Industrial Process Efficiency Programs

Exemplary Programs

Honorable Mention

Industrial Process Efficiency Programs
Exemplary Program

Focus on Energy Industrial Program
***Focus on Energy*[1]**

PROGRAM OVERVIEW

Focus on Energy's (FOE) Industrial Program has been a leader in design and implementation of one of the most successful industrial energy efficiency programs in the U.S. Beginning in 1998 as a pilot in northeast Wisconsin, this program has evolved to become much more than the standard utility DSM program offering of the past. It was expanded to a state wide program in July of 2001. Today, the program serves over 85 percent of the state's customers with comprehensive services that are often cutting-edge program elements.

The general program approach is to provide information on energy efficiency opportunities in a variety of ways and to provide project and study financial incentives to motivate customer and trade ally actions. The program's information outreach includes 26 best practice training courses offered in FY07, best practice fact sheets on common systems such as compressed air systems, "Energy Best Practice Guidebooks" tailored to specific industrial "clusters" like pulp and paper, ten energy advisors providing on-site support and technical assistance for projects, and the Practical Energy Management© (PEM) training and facilitation. PEM is a tool that the Focus Industrial program developed to provide a template for companies to do energy management.

The program has achieved its current status and success through a multi-pronged effort, including the following key elements:

- A team of highly qualified energy advisors and central staff. The team of ten energy advisors across the state provides on-site efficiency project identification and support to overcome technical and management barriers. Energy advisors work with customers through opportunity identification, project development, vendor proposal review, and program application facilitation. The central staff is a team of dedicated professionals that develops new program offerings, manages general program efforts and provides the first interaction in the program with customers and allies.

- Highly effective industrial cluster initiatives targeting five key Wisconsin industries (paper, metalcasting, food/dairy, plastics, and water/wastewater), including comprehensive, energy best practice guidebooks for each, and successful industrial customer and association outreach. These initiatives were undertaken in recognition of their significant energy intensity and the thought that specifically targeted activities, aimed at key leaders and associations, could vastly improve the networking capacity and credibility of the program. In addition, the cluster efforts focus more on processing

[1] Focus on Energy is a public-private partnership, funded by a public benefits charge paid by Wisconsin's electricity customers, to provide programs and support for energy-efficiency, renewable energy and energy/environmental research in Wisconsin.

technologies instead of just the common technologies of industrial facilities. This is accomplished through a cadre of experts who understand their respective industries.

- Development of the Practical Energy Management© (PEM) training and facilitation support to internalize energy management processes within facilities and companies. PEM responds to a serious market need for structure and accountability at the facility level. It provides an adaptable template to allow companies to more easily establish a continual energy management program of their own.

- A highly cost-effective custom grant process sits at the core of the program. In spite of budget constraints and attribution-driven goals, the custom grant program has racked up significant savings at a relatively high benefit-cost ratio. In 2008 the incentive rates for kWh, kW, and therms will increase significantly in response to evaluation recommendations for increasing attribution rate and market penetration.

- Project feasibility analysis grants for up to 50 percent of the study. For less understood applications within a facility, feasibility studies open the door for significant projects that could not get done without reducing the risk of uncertain technology.

- Stream-lined prescriptive grants for well-known, yet under-used technologies. For well-known measures, this program component shortens the turn-around and eases the filing process for both customers and their vendors.

- Close cooperation with business allies. In many cases, especially for compressed air, lighting, and heat recovery, business allies serve as program agents who advance both prescriptive and custom grants.

- A collaborative measurement and verification (M&V) element to assess less-known technologies and applications. FOE's M&V verifies savings for relatively untested technology and provides a basis for showcasing successful technology through case studies. They often lead to specialized incentives.

- Specialized best practice training program, consistent with U.S. Department of Energy guidelines. Focus Industrial provides best practice training in compressed air systems, steam systems, lighting, ventilation systems, refrigeration and Practical Energy Management.

- A robust customer leadership recognition program, including awards, feature news stories, case studies and customer-specific, on-site Practical Energy Management facilitation.

The Focus on Energy Industrial program is lead, implemented and managed by SAIC. SAIC is under a contract that is managed by the Wisconsin Energy Conservation Corporation (WECC). WECC is under contract to the State of Wisconsin to administer the Focus on Energy program. Two other contractors, CleanTech Partners and Franklin Energy Services, provide additional primary support for the Industrial program.

PROGRAM PERFORMANCE

Since July of 2001, working with more than 1500 customers (of 12,000 statewide), Focus on Energy's Industrial Program has accounted for independently verified net savings of 141,151,429 kWh, 20,680 kW, and 15,085,925 therms. This results in lifetime savings of over $262 million. The program budget for this period was a total of $22 million yielding a very high program net benefit-cost ratio of 11.9. According to a recent evaluation summary report, the industrial program accounted for roughly half of the FOE's Business Programs' documented savings (FOE Business Programs include agriculture, commercial, schools and government, and industrial).

LESSONS LEARNED

The guiding program model for the FOE Industrial Program has been to teach customers "how to fish" rather than simply providing them with fish. Towards that end, numerous efforts have been combined to best address industrial customers' needs and circumstances, which tend to be highly specialized and relatively unique to their facilities. The ultimate goal of the program is to have lasting effects, both at customer sites and in the marketplace. Key lessons learned are summarized by program aspects below.

Industrial Cluster Initiatives. The team efforts for all cluster initiatives have yielded sustainable effects through both strong relationships with key industry leaders and associations and widely distributed "Energy Best Practice Guidebooks." Of special note is the paper industry effort, in which the program is working closely with key industry groups, including the Wisconsin Paper Council, Lake States TAPPI (Technical Association of Pulp and Paper Industry), the national TAPPI and the American Forest and Paper Association (AF&PA).These associations have supported distribution of guidebooks to all of its members and have collaborated on workshop development with FOE. The Focus Industrial cluster program initiated and organized an international TAPPI Energy Forum in Wisconsin.

Relationship development with metal casters, plastics manufacturers, dairy and meat processors, and water/wastewater operators are in their early stages, but have also resulted in wide dissemination of "Energy Best Practice Guidebooks." FOE also currently has working relationships with other key associations including: Wisconsin Cast Metals Association, Society of Plastics Engineers–Milwaukee, the American Chemical Council (Plastics), Wisconsin Cheese Makers Association, Midwest Food Processors Association, Wisconsin Association of Meat Processors, American Water Works Association, and the Wisconsin Wastewater Operators Association.

Practical Energy Management (PEM): Focus introduces PEM to customers through a half-day mini-workshop that shows how PEM manages the processes of data collection, facility profiling, opportunity identification, projecting implementation and tracking, goal achievement, and corporate communications, in a self-sustaining model. Customers learn how to incorporate tracking of key performance indicators, set goals, and perform energy calculations for identified opportunities. Advanced customers (those who have begun to implement PEM) also receive free

energy management team facilitation which provides momentum to carry the company into self-sustaining mode. An internal survey of 60 companies that went through the ½ day PEM training showed that 61 percent of those surveyed have used PEM in some way and 30 percent have completed a project since their session (average of 6 months) through the use of the PEM approach.

Ally Development: FOE encourages business allies to serve as program vectors, through specialized training and streamlined incentive processes. Compressed air system allies, particularly, have become major agents in support of best practices. Almost all compressed air vendors in Wisconsin work closely with energy advisors in both prescriptive and custom grant applications. In addition to system upgrades and replacements (equipment sales) they routinely support leak detection and repair and overall system analysis. The program's industrial sector manager serves as co-chair of the Pump Systems Matter advisory committee to promote pump system efficiency. Recently, Focus announced a special incentive for pump and fan systems – $50/hp for variable frequency drive installations, which has been very popular.

Focus provides both its own training and also brings in U.S. DOE training for best practice development in compressed air systems, lighting, ventilation, refrigeration, pumping systems, steam systems, and process heating. These workshops are geared both to support customer projects and to show business allies the kinds of best practices the program promotes. As allies become more attuned to program purpose, they see value in continuing support and incorporating energy efficiency into their sales.

*Emerging Technology Support***:** The program has processes for identifying and promoting new, emerging technologies, that include concept development, customer demonstrations with measurement and verification, and, where appropriate, streamlined financial incentives. Focus also develops case studies and funds feasibility analyses and installations.

PROGRAM AT A GLANCE

Program Name: Focus on Energy Industrial Program

Targeted Customer Segment: Industrial customers

Program Start Date: Pilot program began in 1998; state-wide program began in 2001

Program Participants: Since 2001 about 1500 participants out of an estimated 12,000 eligible industries statewide

Annual Energy Savings Achieved: 141 GWH electricity savings and 15.1 million therms since 2001

Peak Demand (Summer) Savings Achieved: 20.7 MW

Other Measures of Program Results to Date: Benefit-cost ratio of 11.9 (net benefits, total resource cost test)

Budget: The budget for FY07 (July 1 2006 to June 30th 2007) is $4,106,767.

Funding Sources: Wisconsin state public benefits charge

Best Person to Contact for Information about the Program

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Industrial Process Efficiency Programs
Honorable Mention

Custom Process Rebate Program
CenterPoint Energy

PROGRAM OVERVIEW

The Custom Process Rebate Program provides rebates primarily to large volume and dual fuel customers who use throughput for process rather than heating purposes. The rebate is given for the increased efficiency of equipment installed vs. standard equipment available or currently in use that does not need replacement. Rebates are customized for each participating customer.

The program was developed in 1994 to address the potential energy savings in the niche market segment of large commercial and industrial customers, which represents approximately 15% of CenterPoint Energy's throughput. The original project had a total budget of $300,000 and an annual energy savings goal of 65,000 therms of natural gas. From 1994-1998, the program continued to grow with an increased number of project participants and energy savings each year. In 1999 the program started hitting its stride generating a significant amount of energy savings in a more cost-effective manner than previous years.

Since the rebate program is customized, it provides CenterPoint Energy the flexibility to rebate unique energy efficient industrial applications. Each rebate is handled on a case-by-case basis and the rebate is given for the increased efficiency of the equipment as compared to standard equipment available (or to existing equipment being replaced before the end of its lifetime).

CenterPoint Energy works closely with customers and engineers to develop the efficiency improvements in order to ensure that the most energy- and cost-efficient equipment appropriate for the customer's use is installed, and to verify both the rebate for which the customer qualifies and the amount of energy savings achieved. In addition to the rebate, customers may apply for assistance in paying for engineering fees from consulting engineers.

Over 200 different technologies have qualified for rebates under the Custom Process Rebate Program over the last several years in industries as diverse as metals, printing, ethanol plants, laundries, asphalt plants, glass manufacturing and food processing. Some of the natural gas technologies that have been rebated through the customized program include:

- Reverse osmosis systems,
- Process energy recovery systems,
- Tower burner upgrades,
- High efficiency integral quench furnace,
- Economizers,
- Tower melters,
- Grain dryers,
- Steam blanchers,

- Heat treat systems,
- High efficiency parts washers, and
- Soybean dryers.

PROGRAM PERFORMANCE

Since the start of the program in 1994, approximately 510 industrial customers (approximately 17% of total industrial customers) have received incentives to upgrade to higher efficiency natural gas equipment. Since 1999 CenterPoint Energy has spent an annual average of about $1 million on customized industrial rebates, and has saved an annual average of approximately 500,000 MCF of natural gas. In 2006 the program achieved savings at a cost of $2.35 in rebates per MCF saved.

Each rebate application is carefully evaluated by CenterPoint Energy's engineering staff and efficiency program managers before the rebate is approved. These staff verify that the technology being installed will save energy, that it qualifies for the level of rebate requested, and that the project meets state regulatory criteria for cost-effectiveness. In addition, because energy conservation programs in Minnesota are delivered by utilities with state oversight, regulators also have the opportunity to evaluate projects to ensure that engineering assessments and energy savings claims are accurate and that the program is cost-effective.

LESSONS LEARNED

Industrial customers use a great deal of energy, and therefore have the greatest potential for achieving energy savings through the use of efficient equipment. However, identifying energy savings opportunities in varying market segments requires unique technical expertise, and the largest users of energy rarely fit neatly into prescriptive rebate programs. CenterPoint Energy's Key Account Sales Managers are assigned by market segment, and therefore are technical experts for the industrial processes their customers use. By addressing these customers' energy consumption patterns on a case-by-case basis, CenterPoint Energy is able to help identify savings opportunities among its largest customers that might otherwise not be realized. In 2006 the six largest custom projects rebated saved a combined total of over 188,000 MCF – more than all of the company's residential programs combined.

Because CenterPoint Energy works directly with customers to ensure that the projects are successful, customer satisfaction with the program is high. The rebates offered help to offset first costs from efficient equipment, reducing the payback period for customers and allowing projects to move forward. The case-by-case project analysis approach also allows flexibility, so that a customer with an innovative idea or technology to save energy can work with the utility to put their idea into effect.

The project is also having significant success in moving markets towards more efficient process technologies. As an example, CenterPoint Energy's Key Account Sales Manager working with the foundries market segment worked with a customer, consulting engineer and industrial

equipment representative to install a more efficient tower melter for a large foundry facility. This state-of-the-art tower melter was the first of its size in the upper Midwest and was met with some skepticism by others in the industry. The success of the technology has resulted in the installation of six additional tower melters in other foundries within CenterPoint Energy's service territory over the last three years. Without the technical expertise and knowledge of both the customers and this market segment, these projects would not have been successful. This foundries example is just one of many market segments where a customized project has moved the market place to acceptance and installation of a more energy efficient technology.

PROGRAM AT A GLANCE

Program Name: Custom Process Rebate Program

Targeted Customer Segment: Industrial and commercial customers

Program Start Date: 1994

Program Participants: About 510 since 1994

Annual Energy Savings Achieved: About 500,000 MCF annually from new projects

Peak Demand (Summer) Savings Achieved: Not applicable

Other Measures of Program Results to Date: In 2006 the program achieved savings at a cost of $2.35 in rebates per MCF saved.

Budget: In 2006 rebates issued under the Custom Rebate project were about $737,000, out of a total of about $2,381,000 in rebates to the commercial and industrial sectors and $3.6 million in total C&I program spending (including project delivery, promotions, and administration).

Funding Sources: Utility DSM program funds via ratepayers

Best Person to Contact for Information about the Program

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Industrial Process Efficiency Programs
Honorable Mention

Energy Efficiency Grant Program
Southern California Gas Company

PROGRAM OVERVIEW

The Energy Efficiency Grant Program is designed to encourage eligible large non-residential customers, such as large industrial, commercial and chain account customers, to assess and implement comprehensive energy efficiency projects and process improvements. Southern California Gas Company (SCG) administers the program. SCG customers work with a SCG account executive (AE) to plan an energy efficiency strategy. The customer and AE then work with the EEGP program manager, as well as outside engineers, to devise an energy-efficiency retrofit plan. After a proposal is provided to SCG with a professional engineer (PE) stamp, a measurement and verification (M&V) plan is built right into the contract so both the customer and SCG know the data points that will be measured upon completion of the project. When actual therm savings are determined, the SCG pays the customer either 50% of the equipment cost or $0.50 per therm, whichever is less. There has been a $300,000 cap to any one customer premise

EEGP is flexible enough to allow for many different energy-efficient technologies used in industrial processes. Equipment replacement and process improvements both qualify for this program. Some of the technologies and measures include regenerative thermal oxidizers, evaporators, industrial dryer replacements, boiler stack heat recovery, waste water heat recovery, reverse osmosis and condensate heat recovery.

The Southern California Gas Company introduced the Energy Efficiency Grant Program in 2006. The program provides financial incentives (up to $300,000 per customer application) for energy retrofit projects that save at least 250,000 therms per year– enough energy to serve about 500 homes annually.

EEGP was developed to target energy efficiency improvements for the underserved large industrial and commercial market segment. SCG is in the process of expanding EEGP to assist the largest industrial customers in devising an energy efficiency roadmap and increasing the incentive cap thereby reducing the payback period for the customer. A reduced payback period creates a more attractive package and helps SCG move energy efficiency up the priority ladder for large industrial customers as they make capital investment decisions.

PROGRAM PERFORMANCE

In 2007 the Energy Efficiency Grant Program delivered over 5.7 million therms saved for industrial processes in a multitude of market segments including, aerospace, agriculture, paper,

petroleum and textile. The Energy Efficiency Grant Program has achieved energy efficiency savings for California of over 6.8 million therms since its initiation in 2006.

LESSONS LEARNED

EEGP exceeds contemporary natural gas energy savings programs as it targets heavy industrial customers and large commercial customers capable of generating hefty energy savings. EEGP impacts the under served industrial market. While it is believed energy efficiency is a normal part of industrial practices, many times energy efficiency is not at the top of the list when it comes time for capital investments. The current and future incentive SCG provides with EEGP helps move energy efficiency thinking toward the top of the list when capital investment decisions are made.

EEGP was designed and serves a market segment that up until 2006 was unable to take advantage of Energy Efficiency incentives for energy efficient upgrades. The whole process is designed as a method of cooperation with the customer and SCG. From beginning to end, SCG works with the customer to devise the most cost effective retrofit program with a reasonable payback. This allows SCG to bring cost effective energy savings to the state of California while allowing the customer to enjoy energy savings at a more reasonable cost.

PROGRAM AT A GLANCE

Program Name: Energy Efficiency Grant Program

Targeted Customer Segment: Industrial and large commercial customers

Program Start Date: 2006

Program Participants: In 2006, three customers took advantage of EEGP at four different facilities

Annual Energy Savings Achieved: 5.7 million therms from projects in 2007; 6.8 million therms since program inception.

Peak Demand (Summer) Savings Achieved: Not applicable.

Other Measures of Program Results to Date: EEGP is an extremely cost effective program delivering therms saved in 2007 for an average of $0.26 per therm

Budget: EEGP is a sub-program of the larger Business Energy Efficiency Program (BEEP). The BEEP program budgeted over $3.2 million in incentives for 2006 and has just under $5 million available for cost effective projects in 2007.

Funding Sources: Regulatory approved energy efficiency funding via customer rates

Best Person to Contact for Information about the Program

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Industrial Process Efficiency programs
Honorable Mention

Heavy Industrial and Manufacturing Energy Efficiency Program
Pacific Gas & Electric

PROGRAM OVERVIEW

The Heavy Industry and Manufacturing Energy Efficiency Program was created to meet the unique needs of the industrial sector. Through this program PG&E offers heavy industry and manufacturing facility design assistance and financial incentives to support the design and construction of energy-efficient, high performance facilities and retrofitting of existing operating equipment. This program serves the fabrication, process and manufacturing industries, water pumping and treatment, and wastewater treatment plants. Together, these sectors comprise about 15% of PG&E's peak load. The program targets industries in PG&E territories that include predominantly printing plants, plastic injection molding plants, component fabrication, lumber and paper mills, cement and quarries, metal processing, petroleum refineries and exploration, chemical industries, assembly plants, glass manufacturing, packaging manufacturing, auto manufacturing, and water and waste water processing.

Prior to 2006 the PG&E energy efficiency programs serving the various market commercial and industrial sectors were the Standard Performance Contracting Program and the Savings By Design Program. These programs were stand-alone, crosscutting offerings that served all sectors in the market place. However, in its 2006-2008 program design, PG&E departed from this paradigm. New programs, such as the Heavy Industry and Manufacturing Energy Efficiency Program, were developed based on target market segmentation in an attempt to better serve customers and mine all untapped opportunities in energy efficiency that had been often overlooked because of lack of funding and/or focus. This approach has lead to the development of integrated programs that address the particular characteristics of each market. The target market approach is leading to better integration across all demand-side management activities. Energy surveys now include identification of demand response and self-generation opportunities alongside energy efficiency recommendations for many business types, for example.

Industrial facility energy managers are typically interested in controlling costs associated with water, air, gas, electric and steam while maximizing production output from their plant processes. These challenges require ongoing facility and plant manager education as well as training, benchmarking, and systems monitoring. This provides PG&E with substantial opportunities to promote energy efficiency as an integral component in running a cost effective, competitive, and high performance facility.

The savings are achieved through an integrated delivery approach. The program offerings include design assistance, audits and financial incentives for energy efficiency implementation.

PG&E markets the program through energy efficiency workshops, seminars and industrial trade shows. In addition to the outreach activities, PG&E offers education, training and demonstrations

on crosscutting energy management opportunities, focusing on technologies like pumps, motors, variable speed drives, industrial lighting, and various emerging technologies. Retrofits in process systems and new construction opportunities contributed significantly to the success of the program and have encouraged customers to adopt beneficial societal behaviors such as specifying and incorporating energy-efficient measures in their building/systems designs.

PROGRAM PERFORMANCE

In 2006 PG&E significantly exceeded its goals by achieving 4 MW, 35 GWh and 4 million therms in energy savings with a benefit-to-cost ratio of 3.8 (total resource cost perspective). In 2007 PG&E has approximately 500 committed projects filed in the program. The 2007 gross energy savings are 12.3 MW, 101 GWh and 8.4 Million therms; these results are in the process of validation. Significant energy savings were garnered through process optimization projects, retrofitting of system projects, and incorporating of energy efficient measures in new construction projects.

LESSONS LEARNED

Putting energy efficiency in the context of non-energy benefits such as increased production, higher quality products, lower operation costs and better process control has been an important marketing strategy in promoting integrated demand side management projects. The strong water-energy connection in industrial processing also provides an additional significant untapped opportunity to help industries reduce multiple utilities cost in plant operations.

Besides large scale process optimization projects, PG&E will continue to promote the installation of major crosscutting equipment often found in industrial facilities like energy-efficient pumps, variable speed drives, motor systems and compressed air systems. PG&E has also pursued energy efficiency opportunities in industries with high natural gas consumption like the petroleum, petrochemical, chemical and stone/clay/glass industries that resulted in high gas savings. The gas projects include industrial process boilers, and process heating systems.

PG&E's outreach and marketing efforts have raised the awareness of the program and how energy efficiency can be leveraged to reduce operations cost of a company. For example, one CEO had remarked that 1% reduction in energy usage through energy efficiency resulted in $60 million savings in annual energy cost. PG&E has also raised the awareness of the role energy efficiency plays in the reduction of greenhouse gas emissions. Industry leaders have come to recognize that energy efficiency is a cost- effective way of meeting growing energy demand and reducing greenhouse gas emissions.

PG&E continues to explore new technologies and new approaches for achieving greater energy efficiency in large industrial facilities and promoting them through this program. As one example, PG&E is conducting some pilot projects on industrial retro-commissioning and hopes to offer it to industrial customers in the near future. Another example is that PG&E has two demonstration projects on aeration technology—one that involves a new design for pure oxygen

delivery to facilitate efficient aeration and the other involves solar driven aeration equipment. PG&E hopes to promote the use of these technologies as soon as it validates their energy savings.

PROGRAM AT A GLANCE

Program Name: Heavy Industrial and Manufacturing Energy Efficiency Program

Targeted Customer Segment: Industrial, oil refineries and exploration, water & wastewater treatment

Program Start Date: 2006

Program Participants: 500 committed projects in 2007

Annual Energy Savings Achieved: 101 GWh and 8.4 million therms gross energy savings in 2007.

Peak Demand (Summer) Savings Achieved: 12.3 MW gross savings in 2007.

Budget: 2007 budget is $33 million

Funding Sources: California ratepayers through public goods charge (PGC) funds

Best Person to Contact for Information about the Program

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Industrial Process Efficiency Programs
Honorable Mention

PRIME Program
Connecticut Light & Power
Connecticut Energy Efficiency Fund

PROGRAM OVERVIEW

The Process Reengineering for Increased Manufacturing Efficiency (PRIME) program in Connecticut is administered by the Connecticut Light and Power Company (CL&P) and is overseen by the Energy Conservation Management Board (ECMB). The program is funded by the Connecticut Energy Efficiency Fund (CEEF)—customer-provided funding for ECMB-guided programs. Originating in 1999 as an economic development initiative, the PRIME program was developed to teach manufacturers how to implement "Lean Manufacturing" techniques. Lean manufacturers produce more with existing resources by eliminating non-value added activities and by aligning production to meet actual customer demand. A company that employs Lean principles is focused on excellence through "Kaizen" (continuous improvement) and the relentless elimination of waste. Lean techniques employed have typically resulted in reduced inventory and delivery times, improved quality, increased production capacity, and more efficient use of energy. CL&P looks to help its industrial customers be more competitive and profitable and views the PRIME program to be a valuable vehicle for that outcome.

PRIME pays the cost of up to two three-and-a-half day Kaizen (continuous) events at a customer's plan and up to four additional events with partial customer contribution. The program is designed to provide savings in energy usage at a cost of approximately $0.06 per lifetime kWh saved and to encourage companies to shift from traditional manufacturing processes to Lean Manufacturing practices. Qualified program vendors are contracted to help assemble a Lean Team at the customer's location and train them in Lean concepts as well as to apply those concepts to make measurable improvements to a designated production line or process. Program vendors also market the PRIME program, enroll customers, identify projects and quantify savings.

A similar program is offered to customers of the United Illuminating Company, also funded from the CEEF. In Massachusetts the Western Massachusetts Electric Company has a similar customer-funded program.

PROGRAM PERFORMANCE

PRIME has proven to be a cost-effective way to provide much-needed information about better manufacturing techniques to industrial customers in a difficult business environment. Electric energy savings to customers have been significant and have been achieved at an average cost of approximately $0.03 for each kWh saved over the predicted measure lifetime. Other benefits include cost reductions for work in progress, equipment maintenance, inventory, and

transportation. Additional benefits are reduced cycle and changeover times and increased production capacity.

In 2007 there were 55 projects completed that involved 37 individual customers. Several customers conducted more than one project during this period. The cost for these projects was approximately $335,500. This represents the amount paid to the program vendors for conducting events at the customers' sites.

The estimated annual electric savings for these 55 projects is 3,080,312 kWh. Using a measure lifetime of five years, the lifetime electric savings is approximately 15,401,560 kWh. The annual savings shown above result in a cost savings to the participants of approximately $431,244, based on an average cost of $0.14/kWh. This represents an average of $7,841 in savings per project. Overall the benefit/cost ratio for these projects is 1.29, meaning that an average of $1.29 was saved for every $1.00 spent. The cost per lifetime kWh saved ($431,244 divided by 15,401,560 kWh) is approximately $0.028, or roughly three cents.

PRIME claims no peak demand savings (kW) as the program is not involved with changes in equipment, only in the processes used to produce finished goods.

LESSONS LEARNED

The program rules were changed for the 2007 PRIME program in order to reach more customers and to further benefit companies that have conducted Kaizen events in the past. Customers who wish to participate in more than the two fully funded Kaizen events may participate in these additional events with a shared payment arrangement. This financial investment demonstrates a company’s willingness to reevaluate traditional manufacturing process and to adopt a Lean culture company-wide. In addition, customers who were previously ineligible for the program to their rate classification are now being included. A new effort to identify other energy conservation opportunities is also a change for the 2007 program. Following completion of the PRIME events, top management and plant operators are engaged to lead a facility walkthrough with the CL&P program administrator to examine possible equipment replacements and upgrades in the areas of lighting, motors, HVAC, and other end-uses. From this evaluation, the program administrator is able to identify cost-effective energy-efficiency measures and assist the customer in obtaining available financial incentives to implement those measures.

Additional changes have resulted from a final program evaluation completed in March 2007. In this evaluation, a sample of five projects completed in previous years revealed that changes in energy savings algorithms might produce more accurate savings results and that the sustainability of these improvements might have been overstated. Additionally, recommendations were made to target improvements that would result in the greatest energy savings and to assure that energy use before and after improvements are more accurately assessed. In response to these findings and recommendations, program administrators modified these algorithms in order to more accurately estimate short- and long-term savings.

The trend for manufacturers to move away from traditional batch-based production toward production aligned with customer demand or “pull” is advanced by the PRIME program. Each successful project provides cost and time savings, which tend to strengthen a company’s resolve to strive for continuous improvements and provide a testimonial to other manufacturers to the possibilities of adopting Lean thinking and receiving similar benefits at their plants.

CL&P is pleased that this program is providing positive savings to its industrial customers as well as helping them adopt a better way of doing business, resulting in reduced waste, shorter lead times, and better service to their customers. Feedback from these customers has been very positive and many have expressed that they would not have taken the "lean path" without the help of the program vendors, whose services are paid through the Connecticut Energy Efficiency Fund and administered by CL&P.

PROGRAM AT A GLANCE

Program Name: PRIME Program

Targeted Customer Segment: Industrial customers with SIC codes of 2000-3999

Program Start Date: 1999

Program Participants: 55 projects in 2007 involving 37 customers

Annual Energy Savings Achieved: 3.1 GWh

Peak Demand (Summer) Savings Achieved: None claimed; equipment not changed or replaced**.**

Other Measures of Program Results to Date: Program has yielded electricity savings at an average cost of $0.03/kWh over the lifetimes of measures. Average annual energy cost savings per project is $7,841 (2007).

Budget: $750,000

Funding Sources: Public benefits funding; in Connecticut via the Connecticut Energy Efficiency Fund; in Massachusetts the statewide systems benefits charges that go to distribution utilities for energy efficiency programs

Best Person to Contact for Information about the Program

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Industrial Process Efficiency Programs
Honorable Mention

Production Efficiency
Energy Trust of Oregon, Inc.

PROGRAM OVERVIEW

Production Efficiency is a program administered by Energy Trust of Oregon, Inc. Production Efficiency offers energy efficiency services for industrial processes of all kinds, including manufacturing, agricultural and water/wastewater treatment. The program funds studies to identify energy-saving opportunities and provides financial incentives to help customers implement recommended improvements.

The program provides participating industrial customers their own "personal program delivery contractor" (PDC). These contractors are highly skilled, industry-specific specialists with expertise on the best and most appropriate technologies that can help customers capitalize on energy-saving opportunities. Their scope of work in working with customers includes:

- Conducting scoping studies to determine the most profitable upgrades,
- Developing specifications for energy-saving projects,
- Evaluating contractor bids for installation,
- Overseeing installation and verification of the project,
- Facilitating paperwork associated with program incentives, and
- Assisting with the application for Oregon Business Energy Tax Credits.

The services provided by PDCs are done at no-cost to participating facilities. The PDCs examine facility operations and energy usage, and identify ways to save customers money and energy. PDCs also conduct post-installation inspections of projects and will create plans designed specifically so that facility operators understand how to properly use equipment to maximize energy savings.

Production Efficiency targets a broad menu of industrial end-use technologies. The following types of equipment are eligible for incentives:

- Energy-efficient pumps,
- Compressed air,
- Fans,
- Material transport,
- Refrigeration,
- Controls and similar industrial processes,
- Motors, and
- Lighting.

Financial incentives are calculated on an individual, case-by-case basis. Customers must receive approval from ETO before purchasing equipment that is to be provided financial incentives from the program.

Production Efficiency offers standard incentives for the retrofit of lighting and electric motors, and custom incentives for complex process enhancements. The custom incentives reimburse a business for up to 15¢/annual kWh (or up to 26¢/annual kWh for municipal water/wastewater projects) or 50% of total project costs, whichever is less. The maximum annual incentive per site is $500,000. Lighting custom incentives reimburse a business for 12¢/annual kWh or 25% of total project cost, whichever is less.

PROGRAM PERFORMANCE

Since the program began in late 2003 through 2006, Production Efficiency has provided $39.95 million in incentives for projects resulting in 38.2 average MW savings.[2] Production Efficiency is very cost-effective; the program utility cost-effectiveness test yields a benefit-to-cost ratio of 2.6 and the societal test yields a ratio of 1.3.

Production Efficiency's efforts have helped numerous industries achieve higher energy efficiency, thus saving them energy costs and helping them to be more competitive. A broad range of industries have participated, including steel, paper, seafood, shipping, lumber, nurseries, machinery, wastewater treatment and buildings. Production Efficiency has published several case studies of successful projects, which help to increase awareness and interest in the program.

LESSONS LEARNED

The program is unique in the use of a set of trade allies selected through a competitive procurement process who make customers contacts and work with customers to identify projects. The program scope is much more comprehensive as a result of this process. The trade allies—the Program Delivery Contractors—have an advantage with the customers as they typically are experienced engineering professionals who have worked in industry and are therefore familiar with the processes as well as the people who make decisions.

Production Efficiency is a relatively young program, but already has achieved a great deal of success. Program evaluations have helped to improve aspects of the program. Some of the most successful elements of the program include:

- Using a "kicker" incentive in the first year of the program for marketing and gaining early participation;
- Using contractors who have existing strong relationships with various industry groups as the Program Development Contractors, who play key roles as the program's marketing and project management force;

[2] "Average megawatt" is a unit of energy used in the Northwest. It is equal to the amount of energy produced by 1 megawatt for an entire year (8760 hours)---or 8760 megawatt-hours.

- A focus on deep process change---fundamental changes that yield not only significant energy savings but also improve industrial processes and production;
- Willingness to do big projects that decrease load at individual facilities by large amounts---by megawatts in some cases (one facility had a 12 average MW forecast savings and a project that will yield 6 average MW is underway);
- Developing aggressive and eventually fruitful sub-programs that target for small sewer and water treatment plants;
- Achieving large savings at low costs;
- Close integration with state tax credit program; and.
- Flexibility to coordinate services for related programs, such as working with customers to coordinate incentives available for CO2 reductions (available from the Climate Trust).

PROGRAM AT A GLANCE

Program Name: Production Efficiency

Targeted Customer Segment: Large industrial customers; for the very largest customers—those with a 1 average megawatt or 8,760,000 kilowatt hours a year usage--are subject to the Energy Trust Self-Direct Policy. Program services for these self-directing customers are limited.

Program Start Date: 2003

Program Participants: 229 in 2006

Annual Energy Savings Achieved: 7.9 aMW in 2006

Peak Demand (Summer) Savings Achieved: Not applicable (winter peaking system).

Other Measures of Program Results to Date: The program utility cost-effectiveness test yields a benefit-to-cost ratio of 2.6 and the societal test yields a ratio of 1.3 for 2006.

Budget: $15,074,649 for 2006

Funding Sources: Oregon public benefits charges

Best Person to Contact for Information about the Program

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