Scale it up! Deliver Strategic Energy Management (SEM) to More Organizations for Less Money.

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ABSTRACT

Strategic Energy Management (SEM) is equal parts business theory and practical application. Traditionally that has meant high-touch delivery for a significant period of time to achieve organizational change that aligns energy efficiency with operational goals. That's difficult to scale. To address the challenge the Northwest Energy Efficiency Alliance (NEEA) developed online training modules to deliver content and concepts to diverse cohorts of businesses. With a standard foundation in place, program consultants maximized one-on-one time in several ways:

- Group facilities tours and Q&A are more specific and productive
- Participants better leverage consultant time for in-depth, specific problem solving
- Consultants focus more on interactivity and cohort building during group workshops/ webinars.

NEEA's primary objective in developing the Online SEM training was to support utilities in reaching small to medium industrial customers with a low-to-no touch approach. NEEA's own pilot and a subsequent pilot implemented by BPA – with a relatively limited set of participants – provided encouraging results.

This paper describes the development and pilots of the Online SEM modules, detailing what worked, what didn't, and how the key learnings continue to influence the implementation of the training. Find out how Online SEM integrates best practices for adult learners to be brief, insightful, and engaging. Get a glimpse into the Northwest Commercial and Industrial SEM Infrastructure program, and the role that scalable, configurable, online training is playing for regional stakeholders.

Introduction

SEM has been demonstrated as an effective approach to achieving operational savings in industrial and commercial facilities (Jones et al 2013). SEM involves taking a holistic approach to managing energy use in order to continuously improve energy performance. Because SEM is still a relatively new approach to energy efficiency the exact process for implementing SEM is subject to variation. There is, however, concerted effort in the industry to bring greater alignment to the approach. Towards this end the Consortium for Energy Efficiency (CEE) has defined the "Minimum Elements" of SEM as:

- Customer commitment;
- Planning and implementation; and a

- System for measuring and reporting energy performance (CEE 2014).

Utility-sponsored SEM programs in the Northwest have demonstrated a cost-effective program approach, with particular success in industrial facilities. Pilots led by NEEA, Bonneville Power Association (BPA), Energy Trust of Oregon (ETO) and others have been running in the Northwest since 2006, expanding from small scale pilots to fully integrated offerings (Energy 350 2014). NEEA, an alliance of more than 140 utilities and energy efficiency organizations, works on behalf of more than 13 million energy consumers. NEEA is dedicated to accelerating both electric and gas energy efficiency, leveraging its regional partnerships to advance the adoption of energy-efficient products, services and practices.

Established SEM program approaches for large industrial facilities require a high level of consultant effort; for example, a cohort of SEM program participant organizations may attend eight to ten training workshops in a twelve month period, in addition to receiving direct consultant support. Due to this 'high touch' approach several issues emerge. Offering a high level of external consultant input for smaller facilities is not cost-effective. Similar cost-effectiveness challenges apply when serving individual (or few) facilities that may be in remote locations (i.e. additional travel cost and time). At the programmatic level there can also be cost-effectiveness challenges in launching an SEM program for a small utility, of which there are many in the Northwest.

In order to support SEM program scalability in the Northwest, NEEA envisioned an online SEM training program, primarily with the objective of supporting utilities and SEM Program Administrators in reaching smaller industrial customers. The original objective was that the Online SEM could eventually eliminate the need for direct consultant support in small to medium industrial facilities.

Online SEM Curriculum Development

Between 2009 and 2012 NEEA sponsored the development of fifteen web-based training modules and a learning management system (LMS) to access training (www.online-sem.com). NEEA collaborated with regional subject matter experts and program sponsors in creating learning objectives. Training was to be primarily targeted at facility engineers, energy managers, production managers, and other facility-based staff who would participate in energy teams. The training was developed for industrial facilities, though much of the basic training material could apply equally to commercial SEM applications.

While NEEA led the development of the Online SEM training, the long term vision is that it could be a foundational element of small to medium SEM programs implemented by its stakeholder utilities across the Northwest. The LMS was designed to enable these utilities to become Online SEM "affiliates." Each affiliate can offer the Online SEM training with their own logo and has administrative access to monitor the ongoing training progress of trainees within their own industrial programs.

NEEA designed the online training modules in accordance with adult learning best practices at the time. Modules are image-rich, incorporate dynamic animations, and link all learning outcomes to specific example situations, to ensure the student has the context for what they are learning (Figure 1).

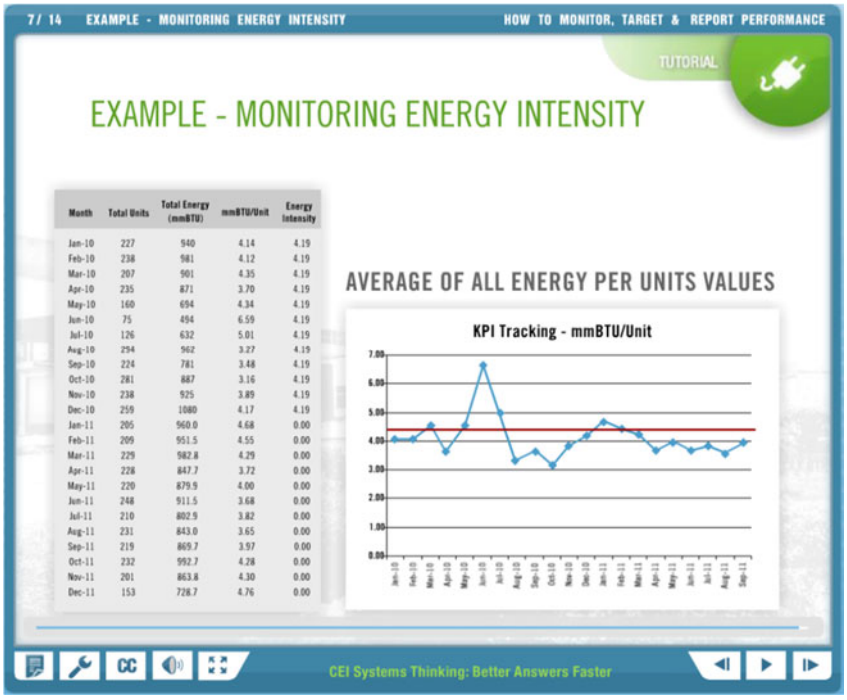

Figure 1. Example screenshot from NEEA Online SEM training. *Source*: NEEA 2015.

Online SEM modules are 20-25 minutes in duration, and can be taken at any time by the user. Module content was intended to cover the full range of SEM activities from early planning through to ongoing tracking of performance after improvements are made. A full list of modules is shown in Table 1.

Table 1. Online SEM Modules

Module Title
• How to Form an Energy Team • How to Write an Energy Policy • How to Get and Record Energy Data • How to Perform an Energy Audit • How to Find Free Help or Hire Professionals • How to Choose the Best Energy Projects • How to Estimate Costs for Energy Projects • How to Convert Measurements to Common Units • How to Translate Data into Performance • How to Set and Achieve Goals • How to Manage the Energy that Matters Most • How to Choose Performance Indicators • How to Monitor, Target and Report Performance • How to Improve through Operations and Maintenance • How to Create Energy Awareness and Support

A wide array of reference materials were developed (or borrowed from other NEEA SEM efforts) to accompany the online training, thus providing practical tools and examples that students can use in applying SEM principles in their facilities.

NEEA SEM Pilot

In 2012 NEEA commenced a pilot of the online SEM training. The key objectives of the pilot were to:

- Document user experience with Online SEM;
- Test effectiveness of Online SEM to drive SEM implementation at participant sites;
- Document the full set of resources and technical support needed; and
- Track the implemented and planned energy efficiency projects (capital, O&M or behavioral).

Online SEM Training was delivered via an LMS hosted by PECI,[1] and additional support was provided via a telephone helpdesk and consultants who were available to field more specialized technical questions.

NEEA collaborated with Puget Sound Energy (PSE), Snohomish Public Utility District (SnoPUD), and Washington State University (WSU) to recruit participants between January and June 2012. A total of eight facilities participated in the online SEM pilot and these were divided into two cohorts. Participation in the pilot was free of charge; participant firms were provided with LMS website details and given instructions on how to register online.

The pilot used multiple methodologies to gather feedback from participants. The LMS provided the program team the ability to track the activities and progress of individuals interacting with the Online SEM modules. It also contained online module feedback surveys designed to capture ongoing feedback on specific modules and aspects of the curriculum. At the end of each cohort's participation period, PECI conducted exit interviews with all participants that had registered via the LMS. At the end of the pilot, PECI conducted interviews with the pilot implementation team members to capture feedback about the overall pilot. Table 2 summarizes the data collected on the SEM pilot between March and May 2013.

Table 2. Online SEM Pilot Feedback Data

Data Collection Strategy	Number Complete
Online Module Feedback	42
Participant Exit Interviews	7
Consultant Exit Interviews	3
Utility Exit Interviews	2
NEEA Exit Interview	1

[1] Since the development of Online SEM, PECI's assets have been acquired by CLEAResult.

Because this was the first application of Online SEM, the speed at which participants would progress through the modules was unknown. To help pace the training and provide participants an incentive to hit certain progress milestones participants were provided with a timeline and key dates when technical consultants would be available to provide personal guidance on training topics. However, if a participant moved through the SEM Modules faster than the anticipated timeline, then the technical consultants were made available to consult on an accelerated timeline, thus providing an incentive for program participants to maintain progress.

NEEA Pilot Findings

PECI conducted an evaluation of the Online SEM pilot and found a wide range of results from the eight participant companies. At one end of the scale two companies had employees who completed all fifteen Online SEM modules, and at the other end was a company for whom no individuals registered on the LMS (Figure 2). In four cases a single individual participated in the training, in one case two individuals participated, and in one case three individuals participated.

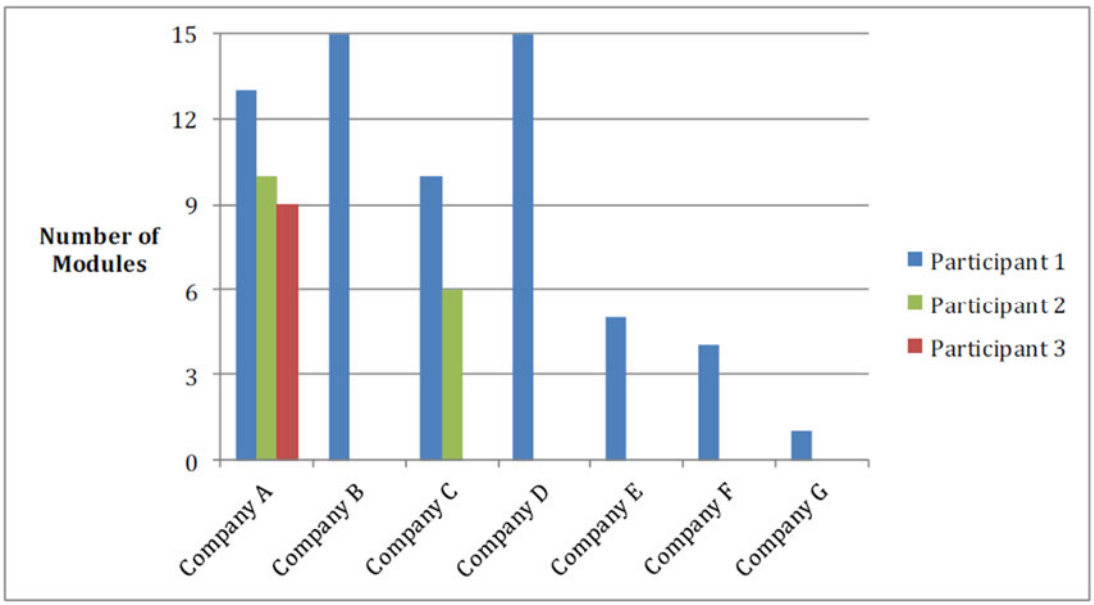

Figure 2. Number of Online SEM Modules Completed by Pilot Participants (Company H had zero modules completed). *Source*: PECI 2013.

With a pilot sample size of eight companies there was no expectation that pilot evaluation data would be statistically significant, but the feedback provided useful qualitative data. An overarching finding was that the six-month pilot period was insufficient for participants to fully engage in the program; while some companies made good progress through the modules there were others that would have benefited from a longer period to complete the training. Despite the relatively short length of the pilot a survey of the seven active participants indicated high engagement in some of the key SEM activities (Table 3), suggesting some level of success in driving action.

Table 3 Pilot Participant Responses on Actions Taken During the Pilot (n = 7)

Action	Yes	Plan To	No
Perform energy audit	43%	14%	43%
Calculate energy baseline	57%	14%	29%
Revisit standard operating procedures for energy efficiency	43%	14%	43%

The time taken to complete online SEM modules was recorded as approximately 25 minutes, which was in line with expectations and which would suggest a total training time of six to seven hours. Participants provided positive feedback on the quality of the training materials, the reference materials, and also the level of technical support.

The Phase 1 Online SEM Pilot provided a valuable opportunity to evaluate the effectiveness of the training as a means of reducing direct input/time from external consultants. The Online SEM Pilot had provided three consultant check-ins with participants, at approximately 25%, 50%, and 75% progress through the online materials. Consultants were available outside of formal participant check-ins, but this only happened on one occasion. Seven out of 12 implementation team members felt that more proactive support would have increased participant engagement, but even with a light touch the pilot indicated that several of the participants made significant progress through the training and acted to implement SEM at their facilities. Given the limited scope of the pilot no attempt was made to quantify the energy impacts of the pilot at participant facilities, and so a full comparison of cost effectiveness with established SEM approaches was not feasible.

BPA Pilot

In 2014 BPA launched the Small Industrial High Performance Energy Management (SI HPEM) Pilot. The SI HPEM Pilot, part of BPA's Energy Smart Industrial Program, incorporated NEEA's Online SEM training as one of several strategies to reduce program costs. The SI HPEM Pilot incorporated a one-year engagement period followed by a second year of 'light touch' strategies and monitoring to assess persistence of energy saving actions implemented through the program.

In contrast with BPA's large industrial SEM approach which can involve eight to ten in-person meetings annually, the SI HPEM Pilot was built around four participant webinars. These webinars were used as a means to create interim deadlines for completion of Online SEM modules. BPA took a modular approach to applying Online SEM: seven of the modules are required, two are optional but encouraged, and the remaining six are optional.

There has been no formal evaluation of BPA's SI HPEM Pilot, but progress is being reported anecdotally by program staff as positive and the Online SEM is proving useful in supporting participant progress with reduced direct consultant input. Given that some of the pilot participants are in remote locations, the Online SEM training is reducing travel costs, and also reducing direct consultant labor effort that would have been needed to conduct onsite training.

One challenge experienced with implementing Online SEM with the SI HPEM Pilot is that BPA's SEM framework differs in some ways to the structure of the Online SEM training. For example the Online SEM training modules are divided into four sections: Plan, Do, Check, and Act. This structure does not align with BPA's overall structure, even though the module content is very similar; as a result, the visual arrangement of the modules in NEEA's LMS is not ideally matched to program documentation. Aside from the training content itself, the principal challenge faced by BPA is in getting and keeping participants engaged through the program webinars; this is not so much related to SEM but rather a general challenge faced when trying to engage participants in a topic that may not be their highest priority on a daily basis.

Evolution of Online SEM

Through 2014, NEEA made a number of enhancements to the Online SEM Training. An overview module and a safety module were added to the LMS. The web portal was also enhanced with user case studies, links to videos and case studies, and general enhancements to the web layout/navigation. In 2015 and beyond, NEEA is considering how to add additional functionality around online quizzes/assessment which might further reinforce learning outcomes.

As of May 2015 there are 21 organizations with employees registered on the Online SEM LMS (excluding utilities and program implementation partners), for a total of 35 individual participants registered. Participants have taken 133 training modules in total. The number of modules completed by each active Online SEM participant is shown in Figure 3. In addition to utility customers there are eleven program sponsors in the Pacific Northwest with registered users in the Online SEM LMS. Program sponsors and their third party implementation support contractors (27 individuals total) have completed a total of 128 modules. NEEA recognizes that the vast majority of users complete less than half of the modules. This is primarily due to SEM program designs that only integrate certain modules into their implementation framework, without requiring users to complete all modules.

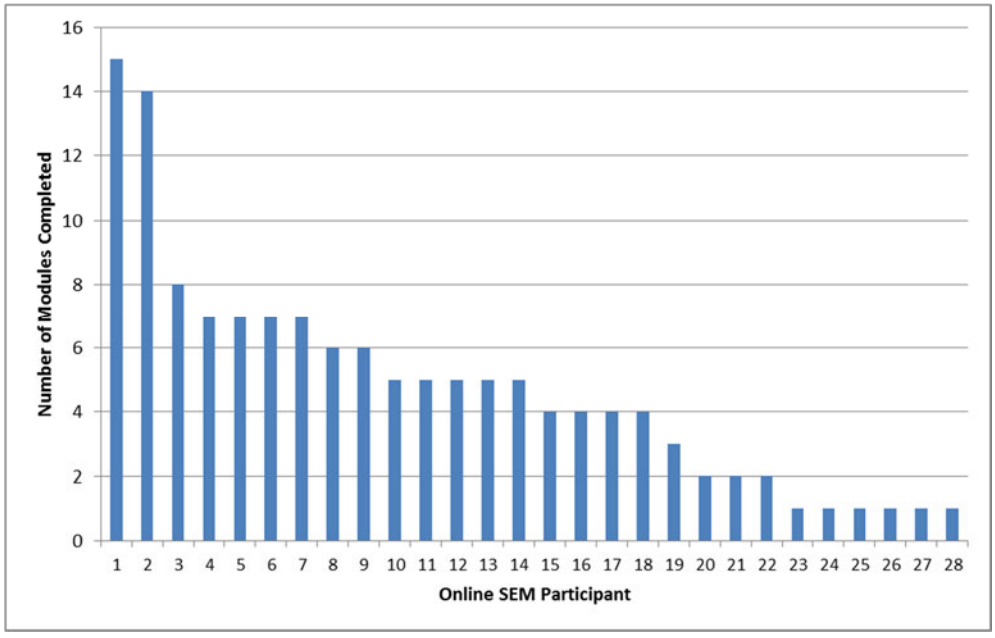

Figure 3. Number of Online SEM Modules Completed as of May 2015. *Source*: NEEA 2015.

The Online SEM training will continue to evolve and be refined, but NEEA considers it ready for broader-scale program integration. NEEA's efforts are now shifting from developing the product to supporting successful integration into programs that will drive participant engagement and tracking student progress/engagement/feedback to continuously improve the product. Currently there are five affiliates offering or who have offered NEEA's Online SEM Training to their customers.

Conclusions

NEEA's primary objective in developing the Online SEM training was to support utilities in reaching smaller industrial customers. NEEA's own pilot and a subsequent pilot implemented by BPA – with a relatively limited set of participants – provided encouraging results. Survey responses and interviews with pilot participants and implementers provided positive feedback on the content and depth of the training materials, and the module duration (approximately 25 minutes on average) was in line with expectations. When participants were asked if they had performed some of the key tasks associated with SEM between 55 percent and 70 percent said they had or that they planned to. The Online SEM training is now available to NEEA's stakeholders as a tool for implementing SEM programs that can reduce program development time and also reduce the amount of direct consultant input required.

While the Online SEM training can support SEM programs for small and medium industrial facilities, pilots indicate that there are still additional challenges in achieving and maintaining participant engagement in the absence of high touch consultant support. BPA's SI HPEM Pilot is continuing to explore how best to integrate Online SEM within an SEM framework for small to medium facilities. Further study is also required to evaluate the energy savings impacts of an SEM program built around the Online SEM training. These pilots have provided some examples of companies successfully progressing through the online SEM modules and implementing key aspects of SEM, which can be used as examples to replicate in larger scale programs.

NEEA is continuing to drive innovation in support of Northwest SEM Program Administrators as they scale-up implementation of SEM in the region. NEEA played a much different role initially on SEM than it is today. NEEA's early efforts helped codify the SEM process, demonstrate its savings potential, and assist key regional utilities and energy efficiency program administrators in launching their own SEM programs. Today, NEEA is moving upstream to support program implementation and innovation by utilities across the Northwest with its Commercial and Industrial SEM Infrastructure program. One core element of this effort is supporting continuous improvement of and tracking results of innovative tools like the Online SEM learning modules.

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