

Evaluation Feedback Drives Industrial Energy Management Training Approach

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ABSTRACT

What happens when you let the market drive your education and training? Wisconsin's state-sponsored energy efficiency program seeks to build energy management into all levels of operations within industry. To achieve its goal, the State provides education and training as one approach. Demands voiced by industry have driven the development of a training approach and tools that can be delivered at a price and method that works for the industrial customer.

This paper will describe how applying feedback from a training program targeted to industrial CEO's and decision-makers resulted in a one-day training targeted to their internal energy managers, plant managers and maintenance staff responsible for energy management issues. The full-day energy management training, in response to evaluation data, then evolved into a half-day training focused on a workbook of templates and tools that attendees take back to their companies to develop and implement their own energy management plan.

Through a continuous improvement process responding to evaluation of each training approach, the market was allowed to steer the development of a new training course that is in high demand, as is the energy management approach guided by the companion workbook.

Introduction

In addition to the private market and energy utility support, Wisconsin encourages energy efficiency through a statewide program funded by a utility public benefits charge. The public benefits money is turned over to the State of Wisconsin Department of Administration, and they deliver conservation programs by subcontracting to a number of private firms and non-profits that administer and deliver programs directly. These programs are implemented under the "Focus on Energy" umbrella (DOA, 2003), and are available to 85% of electric users in Wisconsin who have supplying utilities contributing to the public benefits fund. Conservation programs for commercial and industrial energy users were funded at approximately \$17 million in 2002. A core program for industry is the General Industry Program, funded at approximately \$3.2 million in 2002.

The General Industry Program helps manufacturing facilities of all sizes improve the energy efficiency of existing facilities. The program works with manufacturing companies – "Focus on Energy Partners" – to plan for and implement new energy-saving projects, expansions, or renovations. Focus on Energy Partners can receive services from the General Industry Program at no cost.

Supported by State public benefits funding, Energy Advisors in the General Industry Program offer a variety of services. They can: 1) identify and evaluate energy-saving opportunities at a facility; 2) prepare a detailed report of findings with specific recommendations for action; 3) develop an energy management plan for the business; and 4)

integrate elements from national and state programs to best meet specific needs. They can also help Partners: 1) find vendors and evaluate their proposals for efficiency improvements; 2) overcome existing barriers to project implementation; and 3) provide technical training opportunities on energy-efficient processes and procedures.

Due to high demand for services and limited funding, the General Industry Program applies market transformation strategies to the industrial market. The program seeks to “teach industry to fish” by providing skills training and hands-on facilitation with energy management planning and implementation. Limited resource acquisition is used to “get the ball rolling” at Partner sites. There is not, however, enough money in the program budget to make a significant reduction in Wisconsin’s multi-billion dollar industrial energy bill through resource acquisition alone. Skill building in energy management is expected to provide greater long term benefit to Wisconsin’s extensive manufacturing base.

Central to the General Industry Program’s market transformation approach is creating company-wide energy management ethic, and building the internal capabilities to achieve success when implementing energy management. The Energy Center of Wisconsin (ECW) was the organization retained by the Focus on Energy program to deliver the training component of the market transformation strategy.¹

How the Energy Center of Wisconsin Approaches Education and Training

The Energy Center of Wisconsin’s Education and Training centers around skill-based training as opposed to information-based training. Skill-based training means designing training for application, analysis, evaluation and synthesis so that training is driven by participant-centered actions and behavioral outcomes rather than by transferring a body of knowledge. Information-based training is delivering knowledge to students by means of passive lecture and visual aids within a few hours timeframe (Anderson, 2002). Consistently, on-site evaluation data has shown that participants rate skills-based training higher and that in follow up evaluation, they are more likely to “do” something based on what they have learned at the training with this type of format (ECW 2001-2002). Information transfer type training, on the other hand, results in 90% loss of the content in just a few weeks (BCAL, 1995).

ECW uses several methods to gather analytical data on a completed training event. These methods include: evaluation forms completed by attendees at the conclusion of the event, debrief with instructors, debrief with on-site staff, debrief with host sponsors, and informal discussions at the event with attendees. The evaluations completed by attendees at the training are developed internally by evaluation experts in ECW’s Evaluation and Market Research group that operates with a high degree of independence and objectivity. Engineers on ECW staff provide subject expertise. Combined, these in-house capabilities make adjusting the overall course quicker and easier, and gives us the opportunity to quickly modify technical content.

Although evaluations conducted by independent specialists hired by the training sponsor provide useful information, ECW finds that immediate feedback from attendees and speakers is essential for improving and adapting a training to meet the needs of future attendees. Sponsor-funded evaluations that deliver recommendations several months after

¹ SAIC and Franklin Energy Services were hired by the Focus on Energy program to provide field implementation and management of the General Industry Program.

the event are not responsive to the pace and pressure to provide successful results. Speed is valuable – instructors want to succeed and attendees want to learn. Through multiple feedback methods built into its training approach, ECW can make substantial improvements between events held days apart.

Reaching Industry Management

As part of the General Industrial Program in 2001 and 2002, ECW delivered one- and two-day skill-based training to industrial energy users on topic areas such as compressed air, optimizing motor systems, industrial refrigeration, and process automation and controls.

Under the General Industrial Program, a key target area to create energy efficiency awareness was at the decision maker level—CEO’s and plant managers. Historically they were the hardest group to reach and market training to, but Energy Advisors in the program found it difficult to make progress on energy saving projects and planning without management buy-in. ECW researched options and opportunities to reach management, but uncovered few models that would be appropriate.

ECW collected input from General Industrial Program field staff indicating that the California energy crisis and high natural gas prices had captured the fear and attention of management in Wisconsin industry. In late Fall 2001, ECW developed a special training for upper management entitled “Weathering the Energy Storm”, which acknowledged those fears as legitimate risks. This half-day event was designed to give management a briefing on “What’s happening?” and “What can we do to minimize energy costs while remaining competitive in the changing energy marketplace?” (ECW 2001-2002) Although primarily information transfer, the event was intended to encourage managers to endorse energy management and to delegate responsibility to someone in the company who would then take action with training and assistance from Focus on Energy.

The agenda for Weathering the Energy Storm included five topics: 1) Energy efficiency is good business; 2) Overview of the changing energy market; 3) What’s happening in the Wisconsin energy market; 4) What your company can do; and 5) Where your company can get help. (ECW 2001-2002). Speakers for these topics were chosen for their ability to appeal to upper management and communicate on their level. For example:

- Joe Mettner, Commissioner, Public Service Commission of Wisconsin, discussed Wisconsin’s energy future and the steps needed to protect the state and its businesses from energy supply shortages.
- Susan Stratton, Executive Director of the Energy Center of Wisconsin and former Public Service Commission administrator, addressed issues such as energy risk management and portfolio planning. She also summarized recent activities in deregulated states such as California, Pennsylvania, and Illinois.
- Carl Salas, Principal, Salas O’Brien Engineers, gave attendees practical advice about ways to improve energy efficiency. “The most important thing you realize when your business’s power goes out,” he said, “is that you’ll pay anything to get it back.” He spoke from experience since his firm is based in San Jose, California and he and his clients had faced several rolling blackouts and shockingly high energy prices. He stressed that businesses must create an energy plan and the first step is to learn precisely how each facility uses energy.

A special marketing approach was created based on feedback ECW solicited from CEOs themselves. Rather than the standard direct mail approach – using a self-mailing flyer – an individually addressed letter with RSVP reply card was sent directly to the CEO or manager. In the letter, CEO’s were told that “This is a unique opportunity for a select group of Wisconsin CEOs and decision-makers” and that they will benefit from “understanding which factors influence the fluctuating energy market, how these fluctuations affect your company, and what your company can do to succeed and weather the energy storm.” Targeted mailing lists were obtained from a variety of sources.

Response to this personalized marketing effort was exceptional. The first event attracted nearly double the targeted 30 attendees. That session was repeated at three other locations throughout the state, all of which exceeded target attendance goals. The four events were held in December 2001 and January 2002.

At the conclusion of each “Weathering the Energy Storm” training, we asked attendees to complete a short evaluation to gather feedback. One of the questions we asked was “Would you send someone to a follow-up training event on developing an energy management plan?” A total of 71% of all respondents said they were “very likely” to do so. (ECW 2001-2002) That significant response indicated to us that follow-up training could be successful. We also held a short de-brief with the speakers to get their fresh perspectives on the event, how it could be improved, and what they felt we should do to follow-up.

Energy Management Training Pilot for that Special “Someone”

Discussion of the Weathering the Energy Storm results with Focus on Energy program managers, ECW’s electric utility clients, and key industrial customers ensued. There was consensus that it would be worthwhile to create a hands-on training targeting the “someone” that CEO’s said they would send for training to develop an energy management plan. The decision was made to go forward with developing a full-day curriculum as a pilot test.

To create a full-day pilot training, the Energy Center of Wisconsin worked with a subject matter expert² who had several years experience as energy manager for a paper company with a progressive approach to energy management. The training was targeted at using skill-based methods to show the importance of creating an energy management plan for the company. Energy engineers, maintenance staff and plant or facility troubleshooters were the intended audience for the training. (ECW 2002). The objectives for the training were:

- To help attendees to identify energy-wasting trouble spots in their companies
- To identify energy-wasting areas that could become problematic in the future
- To encourage a systematic approach to gaining maximum benefit from energy resources
- To help employees pinpoint energy projects that could save money

Attendance at the April 2002 pilot was targeted to 30 and the actual registration number was 34. Attendees received a full day training encompassing a combination of lecture and hands-on exercises. Each attendee received a binder of the curriculum that

² Jerry Aue, Senior Industrial Project Manager, Energy Center of Wisconsin

included original material following the lecture and exercises, and an appendix of related resources. The training began at 7 a.m. and adjourned at 4 p.m. Training topics included:

- Benefits and Keys to Managing Energy
- Communicating
- Leading the Internal Team
- “Bird Dogging” O&M and energy management projects
- Tracking Energy Bills
- Analyzing the Real Costs of Operation
- Identifying Savings
- Steps to Get Started

As with the Weathering the Energy Storm training, attendees were asked to complete an evaluation form at the end of the day. Although 88% said they would recommend the training to a colleague, and 94% said they learned useful information, the overall grade for the training was slightly less than a “B” on an “A” to “F” scale. (ECW 2002). ECW seeks to maintain a minimum of a “B” for training events, and the average grade for mature training courses is a solid B+. Among attendees, 41% felt that there was “too much” time for the training. There was sufficient positive feedback to indicate the training should be repeated, with revision to content and agenda.

Evaluation Drives Modification To Half-Day Training

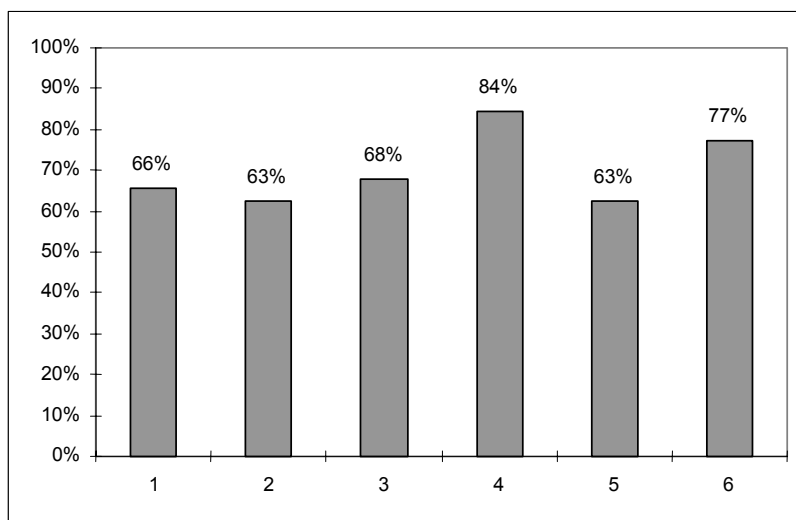
Training data compiled by ECW over time shows that the industrial sector prefers early morning starts, half-day trainings (so that they can get back to their plants) and skills-based training that makes it easy for them to go back to their companies and implement change immediately. Previous training evaluations indicate that 16-79% of attendees undertake an energy efficiency project as a direct result of training.

Responding to feedback collected on evaluation forms completed by attendees at the conclusion of full day event, we studied whether we could do a half-day training that would be more effective. The pilot training was set up as a full day because it was felt that a half-day would not be sufficient to deliver the material. In fact, much industrial training on energy lasts one or more full days. Despite those realities, we decided to proceed with a half-day training—the preference indicated by attendees.

Not only did we analyze the length of the training, but we went back to look at the content area as well. Figure 1 provides data gathered from attendee evaluation forms showing “Percent Agreeing with Statements Regarding Training Content” for the pilot training.

Based on the low percentages on items 1, 2, 3, 5, and 6, ECW sought to improve the training. ECW’s standards are that anything below 80% needs to be examined and analyzed for ways to be more effective. The evaluation was reinforced by discussions with multiple stakeholders in the training. The stakeholders included Wisconsin Public Service Corporation—the utility that hosted the event, the pilot training instructor, senior ECW evaluation staff who attended, and General Industry Program technical staff.

Figure 1. Percent Agreeing With Statements Regarding Training Content



The training...

- 1) addressed the issues I thought it would—66%.
- 2) covered information relevant to my business—63%.
- 3) was at the right technical level for my needs—68%.
- 4) provided useful handouts for future reference—84%.
- 5) used presentation methods that worked for me—63%.
- 6) provided information that I will apply at my workplace—77%.

After careful consideration, ECW brought together technical staff as well as education and training staff to work with a professional curriculum designer. The technical staff included General Industry Program field and management staff, the instructor for the full day event, former utility account representatives, and industrial company managers.

One of the discussions that came from this group was something that we had initially thought would be an outcome from pilot training. This outcome was an energy management training manual that companies could use within their facilities to create their own energy management plan. Handouts from the first training were discussed. It was concluded that the second iteration of training needed to be more hands-on, but the supporting materials also needed to be such that they could be taken back to their workplaces and implemented easily.

Other Delivery Methods Explored

What kind of delivery mechanism could be easy enough for attendees to take back and implement? In conjunction with the training, a “workbook” to create an energy management plan would be produced that could be distributed to industrial energy managers. Although the training would walk them through the manual, the energy management book would be self-explanatory for the user.

The manual was created in a three-ring binder format, but it was also provided on CD. A second CD of “Industrial Best Practices” reference information was also included. This companion CD highlighted tip sheets, case studies, and reference material for “best practices” on systems that can realize energy savings—compressed air, steam, motors, lighting, ventilation, and other end uses. Both CD’s have spreadsheets and fill in the blank policy-type documents that can easily be adapted to individual companies. The manual and CD’s were created to make it as easy as possible for the attendee to create energy management plan for their own company.

Practical Energy Management – The Next Series of Trainings

Several things changed for this second generation training series – now titled Practical Energy Management. The registration fee was reduced from \$129 for the full day training to \$99 for the half-day, although in hindsight the demand was great enough to support the higher fee. On-line registration was also added. While the commercial sector has been quick to adapt to this method of registration, there was no guarantee that the industrial sector would follow suit. Several months of data, however, indicate that the industrial sector has rapidly assimilated to this registration method.

Through the curriculum development process, we determined that we needed to add a second instructor. Our current instructor had great industry knowledge in the paper sector, but we needed a wider perspective to connect with a larger and more diverse industrial group³.

We targeted four trainings at different locations throughout the state of Wisconsin, to be held in December 2002 and January 2003. (ECW 2002). The training objectives for this half-day were basically the same as the full-day training but we changed the “After attending this training you will:” objectives slightly. For the half-day training, the objectives were:

- Have the tools to calculate energy savings and understand energy bills
- Be able to create an energy profile
- Understand the benefits of an energy audit and how to put it to work in your facility
- Have the knowledge to determine small changes that will make the biggest impact
- Be able to explain the benefits of energy management
- Return to your facility and make a difference in your company’s approach to energy management

The training specifically targeted skills-based interactive activities that attendees could take back to their facilities and implement. The targeted audience was energy managers, facility managers, and plant managers. Table 1 below shows the targeted number of attendees and the actual number of attendees. The popularity of the December/January training led to the addition of four more sessions for April 2003, shown in Table 2.

³ Instructors for Practical Energy Management were Jerry Aue, Senior Industrial Project Manager, Energy Center of Wisconsin, and Tim Dantoin, an engineer with SAIC.

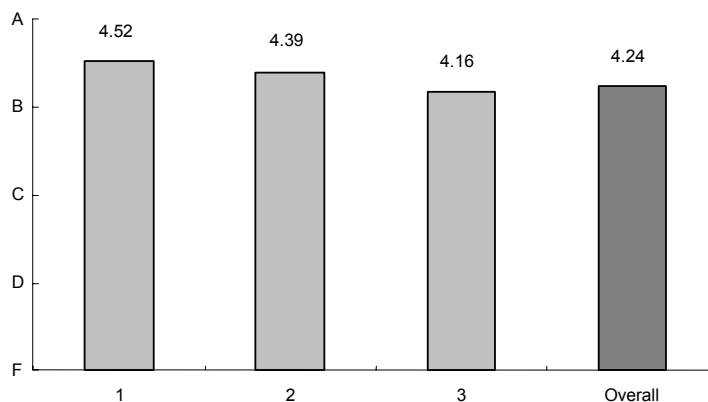
Table 1. Practical Energy Management Attendance

Wisconsin Location for December 2002/January 2003	Number of targeted attendees	Number of actual attendees
Appleton	30	36
Chippewa Falls	30	50
Milwaukee	30	48
Wausau	30	33
Wisconsin Location for April 2003		
Milwaukee	30	30
La Crosse	30	49
Green Bay	30	19
Madison	30	30

Evaluation of *Practical Energy Management*

The four trainings that took place in April received an overall grade of B+ to B from the attendees. The final training in the April series took place in Madison on April 30, 2003, and the evaluation results from that event were very similar to those from the other three April events. Figure 2 provides responses compiled from 28 of the 30 Madison attendees, of which 15 were plant managers, facility managers, or maintenance staff from industry, while the remaining were advisors to industry.

Figure 2. Training Objectives and Overall Grade – Madison, WI



How successful were we at...

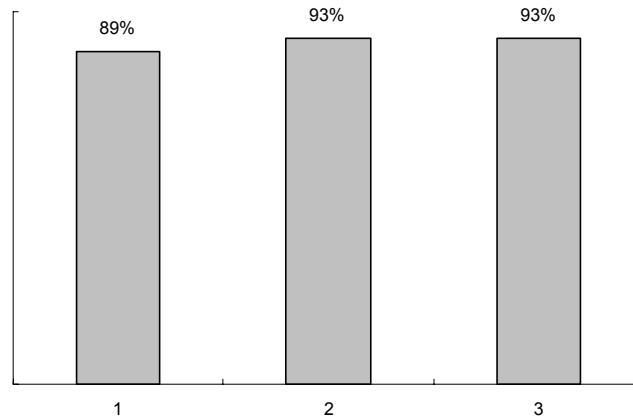
- 1) describing what an energy management system is? (A-/4.52)
- 2) explaining what an energy management system can do for your facility? (B+/4.39)
- 3) providing the information you need to establish a successful energy management program at your facility? (B/4.16)

Overall, how would you grade this training?

Respondents gave the training a grade of B+ or 4.24

As indicated by Figure 3, the training content was well received, although we will continue to monitor each evaluation from future trainings to guide ongoing improvements.

Figure 3. Feedback on Training Content

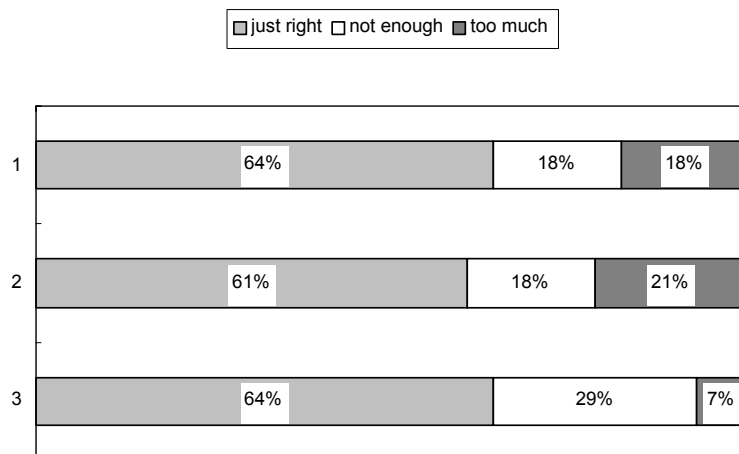


Percentage agreeing that the training...

- 1) addressed the issues I thought it would. (89%)
- 2) covered information relevant to my business. (93%)
- 3) provided useful handouts for future reference. (93%)

Feedback on the training format provided interesting results, as shown in Figure 4.

Figure 4. Respondent Ratings of Training Format



- 1) The technical level of the information presented. (Just Right – 64%)
- 2) The amount of information provided. (Just Right – 61%)
- 3) Time for the entire training. (Just Right – 64%)

Although the training received positive feedback, about one-third of the participants were not fully satisfied with the technical level and amount of information, and the time allowed. Several felt some topics were not covered adequately, and others were more advanced than the target level of the material. These and other comments from individuals indicate that we should consider more clearly marketing this course as an introductory session, and then follow-up with half day sessions addressing specific topics of highest interest.

Conclusions

Through a continuous improvement process responding to evaluation of each training approach, the market was allowed to steer the development of a new training course that is in high demand, as is the energy management approach guided by the companion workbook. Customer demand has driven the development of a training approach and tools that can be delivered at a price and method that works *for the customer*. Reviewing the process, we see that the energy management educational event for CEO's worked well because:

- The timing was right (California crisis, cost spike for natural gas)
- It was marketed effectively
- The speakers and agenda topics were matched to fit the target audience

We were inspired to create a follow-up, hands-on training because CEO's indicated they would send someone to such a training. We developed an initial full-day hands-on training that received some positive feedback, but was not a full success. Multiple feedback and input sources were tapped to understand what aspects were successful, and what needed changes and improvement. Speaker and staff comments, de-briefs, and stakeholder input added qualitative meat to the attendee evaluation results. The training was redesigned based on this feedback and input to a half-day format focused on a workbook of templates and tools that attendees take back to their companies to develop and implement their own energy management plan.

The half-day Practical Energy Management training has proved to be very popular, and four sessions were quickly added to the Spring 2003 training schedule. A key to the popularity has been the multiple methods of acquiring immediate feedback from attendees and speakers, and incorporating that feedback into the content, structure, and delivery of the training. To be successful, training products must adapt quickly to customer needs, or risk losing support from funding sources.

The half-day training continues to be improved "on-the fly", each time it is held. Numerous follow-on trainings, tools, and products are planned to build upon the Practical Energy Management framework, utilizing feedback from the training sessions. Development resources can be applied confidently, because the product specifications are customer-driven.

Although the training is receiving positive feedback, about one third of the participants are not fully satisfied with the technical level and the amount of information, and

the time allowed. Comments from individuals indicate that we should consider more clearly marketing this course as an introductory session, and then follow-up with half day sessions addressing specific topics of highest interest.

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