The Evolution of Continuous Energy Improvement Programs in the Northwest: An Example of Regional Collaboration

Ted Jones, Consortium for Energy Efficiency
Kim Crossman, Energy Trust of Oregon
Jennifer Eskil, Bonneville Power Administration
John Wallner, Northwest Energy Efficiency Alliance

ABSTRACT

The Northwest region is a leader in developing and delivering programs that help industrial facilities integrate energy management into their operations, leading to reduced costs and increased profitability. The goal of continuous energy improvement programs is to enable participating facilities to build and sustain a culture of energy efficiency within their organizations. Strategic Energy Management (SEM), SEM provides a framework and process to establish managing energy as a standard operating procedure. Success in the region has not occurred by accident, but results from close communication, collaboration and learning across energy-efficiency programs and their partners.

Using the evolution of SEM programs in the region as an example, this paper describes how the Bonneville Power Administration (BPA), the Energy Trust of Oregon (ETO) and the Northwest Energy Efficiency Alliance (NEEA) worked together to identify and develop Continuous Energy Improvement (CEI) programs in the region. It describes the SEM concept, how it differs from traditional industrial program design, and important program assumptions and offerings. It describes how BPA, NEEA and ETO learned from each other and adapted NEEA's CEI initiative over time to meet market transformation, resource acquisition and other program objectives.

The paper summarizes current SEM program designs, key lessons learned and next steps. More broadly the paper comments on the strategic value of regional collaboration in the design and delivery of efficiency programs. The opportunity to expand this successful regional effort is also addressed.

Introduction

In January 2011, nearly 200 industry, utility, government and energy-efficiency representatives joined NEEA, BPA, ETO, Washington State University Extension Service and the Northwest Food Processors Association (NWFPA) at the third annual Northwest Industrial Energy Efficiency Summit. For industrial customers, the event showcased Strategic Energy Management (SEM) as a path to productivity, operational efficiency, profitability and ultimately – competitive advantage. By addressing organizational energy behaviors and management practices, SEM can deliver reliable, persistent energy savings. Companies such as Frito Lay, Simplot, Kenworth Truck Company and Blount showcased corporate energy models resulting in dramatic energy improvements, savings and business productivity as a result of embedding SEM into their organizational structure.

The event was significant not only in size and scope, but as a culmination of ongoing SEM program collaboration among BPA, ETO and NEEA – demonstrating that industrial energy savings can be achieved through a regionally-coordinated, comprehensive 'management systems-based' approach to energy efficiency.

Defined as a resource by the region's electrical system, improved energy efficiency is not only an integral utility resource (offsetting costly new generation sources) but also presents opportunities for diverse regional manufacturers to achieve and maintain competitive advantage. As a result, the region is vested in large scale delivery of energy-efficiency resources. However, as each partner organization has unique savings goals, planning cycles and business objectives – close collaboration is critical to effective program implementation (Northwest Power and Conservation Council, 2010).

Like the rest of the country, industrial companies in the Northwest are facing dramatic changes in production costs, global competition, regulation and consolidation - forcing critical strategic adjustments in the way business is conducted and a new urgency to reduce long term costs and risks through better management of energy demand.

One of the roles energy-efficiency program administrators play in the region is to demonstrate to industrial customers the linkages between managing their energy and improving competitiveness. By inserting energy as a proxy for competitive advantage and future industry health and viability – energy-efficiency organizations, utilities and government entities can work in partnership with industry to effectively manage energy costs, reduce greenhouse gas emissions, and increase both productivity and economic growth.

Working hand-in-hand with efforts historically focused on technology upgrades, SEM programs are designed as a whole-system strategy for improving energy efficiency. As such, they complement traditional industrial retrofit programs providing financial incentives for verifiable energy savings projects, by opening up a significant new efficiency resource of persistent savings from operational and other behavior-based changes. While SEM leads to specific actions and energy-efficiency measures, the emphasis is placed on viewing energy as an input into the manufacturing decision-making process, so it is managed as a controlled cost.

While specific programmatic details may vary to meet geographically or technically-specific industrial customer needs; at its core, the region has collectively identified six key elements for successfully embedding SEM s into the management and operational practices of industrial companies:

- Set long-term energy reduction goals
- Develop and regularly update energy management plans
- Dedicate staff, including an energy champion, to oversee and monitor energy management planning and implementation
- Implement a system for tracking energy use
- Quantify energy savings from energy-efficient equipment upgrades
- Quantify energy savings from O&M process improvements

The Northwest's collaborative experience has impact outside of the region, as key local SEM stakeholders have played a role in the development of national and global standards. The development of SEM has enabled northwest industry, utility and government partners to provide critical input on an emerging set of energy management standards (e.g. ISO 50001)[1] and an energy intensity reduction certification schemes (e.g., Superior Energy Performance) which, once completed, promises to help create a clear pathway for industry toward greater energy-efficiency improvements and improved cost savings.

The Evolution of Northwest Strategic Energy Management Framework: A Collaborative Model Moves from 'Proof of Concept' to Program Adoption

By 2005, U.S. EPA's ENERGY STAR for Industry was successfully engaging eight different industry sectors with the development of benchmarking and energy management tools for industry, based on similar programs that EPA had created for the commercial sector. Among other things, the initiative centered on overcoming barriers to energy-efficiency implementation, peer exchange opportunities and plant-level energy performance indicators (US EPA, 2005). In many parts of the country, this is a nascent effort, with few established partnerships or institutions experienced with state or regional scale energy-efficiency initiatives. One of the benefits of long-term regional focus and collaboration on energy efficiency in the Northwest is the ability to apply that experience and scale quickly and effectively. The first three components of these collaborative efforts are summarized below.

The Incubator – NEEA's Continuous Energy Improvement (CEI)

At the request of northwest utility funders seeking an industrial market transformation initiative, NEEA began work on a CEI 'product' specifically suited to energy-intensive industries in the Northwest. As part of developing CEI, NEEA conducted a literature review of various programs and components, including U.S. EPA's ENERGY STAR for Industry, and began development of CEI with the familiar 'Plan-Do-Check-Act' framework. Modeled on proven manufacturing principles frequently found in quality or safety initiatives at most modern industrial plants, CEI set out to develop a management system for energy with a set of recognizable steps. NEEA envisioned a solution that would maximize persistent energy savings for industrial companies by permanently embedding strategic energy management throughout an entire organizational structure.

NEEA's early research and development on SEM on behalf of the region initiated a common language and conceptual framework for market actor consideration (and adoption). A four-year pilot program with food processing companies demonstrated that when facilities proactively manage energy use (with a documented plan for doing so) they use significantly less energy. NEEA's performance indicators link energy consumption to production output – a familiar metric for industrial companies – thus measuring and documenting improvements in energy intensity.

One of the [NEEA] Initiative's goals was to engage 13 percent of the large food processor market in CEI practices. Based on surveys of nonparticipating and participating facilities, 36 percent of the target market currently practices CEI.

For example, under the initiative NEEA helped NORPAC Foods, Inc. to form energy teams, and together with NWFPA, obtained benchmarking data on facility energy intensity

[1] Scheduled for release in August 2011, ISO 50001 is a globally accepted framework for managing energy, including all aspects of procurement and use.

(Btu/lb of product) and on initial plant energy assessments. The collaborative effort further developed NORPAC's energy program by assisting with energy management plans and establishing protocols for ongoing work of the site energy teams (Kolwey, Chittum and Burich, 2011). Bolstered with validated energy savings, NEEA encouraged and promoted emerging SEM tools and best practices while facilitating and aligning the efficient use of available resources among industry members, ETO, BPA and ultimately U.S. DOE (*Industrial Technologies Program* and *Save Energy Now Leaders*). NEEA also established the building blocks of best available practices, tools, qualified suppliers and emerging technologies to help fulfill and advance industry's strategic energy management needs. Information coordination and resource-sharing through workshops, networking & educational events and online collaboration tools allowed participants to leverage each organization's work, and build on it for greater (and faster) regional optimization.

As a measure of CEI's impact, and as an indicator of how companies move through various stages of SEM maturity, NEEA developed five stages of engagement:

Stage 1: Aware/Receptive/Interested. The facility, having heard about the program, has expressed interest.

Stage 2: Engaged. The facility has begun a business practice assessment process to identify specific opportunities.

Stage 3: Committed. The facility has dedicated resources to work and develop an action plan for energy management.

Stage 4: Practicing. The facility is implementing the action plan and actively practicing energy efficiency.

Stage 5: Sustained Practicing. The facility has implemented and continues to practice all CEI elements. The facility can continue practicing CEI without the Initiative's assistance.

Three years later, this partnership has accomplished three key goals:

1. The program demonstrated actual energy savings through behavior change programs - ***separate from capital improvement investments***. Independent evaluation of NW food processors participating in CEI calculated persistent, behavior-related energy savings of 3 percent annually (NEEA, 2011).

2. The program created an early and strategic facility approach to SEM, codified in the 'CEI Playbook,' for adoption and adaptation by other industrial efficiency programs as directed by their business objectives and customer needs.

3. The program established criteria for contractor qualifications which were later were leveraged by both ETO and BPA to identify expertise for developing new trade ally/vendor resources for new and continuing programs.

The Early Adopter – Energy Trust of Oregon's Industrial Energy Improvement (IEI)

Capital projects are a significant portion of the energy-efficiency potential in industrial facilities, and the ETO's Production Efficiency program had achieved approximately 70 aMW of savings from participating Oregon industries in the first six years of the program. However, the state's commitment to attaining all cost-effective energy conservation as the lowest cost energy resource was rapidly accelerating annual savings goals beyond the program's ability to meet them through traditional retrofit measures. Fortunately, awareness of the significant untapped energy savings potential from business behavior change was also growing.

ETO's dual role as funder and advisor to NEEA offered an opportunity to monitor the development and outcomes of CEI. This set the stage for ETO's competitive solicitation for industrial program delivery contractors in 2008, which yielded a proposal from Strategic Energy Group (SEG), one of NEEA's primary CEI contractors, for a new pilot based on CEI. Although SEG's proposal was outside of what had been done in the program historically, it was accepted due to ETO's familiarity with CEI concepts, outcomes of NEEA's CEI work to date and confidence in the qualifications of the contractor.

The IEI was built on evidence that energy intensity can be reduced by two to ten percent with little capital investment and that these savings could persist by applying continuous improvement practices. Energy savings would come directly from behavior changes such as 1) operational and maintenance (O&M) improvements, 2) indirectly, from incremental increases in capital energy-efficiency projects (i.e., more lighting efficiency), 3) from additional capital projects that would not otherwise have been considered (i.e., process changes, consideration of energy efficiency in all capital efforts), and 4) from improved persistence of energy savings associated with capital projects.

Leveraging the NEEA CEI 'Playbook' as a foundation, ETO's IEI pilot incorporated a peer support network approach to deliver training and motivate participation. Additional enhancements included:

1. Cash incentive structures of $.02/kWh with a no cost component requirement for energy intensity savings achieved after one year of SEM training and implementation.

2. Increased focus on energy tracking and information such as development of baselines, MT&R, and Cumulative Sum of Differences (CUSUM) models both early in the process and throughout the program to support resource acquisition goals.

3. Increased focus on incorporating training for diagnostic interventions in order to drive O&M savings. For example, employee engagement efforts were tied to "energy scan" events, modified "lean" practices for energy such as value stream mapping or 'Kaizen' events.

ETO worked with SEG to finalize the pilot design in late 2008, quickly evolving and building on NEEA's previous CEI work as a source of savings for resource acquisition. Two key design innovations included using a peer support network model or "cohort" as the basis for SEM training and the development of an incentive structure to help motivate companies to participate and to achieve real savings.

The IEI peer support network provided training and technical support to 2 cohorts of approximately 10 industrial plants each. Recruitment was targeted at non-competing firms that for the most part were already comfortable with lean practices or continuous improvement paradigms. Participating firms in the IEI are from a wide range of industries and are very diverse in size – from multiple building campuses of many hundreds of thousands of square feet to a small manufacturing plant.

Despite the differences, the experiences and path taken for adopting energy management can be very similar – thus benefiting from working together as a peer group. Working with non-competing companies helped to foster an open environment among the companies and the peer pressure of moving through the curriculum together motivated those who were lagging in implementation. The participant characterization and baseline energy use in Table 1.0, below, demonstrates the diversity of the participants in IEI. The energy savings listed below represent operational and behavioral savings achieved during the IEI implementation period, and do not include savings from capital projects.

Table 1.0 IEI Cohort 1 Participants, Baseline and First Year Savings

Participant	Baseline kWh Consumption	kWh Savings	Percent Reduction
Printer Manufacturer	24,700,000	855,000	3.5
Container Company	1,279,000	26,000	2.0
Forest Products	30,500,000	5,573,000	18.3
Metals Manufacturer	32,621,300	572,000	1.8
Specialty Plastics	10,515,000	1,075,000	10.2
Computer Manufacturer	33,279,000	3,385,000	10.2
Cement Transfer	3,402,000	503,000	14.8
Municipal Water Provider	19,800,000	348,000	1.8
Vehicle Parts Manufacturer	10,000,000	480,800	4.8
Medical Device Manufacturer	4,343,000	690,800	15.9
Total	**170,439,300**	**13,508,600**	**7.9**

Source: Energy Trust of Oregon, 2010

IEI delivers training to participants over a one-year period through in-person training sessions covering the standard SEM topics and in between trainings helps the companies apply what they are learning at their sites through one-on-one technical support. The in-person workshops in particular allow time for the peer companies to share information with each other on their activities, learnings, and successes. Participant staff time (e.,g., Energy Champions and Energy Teams) is a substantial in-kind contribution and their willingness to fully support these obligations is an indication of the value these plants have placed in the SEM opportunity.

All aspects of Industrial Energy Improvement training, support, in-person consultation and coaching, end-use metering services, energy analysis, and referrals to third-parties and Production Efficiency Program Delivery Contractor (PDC) for capital projects are fully funded by Energy Trust. In addition to the high value of these “service incentives”, ETO provides a cash incentive of $.02/kWh and $.20/therm for energy intensity savings achieved at the end of the IEI.

Activity by participants is measured by both ‘bottom up’ and ‘top down’ approaches. Early in the IEI and on an ongoing basis, participants provide baseline energy use information (typically meter-level interval data or monthly electric and natural gas billing information) and correlated production or production indices. These are inputs for the development of a facility baseline that can be normalized for key energy drivers and used for monitoring, targeting and reporting analysis (MT&R). This top down analysis uses single or multi-variable regression analysis and cumulative sum of differences (CUSUM) to measure an overall change in energy intensity. One of the benefits of the top down analytical approach is that it allows for savings analysis for highly interactive or smaller behavior oriented measures for which it would be difficult or too costly to develop measure level baselines (for example, hanging signage asking people to turn off lights). The approach used to baseline and verify savings from a top down perspective is basically IPMVP Option D, an internationally recognized standard for Measurement and Verification (M&V).

The bottom-up approach documents opportunities and activities by the facility, both large and small, in an "Opportunity Register," with estimated energy impacts. A crucial check for top-down savings analysis is alignment between bottom-up date records with actual actions taken at the site to reduce energy. Models should demonstrate correlating improvements with the dates changes were made. If there is a significant improvement identified in the model with no accompanying action, the check dives deeper into what actually caused the change, such as a major process or change in operating hours.

Fortunately, the purpose of these robust analytical tools goes beyond verfication of savings. Energy Champions are trained in the use of their own models as key tools to manage energy use, tune operational efficiency and support persistence of savings. The Opportunity Register of projects and activities also serves as a key tool to support continuous improvement at the site. Participant adoption and use of these tools by the time they complete the IEI is one of the indicators of success of the offering.

The Early Follower/Market Influencer - BPA's High Performance Energy Management

In 2008 The Northwest Power and Conservation Council's (NWPPC) Sixth Power Plan recognized, for the first time, the significant potential SEM can afford industry in the Northwest. This inclusion essentially doubled the forecasted industrial energy savings potential from the 5th Power Plan to the 6th Power Plan, with SEM expanding BPA's industrial energy savings opportunities roughly 30 percent - consistent with the overall goals of the new Plan. Eager to leverage the momentum reinforced by SEM successes both inside and outside of the Northwest region, BPA re-energized their industrial initiative, and built upon key results from the NEEA and ETO pilot to scale up industrial energy savings for the entire Northwest region.

Under the High Performance Energy Management (HPEM) program, BPA developed energy performance reporting and tracking tools that allow management to gauge and track the results and benefits of the effort. HPEM uses a statistical modeling tool to track and quantify energy performance for industrial utility customers and to support tracking energy savings for the overall program. The tool is a methodology that relates energy usage to the primary production metrics used by each facility, referred to here as "energy-drivers."

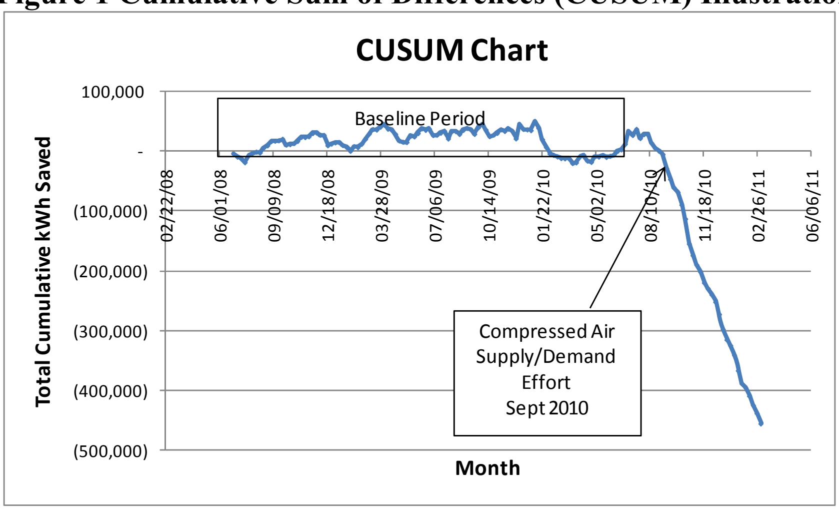
Energy-drivers are the production parameters that define the day-to-day magnitude and fluctuations of energy consumption. Developing a statistically valid model requires the identification and validation of these primary energy-drivers over a reasonably long time period, usually at least one year of recent historical data. A mathematical relationship between energy usage and the energy-drivers can then be established, creating the facility's baseline and facilitating the comparison of ongoing energy consumption.

For industrial customers the primary energy-drivers are typically units of production. Other factors like ambient wet bulb temperature, product mix, or raw material characteristics often influence energy consumption, in which case they would be considered additional energy-drivers. However, these variables cannot be prescriptively applied due to the unique operating characteristics and energy profiles of individual facilities.

Production data is collected from the participating site, while the corresponding energy consumption data is obtained from the serving utility – synchronizing manufacturing production and real-time energy demand. Once data has been correlated and integrity has been confirmed, regression analysis determines the relationship between energy consumption and the energy-driver(s). Using a combination of engineering experience, communications with the site, and software tools, a regression model is developed to establish the facility's baseline.

Applying these standards assures that the model is able to explain at least 75 percent of the variation in energy intensity, and that the energy drivers are correctly identified with a 95 percent level of statistical confidence. Once the linear regression (baseline model) is complete, the actual energy usage is compared to the usage predicted by the model. The Cumulative Sum of Differences (CUSUM) is used to sum the difference between the actual energy consumption and the predicted value (residuals) to track and validate energy savings and to trend changes in energy performance. Changes in energy operating performance are signified by long-term slope changes in the CUSUM plot (see Figure 1). Correlating projects and activities undertaken at the facility to improve operations with these changes in slope provides the direct linkage between the activity and energy savings.

Figure 1 Cumulative Sum of Differences (CUSUM) Illustration



Source: Bonneville Power Administration, 2011

Energy savings achieved through HPEM-related activities will be quantified on an annual basis. Based on early observations of savings performance, the ESI program is projecting an aggregated first-year savings rate of 2.5 percent for the first cohort of 13 companies (Cohort 1). Through the duration of the five-year program, the annual savings rate is projected to increase to 6.7 percent, through continuous improvement of management and O&M practices. The first year savings, and annual incremental changes thereafter, will be aggregated with savings from other ESI components. In that regard, HPEM contributes directly toward the industrial-sector savings targets of the ESI program. In FY 2011, HPEM is projected to comprise 5 percent of the total savings from the ESI program.

While the primary objective of HPEM is the achievement of savings through the improvement of management and O&M practices in relation to energy, HPEM participants are also equipped to identify cost-effective capital project opportunities in their facilities. Capital projects are an integral part of the multi-year energy plan developed by HPEM Energy

Champions. Table 2, below, indicates a significant increase in new capital projects developed after the start of HPEM, with 23 Custom Project Proposals (CPPs) submitted by Cohort 1 participants in the first nine months.

Table 2 New Capital Projects Among HPEM Program Participants

Industry SIC Code	Pre-HPEM Project Completion		Projects Submitted After HPEM Kickoff	
	kWh/yr savings	Projects	kWh/yr savings	Projects
39-Misc. Manuf	1,123,328	1	1,049,021	4
49-Water/Wastewater	234,843	2	1,131,731	2
49-Water/Wastewater	151,428	1	238,287	1
39-Misc. Manuf	-	-	1,106,649	1
39-Misc. Manuf	-	-	2,633,959	2
20-Food Processing	1,942,892	4	746,975	3
24-Wood Products	-	-	1,030,647	3
26-Pulp and Paper	1,230,064	2	2,443,945	1
14-Mining	-	-	2,552,995	3
49-Water/Wastewater	-	-	1,287,716	3
Total	4,682,555	10	14,221,925	23

Source: Bonneville Power Administration, Project Completion Reports 7/1/2009~11/30/2010 and Proposals 7/1/2010-5/1/2011

Acceleration of Innovation: The Benefits and Outcomes of Learning Together

Creating Demand

SEM is still in the early adoption stage, but success breeds success. NEEA's very public achievements working with food processors on CEI are already influencing the regional food processing industry. Energy Trust has brought 27 diverse large industrial plants into the IEI over the past 2 years. BPA has brought 14 industrial companies into the HPEM program. Each milestone and each success documented by any of the programs makes recruiting the next plant easier. This effect is exponential - as companies adopt SEM, they often display their leadership on energy issues and begin to influence each other.

The key demand issue currently is one of supply. Smaller industries are indicaticating interest in SEM, but there is currently no cost-effective solution available for them. Current SEM solutions and especially emerging national and international standards are too labor intensive for most small industries to implement on their own. In addition, the low energy savings potential of these sites prohibits cost-effective delivery through consultants using current program designs.

NEEA will be engaging in long term efforts to address this market's demand for applicable SEM going forward - for example by mobilizing industrial executive management across entire Industry Clusters. As a complementary set of activities alongside plant-to-plant strategy of other programs, NEEA works with industry groups in setting energy-intensity reduction goals and developing the plans and partnerships required to achieve those goals. Working through a networked cluster allows an entire industry to pull its weight and apply resources toward a unified energy reduction goal – sharing in the risk, efficiency and energy savings potential, enhanced purchase power and adoption of SEM as an ongoing business practice. At the same time, utility and energy program administrators can direct resources to the Industry Cluster through a common focal point (such as an industry trade association), thereby reducing the cost of program delivery.

Building Capacity

For many companies, the suite of skills required to support [strategic] energy management is unique, since it combines both management systems and energy efficiency. Individuals and firms familiar with management systems, for example - quality, safety, and environment - understand the dynamics of establishing a management system and its successful integration into the organization's corporate culture. These experts, however, typically have little or no expertise in energy efficiency. In contrast, industrial energy-efficiency experts are highly specialized in energy efficiency, but are trained and oriented toward engineering and the execution of energy-efficiency projects without an integrated management system context. Globally, the need for energy management experts is expected to increase exponentially once international energy management standard, ISO 50001 is published. Capacity-building is urgently needed now to meet this growing need (ACEEE, 2009).

The Northwest experience reflects a delicate balancing act between demand creation (for SEM) and scaling up the availability of expertise to fulfill the impending demand. This requirement for capacity building on an industrial sector level opens yet another opportunity for collaboration.

NEEA's early development of CEI over three to five years, and their use of a few local consulting firms helped create a small base of experienced regional consultants qualified to provide SEM. Both ETO and BPA drew from this base for their initiative pilots, minimizing risk that would accompany using less qualified contractors or inexperienced staff. This generated tremendous impact on ETO and BPA programs, as the experience and skills of the SEM consultants appear to be the single biggest factor in achieving verifiable energy savings at the site.

The entry of ETO and BPA into the SEM space provided more regional funding for SEM, and the critical mass of SEM work available or emerging across all three organizations has created a big enough opportunity that qualified consultants are drawn from elsewhere and are being developed locally to meet the need. For example, ETO's recent RFQ for SEM services broadened their pool of providers from one to four firms, all local and with the requisite experience in SEM consulting to drive success.

While ETO and BPA are expected to continue to use trained consultants to deploy SEM at industrial sites in the near term, NEEA is working on longer-range solutions. These include actively exploring the next levels of possible SEM practitioners, reaching out to those who work with industrial sites already, including pilots that train Lean manufacturing practitioners and utility account executives in SEM practices.

Accelerating and Fine-tuning SEM Program Design

The benefit of running local SEM pilots and programs with slight design variations is highly beneficial, as none of the organizations could afford to run such a variety of tests on their own. The influence on each other's program designs and experience is unmistakable, bringing the three organizations into consensus about what SEM is, why it's effective, and how to use programs to speed deployment of this competitive advantage to Northwestern industries.

Given the similarities between the ETO and BPA resource acquisition programs, BPA was able to use much of this design, which was easily transferred when the contractors providing IEI to ETO were brought into BPA's new Energy Smart Industrial program as subcontractors to run HPEM.

And, adhering to continuous improvement methodology, the process endures as NEEA transfers key learnings and best practices arising from the ETO and BPA programs into subsequent iterations of their initiative strategies. For example, the peer-to-peer network of information sharing uncovered as a best practice by ETO is now a central activity in NEEA's CEI v.2, and in efforts to recruit industry clusters to adopt a long-term energy reduction vision and set of goals.

Progress Indicators

All three programs use third-party evaluators contracted by the organizations' internal evaluation departments for both process and impact evaluations of SEM. These evaluations are not only shared between the organizations, but published and publicly available online.

NEEA third-party evaluation data indicate an expanding SEM sector, with industry open to capital and non-capital approaches, including CEI, for improving energy efficiency and controlling energy costs. Data from the survey with participating food processing facilities also indicate that these facilities have successfully integrated CEI into their corporate cultures, supported by evidence of persistence of capital improvement projects and operations and maintenance measures implemented with Initiative involvement. The evaluation team also found the majority of the participating facilities practicing CEI attributed their decision to do so to NEEA, the Initiative, and/or the Initiative's implementation team (NEEA, 2011).

From a Resource Acquisition perspective, SEM is a persistence strategy for O&M savings. Part of evaluating persistence of the underlying O&M measures will be verification that SEM practices are still being used in the plant. In addition to providing a clear pathway to persistent O&M savings, early indications are that SEM promotes greater uptake of capital projects. In the case of ETO's IEI, participants developed a robust pipeline of capital projects developed, beyond what they had accomplished previously. (Note that those projects are not completed yet, so specific results are not yet available). BPA and ETO are well positioned to analyze capital project activity at their participant sites pre- and post-SEM, as they have been engaged with many of these sites for years. By sharing this information across organizations, they have the potential to evaluate a much larger set of SEM participants and answer these questions sooner rather than later.

National Implications

By working together at the national level, energy efficiency program administrators like ETO, BPA and NEEA have an opportunity to further accelerate the adoption of key energy management practices identified and tested in the Northwest. This could be achieved in part through greater awareness and understanding among program administrators of the costs and benefits associated with supporting energy management and in defining key terms, procedures, practices and metrics that would benefit from consistent program support.

The Consortium for Energy Efficiency (CEE) is a nonprofit organization that works with efficiency program administrators (members) in the United States and Canada to promote energy efficient products, technologies, and services. CEE members create voluntary specifications for higher efficiency products and systems that are intended for use in their energy efficiency programs. CEE's Industrial Program Planning Committee has been monitoring the CEI programs coming out of the Northwest and other regions (e.g., Wisconsin and British Columbia) in order to identify strategic energy management concepts and program approaches that are scalable, transferable, and where consistent program support would accelerate the market.

Broad-based and consistent efficiency program support would make it easier for customers with plants in multiple locations across the country to participate in efficiency programs. It would also address capacity issues by encouraging those that provide energy management systems and associated services to enter the market and meet the qualifications established by programs. Finally, greater consistency among programs could help identify a robust pathway for energy management to be adopted by medium and smaller-sized companies.

In Pursuit of ISO 50001 – Global Energy Management Standard

The United States is pursuing a leadership role in the development of ISO 50001 to preserve a data-driven approach to the standard. An international energy management structure requires companies to seek continual improvement in a meaningful way, by developing a discipline of measuring activities in correlation to outcomes.

Using data to drive the standard forward also has global relevance. By developing a framework that is consistent and reliable for industry to do the kind of planning they need to move forward with energy management initiatives and not have to worry about a high degree of variation from company to company, industry to industry, state to state and country to country.

In the Northwest, a selection of industrial companies is currently participating in a U.S. DOE and NEEA-sponsored Superior Energy Management demonstration project that will be among the first in the country to become certified under ANSI's Management System for Energy standard (ANSI/MSE 2008), the official US proposal for ISO 5001, which is currently scheduled for release by fall of 2011.

References

ACEEE Summer Study on Energy Efficiency in Industry. *Thinking Globally: How ISO 50001 – Energy Management Can Make Industrial Energy Efficiency Standard Practice*, Aimee McKane, Lawrence Berkeley National Laboratory, Deann Desai, Georgia Institute of Technology, Marco Matteini, United Nations Industrial Development Organization, William Meffert, Georgia Institute of Technology, Robert Williams, United Nations Industrial Development Organization, Roland Risser, Pacific Gas and Electric, ACEEE 2009

Kolwey, Neil, Anna Chittum and Bill Burich, March 2011. *Industrial Energy Efficiency Programs and Supporting Policies: A White Paper*, Southwest Energy Efficiency Project (SWEEP) American Council for an Energy-Efficient Economy (ACEEE), and NORPAC Foods

NEEA Market Progress Evaluation Report #6: Evaluation of NEEA's Industrial Initiative, The Cadmus Group Inc./Energy Services, January 2011

Northwest Power and Conservation Council, Sixth Northwest Conservation and Electric Power Plan, http://www.nwcouncil.org/energy/powerplan/6/default.htm, February 2010

US Environmental Protection Agency, ENERGY STAR® and Other Climate Protection Partnerships 2005 Annual Report, 2005