticals industry, where there are many high-tech, low-process facilities that pretty much look like offices. Some owner-occupants outsource O&M.

Within all these categories, the discussions centered largely on buildings large enough to have a facilities person on-site, or at least on-campus. Smaller buildings may be less intensively managed, and more of the O&M may be contracted. These smaller buildings may be difficult targets.

## Barriers

For all firms, knowledge, funding, and time to do adequate O&M were described as key barriers.

For larger firms, one observer thought it was difficult for O&M staff and managers to admit they weren't already doing everything right.

The one large property manager described a dispersion of O&M responsibilities among many contractors and the absence of any staff person with a job focus on O&M. This would make it difficult to create a chain of accountability for good O&M. An engineer familiar with small rental offices also said that the lack of accountability and crisis response were key barriers.

Dollar benefits of good O&M may be more direct in medium and large owner/occupant facilities. However, in some cases the long chain of command and bureaucracy has discouraged initiative.

## Need for Training

There may be less need for training in large facilities that have union operators who have been through the union apprenticeship program (see industrial section, below, for details). Additionally, some large firms put their personnel through the BOMI SMT program. In large facilities, there are often energy engineers with significant training and technical capability (e.g., on an unrelated project, PEA talked with a very sophisticated engineer in an insurance company who was doing in-house recommissioning of HVAC units).

However, at least one respondent pointed out limitations to the BOMI training (discussed in the section on training options, below). Training was generally thought to be weak among some large property managers and in many owner-occupied buildings. Underlying this is a lack of clear understanding of the benefits, and various corporate accountability and delegation issues that do not place responsibility for reducing O&M costs in one place in an organization.

## Motivation

Respondents stated that the level of motivation varied widely from firm to firm. However, many stated that there would be more motivation if financial managers understood the bottom-line benefits.

## Who to Train

As for all building types, respondents think that the primary target should be the lead O&M technician. Many large corporations have in-house training programs where lead technicians can train others.

Several respondents emphasized that the first task was to educate:

- O&M managers as to the benefits of preventative maintenance and good O&M; and
- Major tenants, building managers and financial managers as to the ROI.

## Can Agencies Afford Training?

Many property managers and owner/occupants can afford training if the proper motivators are in place. Generally, the O&M managers propose training to the building or financial manager. The most pessimistic response was from an engineer with experience in small rental offices. He said that minimal costs would be tolerated, but no more unless the value system changes for building O&M.

## What Type of Training?

Responses are summarized in *Table1*. There is strong support for efforts to promote and enhance BOMI SMT training, but limited expectations about additional short-term benefits from the utility effort. There is significant support for an eight-day class similar to the NEEP/NEEC course. Generally, the eight-day course was considered a complement to existing BOMA offerings, and also attractive to personnel who would not go through two years of night school to get the BOMI System Maintenance Technician certification.

**Table 1: Preferred Forms of Training**

| TYPES OF TRAINING | NUMBER WHO FAVORED UTILITY ASSISTANCE | | |
|---|---|---|---|
| | Customers | Consulting Engineers | University Advisor |
| BOILER/HVAC CERTIFICATION SCHOLARSHIPS | 1 | 1 | |
| SEMINARS/SHORT COURSES | 1 | 1 | |
| BUILDING TUNE-UP COURSE | 0 | 2 | |
| ENHANCE BOMI SMT-TYPE COURSE | 2* | 1* | 1 |
| EIGHT-DAY/PRACTICUM COURSE | 2 | 2** | 1 |

* *But 2 out of 3 said expect slow changes and concentrate energy elsewhere.*

** *One suggested breaking up as a half-day biweekly.*

Detailed responses regarding specific types of training are provided below.

### Refrigerant, Boiler and HVAC Certification

One consulting engineer thought that co-pay scholarships for these basic certifications were a good idea. One industrial/office customer thought this might help expand his labor pool; he would pay for the certifications if he had to hire staff without them. Most respondents felt that operators in office buildings usually were certified for the necessary equipment. Given the different levels of boiler certification and the equipment focus of these trainings (as opposed to system focus), many respondents did not regard this option as a very important O&M efficiency tool.

### Seminars and Short Courses

Respondents did not seem to think that vendor-sponsored seminars were fulfilling all their training needs. To quote one respondent, "vendors are vendors."

A customer/contractor recommended several possible courses. While the length of the course was not specified, most of these sounded like half-day to two-day courses:

- Training on EMS systems for lead technicians and contractors.
- Training in other control systems, such as fire suppression. Too few people understand the equipment. In particular, seminars on what are required by codes (health, safety, building, etc.) for various equipment.
- Training on new technologies (e.g., water filtration alternatives such as reverse osmosis filtering).
- Bill analysis and monitoring.
- One engineer proposed teaching operators the importance of keeping blueprints, understanding billing, and other energy O&M fundamentals.

Some of these areas relate only indirectly to efficiency.

### Building Tune-Up Course

Two consulting engineers thought a building tune-up, or recommissioning course would be valuable. Other respondents thought that it would appeal only to a limited market of the most sophisticated building operators and contractors, and would result only in limited long-term changes to the markets.

One customer (same customer speaking about large industrial and large commercial) thought that both training in EMS systems, and in bill analysis and trending, would be valuable. This seems to approach the content of a recommissioning class in some respects.

### BOMI Systems Maintenance Technician Course

Comments on the BOMI course were mixed. Some customers support the BOMI series and the SMT course in particular. One consultant noted that the SMT course was "more for managers than workers." Another said that he would prefer that the SMT course have more of an energy focus. He thought that the utilities should work with BOMI on this, but not make it their top priority, and they should expect results to be slow. A third consultant thought that the utilities should support the efforts of BOMA and other associations, but felt that the absence of a practicum (homework) element weakened the BOMI courses as a tool to train practitioners.

Comments from the respondent who was a customer and a BOMA representative are presented in the section on associations.

### Building Operator Certification

Description of the NEEC/NEEP Building Operator Certification (BOC) course elicited positive responses from one advisor and two customers (one enthusiastically and one more tentatively). The more enthusiastic customer's response is discussed under Associations, because he is also the New Jersey BOMA Chair.

The more tentative customer thought that most training should be tied to existing organizations and channels, but liked the idea of a finite course with more hands-on type training. He thought it would be valuable for smaller corporations where staff would not likely take the BOMI courses.

An additional engineer liked the idea but thought the class should be a half-day biweekly to enhance attendance.

The only explicit negative comment, "not high on my list" came from an engineer who thought that shorter, more basic courses would be better.

### Other

One engineer suggested scholarships for staff attending advanced ASHRAE design and engineering workshops.

## Alternatives to a Training Program

A consulting engineer suggested (unprompted) using the ASHRAE O&M outline to come up with a specification of the O&M tasks that contractors should do. He believed that contractors were often hired without the client having a clear idea what to ask for. In this environment, price competition tends to drive out quality of services offered. Two other engineers pointed out that customers rarely knew what to ask for when contracting out. When the idea of an efficient or green model O&M contract was raised, they thought it had merit. One respondent thought it would be best to lay out the model contract by system (e.g., chiller first).

A consulting engineer suggested that the Resource Conservation Manager approach (salary guarantee or shared savings for a firm to bring an RCM on staff) would be attractive for military installations, universities, and schools.

One engineer and one customer pointed to the value of site-specific engineering assistance.

A different engineer thought that financial managers needed better information benchmarking the energy performance of their buildings.

## Role of Case Studies/Marketing

Most respondents thought it was crucial to provide case studies to financial, corporate, and facility management explaining the bottom-line value of good O&M. One suggested working with IFMA to try to build this material into their training. Another thought this might be valuable,

but would take many years to have an impact, depending on which managers attend training with which trade groups and when they train. "You might not wind up training the right people." This individual thought that breakfast meetings and face-to-face contact would work better.

## Is Certification Important?

All responses to this question were generally positive. However, some focused on the basic HVAC, boiler, and refrigerant specifications, while others thought a higher level of certification (e.g., BOMA or BOC) would offer additional value. Some thought that management would value certifications, while others felt that the increase in confidence and self-image of the workers would be the primary reward.

## Key Allies

Respondents pointed to a large number of potential allies and co-marketers:

- BOMA and BOMI
- Contractors associations
- American Institute of Architects
- Association of Energy Engineers
- ASHRAE
- RSES
- Unions (see below)
- IFMA

Only BOMA was mentioned more than once. One engineer said that ASHRAE and AEE were "too scary." This was interpreted to mean that it would be difficult to set up a functional alliance, and their training focus might be too technical for most operators. These organizations have a primary focus on engineering, with O&M as a portion of their missions.

Three respondents thought that unions are important in many larger office buildings. Only the respondent with small rental experience stated that they were not important. The general consensus is that some larger buildings (but not all) have union operators. A description of industrial activity is presented in the industrial section.

## Comparison to RLW Baseline Study Results

*Table 2* shows the levels of interest to various assistance options shown by 61 respondents from throughout New England and New Jersey to the RLW baseline study.

**Table 2: Interest Shown by Respondents to Various Types of Utility Assistance**

| TYPE OF ASSISTANCE | PERCENTAGE SHOWING INTEREST |
|---|---|
| SITE-SPECIFIC ANALYSIS | 69% |
| SPECIFIC EQUIPMENT TRAINING | 45% |
| GENERAL TRAINING ON O&M AND CERTIFICATION | 42% |
| SHARED SAVINGS/PERFORMANCE CONTRACTING | 58% |
| RECOMMENDED/APPROVED CONTRACTOR LISTS | 60% |
| PROVIDE CONSULTING ADVICE | 71% |
| DEVELOP STANDARD GUIDELINES FOR O&M ITEMS IN MAINTENANCE AGREEMENTS | 54% |

These results are difficult to interpret without further discussion with respondents, for several reasons:

- Most customers have meager experience with utility support for training, and many more have experience with utility incentives, shared savings, and technical assistance. A general rule of market research is that customers have difficulty with options that are less familiar and more hypothetical to them.

- The baseline study also showed that many customers have limited awareness of the benefits of enhanced O&M. The responses indicate what customers would do *given what they know now.* This is one reason why the current study relied on a mix of customers and experts.

- The results are not size-weighted. It is difficult to know if the customers favoring site-specific assistance are large enough to produce sufficient savings to justify that type of help.

It is clear that more customers would utilize more direct and site-specific forms of advice and financial assistance than would currently utilize training. This is not surprising, given that these forms of assistance require less commitment and time on the customers' part.

Also, more customers favor training on their specific equipment to more general training. Caution is advised in that this result (for offices) differs from that for the "Proficient" market cluster that dominates utility loads in New Jersey. This may indicate an inordinate influence by smaller customers or customers who are not in New Jersey on the Office results.

Nearly half of office respondents to the RLW survey thought that utilities could help improve training and certification.

These options are not necessarily mutually exclusive; many respondents to the PEA study felt that training and other forms of assistance (rebates, site-specific engineering help) were useful complements.

# V. Schools

## Notes on Responses

Interviews were held with eight school districts, and a representative of the New Jersey Buildings and Grounds Association. Three of the school districts provided full interviews, two were asked some training questions as part of the CPD school O&M pilot program[2], and three were not very interested in training and provided limited responses. Three consulting engineers with extensive experience with O&M in schools were interviewed.

It is important to note that school district respondents were predominantly Buildings and Grounds Supervisors (or the equivalent) from medium-sized school districts (four-to-seven buildings). This was largely a coincidence in sampling, but also reflects some difficulty in reaching larger districts for interviews. One of the larger districts had just signed a ten-year performance contract for O&M, and the O&M manager believed that all his problems were solved. Therefore, he declined a detailed interview.

Also, two engineering respondents and two of the school districts were participants in the CPD O&M pilot. This did not seem to color their responses in most respects, but explains the strong support for on-site services and energy accounting as alternatives or complements to training. These services are offered through the CPD pilot.

## Segmentation

Levels of O&M capability vary significantly among school districts, as reported by both on the district interviews and the observations of the engineers and expert. Five categories are described below.

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[2] In 1999, CPD worked with two school districts to enhance the efficiency of their operations and maintenance, offering a review of practices, training, energy accounting, and engineering assistance.

### Minimal Capability

This is analogous to the RLW study's "Run it "Til It Breaks" market segment. Some districts have no time to do anything beyond fix systems after they break. Personnel at these districts are not thinking about making things better. At one district, the O&M manager had left years ago and was not replaced; two foremen worked directly for the Business Administrator. At another district, the Buildings and Grounds manager said that there was no point in training anyone, because there was nobody to do anything they weren't already doing. The perspectives at these districts are colored both by overwork and by a lack of a sense of empowerment. Many of these districts contract out for maintenance of boilers, HVAC system, and controls, but they do not contract for a high level of service. The focus is on crisis prevention.

These districts are not the most promising candidates for O&M assistance. They might best be influenced by presentation to boards and superintendents of case studies from other districts that have committed more time and invested in more personnel to address O&M issues. In some cases, a Resource Conservation Manager (salary guarantee) approach may be useful (as suggested by one engineer).

### Farmed-Out Their Problems

One responding Business Manager has attempted to delegate all responsibility for O&M quality to turnkey contractors. While the contractor may not "make all the problems go away" it will be difficult to work with this customer. It may prove more fruitful to work with the contractor.

### Ready to Improve

These customers are analogous to RLW's "Interested Amateurs" market segment. Some districts have limited current capability, but significant potential to improve O&M if staff training, communications, and/or contractor management improve. However, these districts are not likely to develop high-level technical skills in-house. These districts usually contract out for maintenance of complex equipment (boilers, controls, HVAC), but perform routine maintenance in-house. Training is a good option for these districts. Some could take over more maintenance

functions (and lower costs) with more training, as well as run equipment more efficiently.

### Ready to Excel

These are similar to RLW's "O&M Proficient" market segment. A limited number of districts are performing "decent" O&M, but could improve though a combination of training, on-site help, and communications and organizational assistance. The CPD O&M pilot demonstrated that there is at least a reasonable chance of providing significant and sustainable improvements to these districts through an organized program of site-specific technical assistance. One of the two participating districts felt that classroom-type training was an important complement to this. "Ready to Excel" districts may have a highly trained HVAC technician, and perform more in-house periodic maintenance than most other districts. However, they are not necessarily experienced at looking at load data, troubleshooting energy problems, changing controls to save energy, managing chilled water set-points, etc. There are significant potential additional savings. Training may be a component of an approach for some districts, and may help by itself in others.

### Top of Their Game

These are equivalent to RLW's "O&M Experts". One district we visited (six buildings) appeared to have extremely high in-house O&M capability. The Environmental Services Director came from a construction management background and had brought in some technicians with many years of private-side energy services experience. The director believes that they get enough training, have enough capability, and don't need much help. There is no reason to doubt him. We believe that few New Jersey districts are at this level. The one respondent in this category agreed that most of the neighboring districts were not managed at this level.

One consultant with extensive experience in school districts stated a belief that you could roughly divide districts into thirds, with a third difficult to motivate (minimal), a third ready for significant improvement (ready to improve or ready to excel), and a third either having achieved excellence or having delegated all services to contractors. Turnkey contracting was thought to be more common among large districts, but not prevalent.

## Barriers

Barriers to effective O&M cited by respondents included the following:

- Old equipment
- Teachers needs vary, making it difficult to program equipment
- Staff knowledge, time, and training
- Prestige of lead O&M technicians – they know more than they get credit for (from an engineer)
- Board and administration awareness of potential benefits

## Need for Training

Only two respondents did not think there was a need for further training. One was the "farmed it out" district, and the other had no time to do anything new, do to understaffing. Even at the district where there was no O&M manager, the foremen thought that there were benefits from further training the staff at times when new staff are hired. And the district at the "top of their game" thought more training would help at neighboring districts.

However, support for training was not always unconditional. In one case, the respondents felt that training would not be valuable until the lead electrician retired and somebody more ambitious took his place. At this same site, an HVAC system which was only a few years old was running completely out of control due to design problems; the district was considering replacing the system, and the respondents felt that training would be more useful once the new system was installed.

## Who to Train

Among the respondents with an interest in training, respondents were unanimous in stating that the key target for technical training should be the lead O&M technician or the electrician. In some cases the "electrician" was the lead technician, while in other cases they worked under a foreman.

While the respondents from school districts thought the primary need was for technical training, two consulting engineers and the association representative emphasized the importance of training people in the administration and boards on the value of good O&M, in terms of saving money and extending equipment life. It may be that these issues did not occur to the school district respondents because the respondents do not typically think about training their bosses.

One engineer also emphasized the importance of "awareness" training for custodial personnel, to make sure they shut off lights, report broken equipment, etc.

Several respondents noted that there is already a program to certify Buildings and Grounds managers, cooperatively run by the State, Rutgers, and the State Buildings and Grounds Association. Respondents reported that there is legislation under consideration to make this certification a requirement for Buildings and Grounds managers in school districts. The training was described as of high quality, including an "overview" of operations and maintenance efficiency. A couple of respondents suggested that the training could be enhanced to include more about "applied" issues such as what staffing is required and what tasks are involved in effective, efficient O&M, the specifics of a good O&M contract, troubleshooting, etc.

Respondents who were members of the Association noted that it was mostly managers and not lead technicians, so it missed the primary target for O&M efficiency training. However, the association is an important potential ally in marketing training of technicians.

## Can Districts Afford Training?

The answer varied by district. Four districts noted that their boards would fund reasonable training expenses if they think it is worthwhile. However, one of these noted that training funds were limited at many other districts. Other respondents were vague on the issue, or cut the interview short due to lack of interest in training. The consulting engineers reported that training could be funded if the bottom line benefits were convincingly conveyed.

## What Type of Training?

The types of training most favored by the respondents are listed in *Table 3*; some favored multiple approaches. Details are provided below

**Table 3: Preferred Forms of Training**

| TYPES OF TRAINING | NUMBER WHO FAVORED UTILITY ASSISTANCE | |
|---|---|---|
| | Districts | Consulting Engineers |
| BOILER/HVAC CERTIFICATION SCHOLARSHIPS | 1 | 2 |
| SEMINARS/SHORT COURSES | 2 | 1 |
| BUILDING TUNE-UP COURSE | 2 | 1 |
| BOMI SMT-TYPE COURSE | 0 | 0 |
| EIGHT-DAY/PRACTICUM COURSE | 2 | 1 |

### Boiler and HVAC Certification

- Boiler and HVAC certification was promoted by two out of three consulting engineers. One noted that it was important to build the prestige and credibility of the lead technicians, and to encourage their initiative.

- One school district said this was "important for apprentices." Another thought it was an important thing to promote.

- Several respondents noted that it's pretty simple, many technicians get it anyway, it doesn't cover systems, only items of equipment, or it's not a very high threshold.

- Not all districts had personnel with HVAC certifications. Boiler certifications were more common.

While some school districts will pay for this level of training, some will not; there may be a modest market for scholarships to help lead technicians get this training.

### Seminars and Short Courses

Several respondents noted that staff goes to vendor-provided seminars on operating and troubleshooting specific equipment, but some expressed reservations about the utility of these seminars, given the obvious need to promote the trainers' products.

Two school districts' Buildings and Grounds managers felt that the more intensive options discussed in the interview (BOMA, BOC) required too much work to attract the participation of many districts. Concerns included the motivation of workers and the willingness of boards and administrations to let workers off-site for extended periods. They favored shorter courses. A third district B&G manager seemed generally satisfied with the vendor courses as a means of training.

One engineer proposed a basic course in the importance of blueprints, O&M diligence, and basic systems. Other suggestions focused on O&M or equipment fundamentals, understanding energy bills, and other basics.

### Building Tune-Up Course

Two school districts and one engineer responded positively to this option. Many school districts do not have chiller systems or have small systems in only one school. Many also contract-out maintenance of their energy management systems. Most of the time, school district personnel were still struggling with more basic operational concerns. It was not clear to the interviewer that the B&G managers who responded positively understood the complexity of the training.

### BOMI Systems Maintenance Technician Course

Respondents did not know of any school district personnel who had taken the course. Generally, BOMI and BOMA New Jersey were regarded as "another culture," with different organizational connections, and a different type of personnel.

One respondent noted that the SMT course would be a large time commitment for a school O&M technician, and there would need to be a hands-on element (currently absent from the BOMA course) for it to be worthwhile. That was the most positive response.

### Building Operator Certification

There were favorable responses from two districts, one engineer, and the association. The practicum element and limited time span for the course were the main positive features. Negative responses generally focused on the length of the class time and the length of time away from the shop. In contrast to the districts that thought eight days was too long away from the shop, one B&G manager suggested that the course occur on eight straight working days to aid in retention.

One Buildings and Grounds manager suggested offering a class in two-day chunks, so that workers could achieve something in less time and focus on individual systems. Another suggested that half-day courses in the afternoon (in a short series) would allow workers to take care of some problems on site, then "escape" to class with minimal disruption.

## Alternatives to a Training Program

All but two of the respondents felt that training was an important area to improve O&M capability in school districts. However, many also wanted to see other services.

Rebates were frequently mentioned as a higher priority for utility assistance. The interviewer sometimes described current utility rebate programs and filed utility plans for additional programs. This generated considerable, tangible interest. Many school districts are now investing in new buildings and building improvements. Contact information has been provided directly to PSE&G for those customers who stated an active interest.

The two schools that participated in CPD's pilot were presented with a number of additional options including a salary guarantee for the district to hire a Resource Conservation Manager, on-site engineering assistance to address specific O&M issues, site-specific staff training, and energy accounting. Both districts expressed interest in all of these options except for the salary guarantee. They felt that their boards would not be very interested in additional staffing, and it might be more prudent to begin by working to enhance what could be done with existing staff.

The consultants who were directly involved in providing on-site assistance through the CPD pilot program, and another who knew about it, all

mentioned on-site engineering assistance as a valuable complimentary activity.

## Motivation

Many districts and engineers believed that if the appropriate training were available, staff would go, and districts would fund it. However it may take significant selling and convincing for many of the "minimal capability" and even some "ready to improve" and "ready to excel" districts to move forward. At other districts, B&G managers are confident that they can get funding for important training, and thought that O&M training was important.

One consulting engineer emphasized the importance of showing management case studies to demonstrate that training results in real money savings. Another noted that staff is willing to train where there is formal recognition or reward for training.

One Environmental Services manager at a school district noted that most districts are required to pay staff salary for time away at training, and some school boards are not willing to pay for much training time. However, other respondents noted that staff participates in training regularly, and did not note this as a problem.

## Role of Case Studies

The respondents differed as to the importance of developing case studies of successful building O&M and its impact on costs and service. One B&G manager said that it would be good for the board, but his Business Administrator would take him at his word, so they weren't necessary to sell to his boss. Another say they are useful for new staff, once some unmotivated personnel retire.

The researcher interprets the limited focus of B&G managers on case studies as being a result of their pragmatic and action-orientation. Our experience in the CPD pilot and in these conversations is that many B&G managers are focused on doing a good job, but not necessarily on improving their own credibility with their overseers.

Two consulting engineers strongly supported case studies as a way to increase management receptivity. The researcher's sense was that the other engineers did not minimize the value of case studies to sell to management, but focused more on other issues in the interview.

## Is Certification Important?

In responding to this question, some respondents were discussing basic boiler or HVAC certification of technicians, while others were discussing whether certification of operators who completed broader O&M coursework was important.

Response was decidedly mixed, reflecting the philosophies of the respondents and the dynamics between the respondents and their administrations and boards.

One school district Buildings and Grounds manager, and the New Jersey School Buildings and Grounds Association respondent thought that broad certification of O&M competence through some new program would be very valuable. Two other school district respondents felt that the certification (in general) was important to the workers, in terms of their own confidence and prestige, but that the administration and board focus more on results. Some respondents were not clear how a new certification would do more than existing boiler and HVAC certifications. Other school district representatives did not think it was important, or had no opinion.

One consulting engineer thought that basic boiler and HVAC certification was valuable in that it gave lead technicians more credibility. He felt that a common problem in the districts where he consulted was that the B&G managers did not pay enough attention or give enough credence to the recommendations of the technicians, and in some cases, this lack of support reduced the initiative of the technicians. Another concurred that any certification was important. A third felt that certifications didn't carry much prestige or weight.

## Key Allies

The county and state-level B&G associations were frequently mentioned as key allies in marketing and institutionalizing additional training. Some

respondents at first thought that the existing training through the association covered their needs. However, with more detailed discussion, they concluded that: 1) it was only an overview; and 2) most technicians didn't go, their managers went.

Most Buildings and Grounds managers and some other personnel belong to the teachers union, the NJEA. However, the union does not get involved in O&M training and is not a key ally for any training or certification program.

# V. Schools

# VI. State Buildings

## Notes on Responses

State buildings were a high priority target for this study, but only two interviews were completed for this segment.. One is a Vice President for Asset and Property Management at a property management firm, with the State as a major client in one building. The other respondent, who provided the bulk of the material for this section, is a former manager for buildings within the state administration. The manager had not been replaced, making it difficult to get a current perspective.

## Segmentation

From a marketing point-of-view, our key respondent suggested dividing state buildings into two groups: those few run by hands-on, dedicated facilities managers, and then everyone else. He suggested working with the dedicated few to provide examples of leadership and financial savings that can then be taken up the decision-making chain.

From an agency point-of-view, he said that the largest uses of space in the State are the Department of Human Services (declining) and the Department of Corrections (smaller, but ascending). Treasury is next. In very rough terms, the State has 30 million square feet of buildings, the universities another 30 million square feet.

There are many more square feet that are leased, but we could not get an estimate of how many.

The property manager described communication with the tenants as "clear," it also seemed rigid; the agency declared their needs, and the facility manager met them precisely. The property management firm is extremely quality and energy-focused, but basically could not have a conversation about issues that were not of interest to the tenant. And the tenant agency was not focused on energy costs.

The big drivers behind state building equipment and system design, from the designer and agency perspective, are "trouble-free" systems, even if they're less efficient. Agencies will lease equipment that they could own more cheaply in order to avoid the O&M.

Our key respondent noted that generally, the "guys at the bottom," the technicians – boiler operators, mechanics, electricians – are pretty good. Many have certifications or have taken vendor courses to understand how to clean steam traps, maintain systems, and do basic repair. The engineers would be willing to do more work on energy issues. However, their bosses, and the construction department, and the Department of the Treasury are so indifferent to O&M and energy costs that it demotivates the workers.

## Barriers

Our rather plainspoken primary respondent described O&M in state buildings as "virtually nonexistent."

Currently, energy bills are largely regarded as fixed costs, and are paid out of the Department of the Treasury. Nobody who sees the bills is closely connected to the buildings. Furthermore, budgetary processes tend to discourage building improvements.

Capital costs for new equipment comes out of a budget that is outside the individual departments. O&M funds, on the other hand, compete within the agency budget. Agencies are mission-oriented, and likely to dedicate scarce funds to pivotal mission-related services at the expense of facility management.

If O&M improvements result in reduced staffing needs, the agency loses staff positions permanently. Not only do they lose staff costs out of their own budget, but they lose overhead costs associated with that amount. Those costs come out of the overall state budget. This discourages efforts to create more operable and effective building systems.

Also, funding is broken up into object accounts that disperse authority and focus. Basically, nobody looks at energy bills and cares. Personnel systems do not provide promotions for O&M certification.

State financial officials have not focused on building O&M issues as opportunities for reducing the cost of government. A high-level audit of buildings as a financial issue (done under the last administration) lies gathering dust.

Implied, but not stated, was that the equipment in many buildings is so shabby and run-down as to defy efficient operation. The response to many O&M questions was to replace balky hardware that could easily be financed out of savings.

## Need for Training

Many of the workers have basic certifications, but there is a need for additional technical training. However, the primary need is to educate the State's financial managers about the benefits of good O&M.

## Motivation

There are currently only a few motivated individuals within the State building management system.

## Who to Train

The lead technician, he'll train the rest.

## Can Agencies Afford Training?

Most currently will not fund training beyond the required technical certifications (HVAC, boiler, refrigerant). Some don't even go that far. It will take a change from the top.

## What Type of Training?

### Refrigerant, Boiler and HVAC Certification

Many technicians have this; co-funding would help more get it.

### Seminars and Short Courses

The preferred format for any subsequent training (after demand is created) would be a couple of hours at the end of the day, because managers won't let staff go for entire days. The key respondent was particularly interested

in classes to help staff understand energy bills, convert fuel sources, do end-use splits and do trend analysis. He saw this as valuable for both O&M managers and technicians.

### Building Tune-Up Course

This would be useful for advanced technicians.

### BOMI Systems Maintenance Technician Course

The only way this would receive much participation is if it were tied into the "title" system, basically the state job descriptions that influence salaries. The same would be true of any other training. The respondent did not have anything to say about the course in particular.

### Building Operator Certification

The respondent did not think many facilities managers would let staff off-site for entire days. While the content may be valuable, it would be important to break it up into half-day or evening sessions.

## Alternatives to a Training Program

The key respondent kept diverting from the O&M subject of the interview to note the need for very cost-effective hardware improvements to enhance operational efficiency. He would like to see on-site technical assistance and rebates. He was very interested in the *C&I Construction Program* in his current job as a university facilities manager.

He also suggested that utilities bulk purchase and distribute equipment to reduce the payback for customers.

He was interested in training technicians in building simulation. It would seem unlikely that many state employees would engage deeply enough in design to use these skills. However, the respondent is now managing the redesign of a large HVAC system and would be able to use this type of training.

Utilities could charge incremental cost for T&D upgrades; that may motivate facility managers to minimize load increases. He would rather that utilities simply refuse to serve inefficient new equipment that is bad for the State and creates bad peak loads for the utilities. But he understands that the utilities would find that politically difficult.

## Role of Case Studies/Marketing

The key respondent thought that the most important thing to do was create showcase sites, evaluate the financial benefits, then press the Office of the Treasury with this information and a plan for reform of O&M and energy accounting, management, and personnel policies.

## Is Certification Important?

Only basic technical certifications.

## Key Allies

Key Allies are highly motivated managers at individual facilities. He provided names of a couple of such customers in PSE&G and CPD territory.

Unions did not come up as an important factor in these discussions

# VI. State Buildings

# VII. Industrial Customers

## Notes on Responses

Industrial firms were a secondary target for this research. As a consequence, only limited information was gathered on industrial customers. One interview was held with the manager of the Industrial Assessment Center at Hoffstra University. This interview provided the primary information regarding small industrial customers.

A second interview was held with a contract energy and facilities manager at a large pharmaceutical plant. This manager has extensive contracting and management experience with large plants. His experience probably reflects the way pharmaceutical and other large-but-light industrial firms operate. It may not be pertinent for heavy industrial firms such as pulp and paper or oil.

As part of another project, PEA conducted interviews with eleven PSE&G industrial customers with loads between 200 kW and 3 MW in 1998. While the interviews did not focus on O&M, some pertinent information surfaced, and is reflected below.

A final caution is warranted. The health of industrial firms is notoriously cyclical, and their outlook, capabilities, motivation, and even organizational structure change with economic conditions. The perspectives provided in these interviews (especially the large industrial interview) reflect a period of unprecedented economic health. While it is difficult to say what the next economic phase will bring, prior PEA interviews with industrial customers for various projects painted a much more equivocal picture of corporate focus on O&M, capability, commitment, etc.

## Segmentation

Small firms generally do most process or compressed air O&M in-house, but contract out for electrical work and HVAC maintenance. It is the interviewer's experience in prior New Jersey projects that many medium-sized firms have electricians, but still contract out HVAC maintenance.

The large firm where the interview took place uses on-site "contractor surrogate staff" to perform all facility O&M and energy management.

Custodial work is contracted out separately from energy and building systems, which are contracted out together. The "surrogate staff contractor" will bring in other specialist contractors to perform work where that is the most effective and least-cost route. However, he estimated that 75% of the O&M work is performed by staff or surrogate staff. Energy Management Systems, for example, are installed and programmed by "out-of-house contractors," but then operated and monitored by "contract surrogate staff."

The IAC respondent spoke about a graduated spectrum of capability and need based on the size of the firm; it is not a clean break between "large" and "small." PEA's interviews last year with firms in the 200 kW to 3 MW range (albeit not focused on O&M) confirm that their capabilities vary, but seem related to size. A smaller plant spent the winter with a garage-type door open because they couldn't afford to fix it. Two multi-MW plants with process loads had significant onsite project planning and engineering capability, and had O&M efficiency projects underway. Several plants intermediate in size had "some" on-site engineering capability, but primarily focused it on production-related projects.

Both respondents to the current study also emphasized the need to market to industrial firms one SIC at a time. Case studies, referrals, techniques, etc. tend to spread within a specific industry type. Some industries have associations that may be useful points of entry for marketing.

## Barriers

The barriers described among smaller customers included limited time, lack of awareness of where energy costs come from, limited knowledge of efficient O&M, and understaffing. Many smaller firms have two managers, one "front office manager" for sales and marketing, and a "back room manager" who keeps the plant running. The "front office manager" is not always aware that there are financial benefits to better O&M, and the "back room manager" has neither the time nor the training to pursue improvements.

Larger industrial customers were depicted as having fewer barriers than most customers. The main issue cited by the respondent was finding personnel with the requisite qualifications, both for staff positions and for controls contractors.

For many firms, language is a barrier. Our small-firm respondent noted that in many small firms, the front office and the back room managers have a very limited common vocabulary, because many of the operations people are immigrants with limited English. There is enough common language to cover the basics, but complex or new subjects may require additional types of effort at communication. In our prior interviews with New Jersey industrial customers, we have found that these barriers sometimes exist in some medium-sized (1-3 MW) plants as well.

## Need for Training

The need for training among small industrial customers is clear. The firms themselves are said to be aware of the limitations on their knowledge and capability. For larger firms, the needs may be more limited and specialized.

Larger firms more often have energy managers, an energy engineer, and higher-paid technical people. Better-trained O&M people tend to go to large industrial firms, and larger firms tend to pay more and seek more training and experience in their operations people. Lincoln Tech, for example, has a two-year Associates Degree in System Maintenance. Graduates tend to join industrial firms. Additionally, some large firms (including the firm where the large industrial respondent works) encourage their personnel to participate in the BOMI SMT course, as well as more advanced BOMI courses. Other large firms may be more closely aligned with other associations and use their training.

## Motivation

Large customers with large loads were depicted as being highly motivated to train their personnel. Smaller firms often understand that they are not doing good O&M, may wish they could do better, but do not necessarily understand the financial benefits. Additionally, many do not know how, with their limited staff resources, to get further training.

## Who to Train

The respondents with an interest in training were unanimous in saying that the key target for technical training should be the lead operations person in

smaller firms, and the lead O&M technician or the electrician in firms large enough to have one. In some cases the "electrician" was the lead technician, while in other cases they were "O&M technicians".

Additionally, for small industrial firms, it is important to provide the front-office manager with the information to understand the financial benefits of good O&M, and the back room manager with the technical training. The knowledge of the benefits was reported to already exist at large industrial firms. In PEA's prior interviews with 200 kW to 3 MW industrial customers, it was our impression that many understood the importance of good O&M, but few paid much attention to the energy linkages, or focused on O&M enhancements to reduce energy costs, per se. Their focus was on process equipment and production objectives. Those customers who understood energy and O&M were at the higher end of that size range.

## Can Industrial Customers Afford Training?

The answer depends on the current economic condition of the firm. Times are now good, and large firms can afford training. Many small firms may not, depending on their unique situation. For small firms, a bigger issue than money, per se, is time out-of-plant.

## What Type of Training?

Case studies, breakfast meetings, troubleshooting videos and short classes work for small industrial consumers. Marketing is crucial, and can proceed through industrial and economic development groups. On-site assistance with understanding usage patterns may be important.

For large industrial customers, needs are limited. Specialized seminars on narrow technical issues would be most useful, particularly for staff and contractors who work with complex controls systems. Training in energy accounting and analysis would also be valued.

Specific options are discussed in detail below.

### Refrigerant, Boiler and HVAC Certification

The small-plant respondent indicated that utility intervention was not important with respect to this type of training because it is required anyway. The large building respondent thought that a matching fund scholarship program might help encourage people to get this training and improve his supply of qualified applicants for positions.

### Seminars and Short Courses

The small-plant respondent suggested that there was a role for short classes (e.g., breakfast meeting or late afternoon, a half-day at most) focusing on troubleshooting specific equipment. However, he did not see a ready market until the communications with the front-room managers created the demand.

For larger customers, the following were recommended (while the length of the course was not specified, most of these sounded like half-day to two-day courses): [3]

- Training on EMS systems for lead technicians and contractors.
- Training in other control systems, such as fire suppression. Too few people understand the equipment. In particular, seminars on what are required by codes (health, safety, building, etc.) for various equipment.
- Training on new technologies (e.g., water filtration alternatives such as reverse osmosis filtering).
- Training in high-voltage management. PSE&G allows plant personnel in some of their training, but the customer would like more.
- Bill analysis and monitoring.

Only some of these areas relate to O&M in a way that might impact efficiency.

[3] The respondent is the same one who recommended many of these options for offices.

Generally, vendor seminars were acknowledged, but not discussed much in these interviews.

### Building Tune-Up Course

This would be too much for the small industrial firms. The small industrial expert saw many opportunities to troubleshoot small industrial ventilation systems, but he thought that the solution was site-by-site analysis and assistance. Many of the issues were design-based, and might take considerable effort to diagnose and fix. One example was the prevalence in conditioned plants of exhaust vents for process or combustion areas with no provision for make-up air.

The large plant respondent thought that there was a need for training for controls staff and contractors, but he focused more on basic system knowledge and operation. In particular, he said there was a dearth of controls contractor personnel who really understood how to get the most out of their systems. He also pointed out the importance of training staff in how to read energy bills, perform basic monitoring, and perform trending analysis to figure out what's going on in their plant. The combination of bill analysis and EMS training resembles the first half of a building tune-up course.

### BOMI Systems Maintenance Technician Course

This was described as clearly too ambitious for most small industrial firms.

The large firm respondent was an avid supporter of the class, and encouraged his personnel, even some that were not on a management track, to go through the class. He did wish it had more hands-on and pragmatic material on energy systems, particularly control systems. He did not see a need for a utility role in marketing the class, per se, for his type of firm.

### Building Operator Certification

The BOC course was described as too much for small firms, and not a good fit for large firms. The large industrial respondent preferred the BOMI approach and highly focused technical classes on equipment.

### Videos

Unprompted, the small industrial respondent suggested that training videos might be the best approach for many small firms. They can be watched on breaks or at home, which is important for plants with very limited staff. He suggested that compressed air O&M would be a great place to start. This re-enforces recommendations out of PSE&G's recent compressed air market study.

The large industrial respondent also saw an important role for videos in helping more enterprising custodial staff make the transition to O&M personnel. However, he said that this type of video is already available, so there wasn't a need for utility involvement.

## Alternatives to a Training Program

The large industrial respondent discussed a variety of potential utility services that were not efficiency related. Several are discussed in the section on short courses, below. He was generally interested in outsourcing functions to utilities wherever practical.

The IAC representative thought that some of the better cost-saving opportunities in small industrial plants involved correcting power factor, buying their own transformers, and in load management.

The IAC representative clearly felt that he was adding value through low-cost, O&M-type on-site facility audits. Rebates were mentioned as a valuable resource in small buildings, and the large industrial representative (like many representatives) mentioned lower rates as an important utility objective. In PEA's industrial interviews for this and prior projects, rebates and low rates were also requested.

Additionally, the IAC representative pointed out the importance of helping small industrial firms understand what equipment is on what meters and how to assess that information. Many small plants grow incrementally and are poorly documented. They can have many meters, but often have not taken the time to figure out which equipment is dominating their loads. While help in this regard might take the form of training for larger, more sophisticated customers, someone would probably need to go on-site to help the small ones.

## Role of Case Studies/Marketing

For small firms, the highest priority was stated as building awareness of the potential dollar savings. Case studies, organized and marketed on a SIC-specific basis, were considered to be pivotal to improving O&M and to building a market for training. The case studies (or versions of them) needed to show dollar benefits to the front room managers, and to focus on specific equipment and issues in a step-by-step way for back-room managers.

The respondent noted a few ways to reach smaller firms:

- In some cases, accountants have called the IAC for small firms who were concerned about energy costs.

- Local economic development groups are an attractive way to get to the front-room managers, because they go to these groups looking for ways to get capital, and their potential funders are also present. By presenting information in this context, it may be possible to create the perception that good O&M is part of good financial management.

- Some industry types have associations, where presentations can be made.

- Through the free trade magazines which many firms subscribe to (e.g., *Plant Engineering Manager*).

For large industry, case studies were thought to be part of an overall delivery approach. However, a top-down sales approach using case studies was not emphasized, because the firms were thought to already understand that there were dollar benefits. The respondent emphasized the importance of marketing through existing organizational channels. One respondent noted that different industrial firms are allied with different professional groups (BOMA, AEE, etc.). It is important to find the groups that provide access to each firm.

## Is Certification Important?

For small customers, it was not stated as an important issue. For large customers, two types of certification were discussed as potentially valuable:

- Basic boiler, HVAC, and refrigeration training for technicians.
- Certification by BOMA or other professional groups for more advanced personnel.

Our respondent emphasized the importance of running any certification through existing channels, including the Board of Education program for technical certifications, BOMA, IFMA, etc. Use of existing channels might aid in the credibility of certification and prevent confusion and redundancy.

## Key Allies

The IAC representative recommended local economic development boards, accountants, utility sales representatives, industry associations (as discussed above), and the IAC itself as strong allies for small customers. The large customer respondent recommended BOMA as a key ally along with the union (see below).

Small industrial firms are predominantly non-union. Large industrial firms, with respect to O&M, include both union and non-union shops. One union was mentioned as a potential ally, or at least an important player: the International Union of Operating Engineers Local 68. They have an apprenticeship program that encourages basic certifications (boiler, HVAC, refrigerant) and also promotes participation in the BOMI SMT training program. If utilities could find a way to encourage union shops to bring in apprentices with these certifications, it may strengthen O&M. The respondent was not sure how interested the union would be in working with utilities.

## Comparison to RLW Baseline Study Results

*Table 4* shows the levels of interest to various assistance options shown by 110 manufacturing respondents to the RLW baseline study from throughout Southern New England and PSE&G's territory in New Jersey.

**Table 4: Interest Shown by Respondents to Various Types of Utility Assistance**

| TYPE OF ASSISTANCE | PERCENTAGE SHOWING INTEREST |
|---|---|
| SITE-SPECIFIC ANALYSIS | 55% |
| SPECIFIC EQUIPMENT TRAINING | 39% |
| GENERAL TRAINING ON O&M AND CERTIFICATION | 49% |
| SHARED SAVINGS/PERFORMANCE CONTRACTING | 55% |
| RECOMMENDED/APPROVED CONTRACTOR LISTS | 62% |
| PROVIDE CONSULTING ADVICE | 77% |
| DEVELOP STANDARD GUIDELINES FOR O&M ITEMS IN MAINTENANCE AGREEMENTS | 46% |

These results are difficult to interpret without further discussion with respondents, for several reasons:

- Most customers have meager experience with utility support for training, and many more have experience with utility incentives, shared savings, and technical assistance. A general rule of market research is that customers have difficulty with options that are less familiar and more hypothetical to them.

- The baseline study also showed that many smaller customers have limited awareness of the benefits of enhanced O&M. The responses indicate what customers would do *given what they know now.* This is one reason why the current study relied on a mix of customers and experts.

- The results are not size-weighted. It is difficult to know if the customers favoring site-specific assistance are large enough to

produce sufficient savings to justify that type of help. The current study shows significant variations by size.

It appears that, on first blush, customers appreciate more direct and site-specific forms of advice and financial assistance, and more favor that option than help with training. However, nearly half thought that utilities could help improve training and certification.

A separate analysis in the RLW baseline study considered responses to several questions in trying to define the market for broadly defined program options. The results are presented in *Table 5*. The potential industrial markets for technical assistance, contractor selection, performance contracting, and training were all within the range of 53-58% of respondents (statistically insignificant differences). Of the major strategy types listed only "Energy Manager," a staffing salary guarantee option, fell to the bottom, with 20% favoring the option. That option is generally targeted at schools and institutions, not industrial firms.

**Table 5: POTENTIAL MARKETS FOR VARIOUS OPTIONS FROM RLW STUDY**

| CUSTOMER TYPE | TECHNICAL INFORMATION /ASSISTANCE | PERFORM-ANCE CONTRACTING | CONTRACTOR SELECTION | ENERGY MANAGER | TRAINING |
|---|---|---|---|---|---|
| ALL INDUSTRY | 58% | 53% | 58% | 20% | 57% |
| PRIMARY & FABRICATED METALS | 36% | 27% | 51% | 24% | 63% |
| CHEMICALS, RUBBER & PLASTICS | 54% | 49% | 47% | 21% | 36% |
| ELECTRONIC & OTHER | 65% | 55% | 70% | 24% | 63% |
| INDUSTRIAL EQUIPMENT | 53% | 37% | 63% | 0% | 48% |
| PAPER AND ALLIED PRODUCTS | 85% | 80% | 71% | 31% | 80% |
| PRINTING AND PUBLISHING | 52.2% | 55% | 46% | 84% | 46% |

The markets for training are strongest in the metals, electronic, and paper industries. These are the most favorable markets for most forms of O&M assistance.

Our conclusion is that the RLW study provides some useful information for targeting assistance, but provides very limited feedback on preference for specific program options.

Training and other options are not necessarily mutually exclusive; many respondents to the current study felt that training and other forms of assistance (rebates, site-specific engineering help) were useful complements.

# VIII. Bibliography

Tom Ledyard, Leslie Barbagallo, and Ed Lionberger, *Commercial and Industrial O&M Market Segment Baseline Study,* July, 9, 1999.

Adam Hinge, *Background Research on O&M Training and Certification in the Northeast US,* March 31, 1999.

# *VIII. Bibliography*

# *Appendices*

**Appendix A:** **PSE&G / CPD O&M Training and Certification Market Research Interview Guide**

**Appendix B:** **Overall Comparison to RLW Baseline Study Results**

# *Appendices*

# Appendix A

## PSE&G/CPD O&M TRAINING AND CERTIFICATION MARKET RESEARCH INTERVIEW GUIDE

Respondent: _____

Phone: _____

Fax: _____

Address: _____

_____

Employer: _____

Organization (if different): _____

Organizational Role: _____

*Hello, my name is _____, with _____. As part of its regulated activities, PSE&G/CPD have committed funding to help customers improve their energy efficiency. I'm a consultant helping these utilities design these energy efficiency programs.*

*One area the utilities are exploring is energy efficiency of building operation and maintenance. We see this as important because there are demonstrated opportunities for large energy savings in building O&M. We'd like to talk to you for about 30 minutes to get your thoughts regarding how the utilities could play a constructive role. Ideally, we'd like to visit. Is that possible? Prefer phone?*

Date: _____

Time: _____

Location: _____

Directions: _____

## Background

### PSE&G's Objectives:

- *Increase operator capability to improve resource-efficiency (energy, water, sewer) of O&M.*
- *Increase operator motivation to perform resource-efficient O&M.*
- *Help building managers understand financial benefits.*
- *Give building managers an easy way to identify qualified staff.*

*This is a not-for-profit initiative by PSE&G's/CPD's regulated side, intended to create long-term, sustainable changes in the efficiency of building O&M, not just short-term fixes. (In the interviews, we often had to distinguish this effort from unregulated utility marketing subsidiaries).*

### We Recognize That:

- *Buildings, their managers, and operators are diverse.*
- *One type of training may not be the best for all.*
- *There are some existing efforts.*

*We're trying to figure out the best way to complement existing organizations that support and train for building O&M.*

*This interview is part of the effort to consult with others in developing this effort.*

*PSE&G /CPD are not viewing this specific activity as a profit center, but as part of their regulated commitment to efficiency.*

## Questions

1. **Building types.** Regarding O&M, what building types are you most experience with?

2. **Opportunities.** What do you see as the biggest technical opportunities to reduce energy or other resource use with regard to building operation?

3. With regard to building maintenance?

4. **Barriers.** Why doesn't this happen now?

5. **Structure.** Could you describe a typical O&M organization in the type of building you're most expert in?

| | IMPORTANCE OF TRAINING TO ACHIEVING EFFICIENT O&M (LO/MED/HI) | ENGINEER? ROFESSIONAL? CAREER TRACK? ANY TRAINING? | CONTRACTED OR STAFF? | UNION? |
|---|---|---|---|---|
| CUSTODIAL STAFF | | | | |
| O&M STAFF | | | | |
| LEAD O&M TECH | | | | |
| O&M MANAGER | | | | |
| BUILDING MANAGER | | | | |
| OTHER | | | | |

6. **Contractors vs. staff.** Describe respective roles of contractors vs. staff in operations as compared to maintenance.

7. **Who's important.** Who generally makes important decisions regarding building operation? Building maintenance?

8. **Training needed.** Is additional training needed? Training of who?

9. **Motivation.** Would they be motivated to be trained? Would the organization be motivated to pay for it? If not, ideas for increasing motivation?

10. **Certification important?** Some O&M experts think that, beyond training, "certification" of trained operators is important to improving the efficiency of O&M practice, in that:

    - It helps managers know what staff have a basic level of education and practice.
    - It provides prestige.
    - It provides an "identifier" for trained staff, which then can be promoted with case studies, awards, and other marketing.

    Do you think that certification is important, or is it a sideshow?

11. **Alternatives.** Are there other, better ways PSE&G/CPD could enhance the perceived value of good O&M?

12. **Key organizations.** What organizations do they (the best training targets) normally associate with?

13. **Current activity.** Thus far, we've identified the following training opportunities for O&M personnel in New Jersey.

    - There are a number of one-day or half-day courses offered by vendors and associations, with limited scope, no homework, and no certification.

    - There is a certification program for School O&M managers. (we are gathering more info on this).

    - Building Operators and Manager's Association runs a two-year, $6,000 night school certification program that is frequently offered in NJ. The curriculum is from the Building Owners and Managers Institute, their non-profit affiliate.

    - There are certifications run by various national groups (e.g. AEE, IFMA) which seem focused on management or engineering personnel. There doesn't seem to be much activity in New Jersey.

    Do you know of any other such certifications?

14. Are the unions important in training? What do they offer? Who would know?

15. (For organizations) If the respondent is with another customer organization (e.g., schools and grounds org), BOMA sponsorship is a plus or minus.

    - How might expanded training best appeal to this organization and membership?

- Would your organization play an important role in offering expanded training and certification opportunities?

- Would your organization want to directly franchise and organize courses for your membership? Consider (1) needs of members, (2) organizational benefits, and (3) organizational burdens.

- Is it important that your organization be a sponsor of any training to promote it?

- Is co-sponsorship with other associations considered to be an advantage, a negative, or both? Why?

- What does your organization need to get out of any effort to enhance training?

16. **Best Targets and Approaches.**

*Shape this question around training or certification, whichever they think is important.*

*Focus on the key audiences they mentioned*.

Given what you've said about who to train, and the importance of certification, let's discuss program options for the specific audiences.

***Building Owners and Managers:***

- Are they motivated to attend formal training?

- Would they want certification in as narrow an issue as O&M and efficiency?

- Where and how to offer?

*Career/professional track O&M personnel (O&M managers and ambitious staff):*

- Are you familiar with any existing course? Probe about BOMA and state Buildings and Grounds association.

*Ask the following if they're familiar with the BOMA course, or if they mention another.*

- Opinion of this course?

- Does it appeal to O&M personnel?

- Does it teach O&M for energy and other resource efficiency?

Try to direct discussion away from AEE or other programs that do not have an O&M focus.

- Relationship of your business, institution, or association with BOMA? (or other groups if they mention).

- Might they support expanded offerings of the BOMA/BOMI course? Buildings and Grounds course? Other?

- Prefer to work with BOMA or directly with BOMI (i.e., independently of the local BOMA chapter). BOMI offers the courses to non-BOMA organizations.

*Lead Technicians*

Your opinion of these options:

- Encourage more widespread HVAC certification?

- Refrigeration certification?

- Training and certification in monitoring and re-tuning HVAC controls?

- General O&M training? (e.g., 8-day course over 7 months on O&M fundamentals, with homework, leading to a certification)?

- Other ideas?

***General Blue Collar O&M workers.***

Your opinion of these options:

- There's a NW program being piloted in New England, which is a 7-month 8-days-of class overview of building O&M and resource efficiency. It has homework projects in the operators' building as part of the requirements for certification. Does this look like a fit?

- Are you familiar with the BOMA/BOMI course (2 years night school, $6K, no practicum)? How does this compare as a fit with needs of the target audience?

- There are one-day or half-day seminars offered by groups or vendors, with no "homework" and no certification. Do these fill the need?

- Other approaches?

17. **Actions.** Here are possible specific actions. Please comment and make further suggestions. (Use this to clarify any prior statements; skip if they've already made their top priorities clear).

    - **Co-Market Courses.** Support wider marketing for existing association-sponsored training, including more aggressive cross marketing to different types of customers (e.g., BOMA training for institutions).

    - **Enhance energy aspects of BOMA (or other) O&M training.** Work with existing organizations to enhance the energy content of their training curriculum, or build in practicums (building projects) prior to certification.

- **Evaluations and case studies.** Fund evaluations and case studies to demonstrate how training and certification has resulted in bottom-line benefits.

- **Tech certification scholarships.** Offer partial scholarships for lead technicians to get HVAC or refrigeration certification through the appropriate trade programs.

- **Building tune-up course.** Offer a one-week intensive course in monitoring and tuning up controls systems and integrating user needs into control settings.

- **Start a "Blue collar" certification course.** Adopt a program being run in New England and the Northwest for blue-collar training.

  – Eight day course over seven months.

  – A strong energy focus, but still strong on general O&M.

  – Certification based on completed coursework and on-site projects.

18. **Alliances.** What other organizations would you suggest we work with to co-market, offer reciprocal credits, etc.?

19. **Resources.** For the customers you're most familiar with (schools, offices), who sets training requirements and budgets for O&M personnel?

- Is it on-site or a parent organization?

- How do we best encourage their long-run financial support for staff training?

20. **References.** Who else is knowledgeable about status and needs for O&M training that we might talk to?

# Appendix B

## Overall Comparison to RLW Baseline Study Results

*Table B-1* shows preferences for utility O&M assistance expressed by customers throughout Southern New England and PSE&G's territory in New Jersey in the RLW baseline study.

**Table B - 1: Customer Preferences for Utility O&M Assistance**

| TYPE OF ASSISTANCE | O&M EXPERT | O&M PROFICIENT | INTERESTED AMATEUR | PASSIVE UNDER ACHIEVER | RUN 'TIL IT BREAKS |
|---|---|---|---|---|---|
| SITE-SPECIFIC ANALYSIS | 82% | 80% | 76% | 72% | 14% |
| SPECIFIC EQUIPMENT TRAINING | 62% | 58% | 44% | 59% | 7% |
| GENERAL TRAINING ON O&M AND CERTIFICATION | 85% | 72% | 46% | 59% | 13% |
| SHARED SAVINGS/ PERFORMANCE CONTRACTING | 56% | 72% | 63% | 70% | 16% |
| RECOMMENDED/ APPROVED CONTRACTOR LISTS | 69% | 75% | 63% | 80% | 25% |
| PROVIDE CONSULTING ADVICE | 95% | 82% | 89% | 85% | 39% |
| DEVELOP STANDARD GUIDELINES FOR O&M ITEMS IN MAINTENANCE AGREEMENTS | 69% | 65% | 61% | 61% | 18% |

It is remarkable that, while training and certification are not strong favorites for less-interested customer groups, they are favored or even with most other options for "proficient" customers, as well as "experts."

The "proficient" cluster, as noted above, dominates PSE&G customer floorspace.

At the same time, slightly more "proficient" customers would like site-specific analyses and consulting advice than training. These more personalized (and more expensive) options are familiar to most customers, which may have influenced the response. Also, these options require less commitment on the part of the customer, and so may be more attractive.

A separate analysis of multiple questions in the RLW Baseline study provided the assessment of the market for broadly defined options as shown in *Table B-2*.

**Table B - 2: POTENTIAL MARKETS FOR VARIOUS OPTIONS FROM RLW STUDY**

| CUSTOMER TYPE | TECHNICAL INFORMATION /ASSISTANCE | PERFORM-ANCE CONTRACTING | CONTRACTOR SELECTION | ENERGY MANAGER | TRAINING |
|---|---|---|---|---|---|
| O&M EXPERTS | 76% | 67% | 70% | 34% | 83% |
| O&M PROFICIENT | 75% | 66% | 70% | 33% | 71% |
| INTERESTED AMATEURS | 73% | 64% | 54% | 22% | 58% |
| PASSIVE UNDERACHIEVERS | 74% | 63% | 74% | 24% | 64% |
| RUN 'TIL IT BREAKS | 9% | 10% | 23% | 2% | 6% |
| TOTAL | 67% | 59% | 62% | 25% | 61% |

For the "proficient" customers who dominate PSE&G's load, the potential market for technical information, contractor selection assistance (a politically difficult option for utilities to provide) and training are virtually the same size, with the other options less favored. For the market as a whole, there is a slightly larger market for technical information, then about the same size of market for training, contractor selection, and performance contracting.

We conclude that, while the RLW study is valuable in providing information on decision-making structure and trackable indicators of

progress in the market for O&M efficiency, it does not provide much guidance for choosing program options beyond the indication that the Resource Conservation Manager (RCM) option has a very limited audience. Given that the RCM option was developed for use with schools, which were excluded from the RLW study, and municipalities, which were a limited part of the respondents, this is no surprise.

# *Appendix B*