

# **Utility SEM Programs from the Southwest**

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## **ABSTRACT**

PacifiCorp's new strategic energy management (SEM) program in Utah and Xcel Energy's Process Efficiency program in Colorado are two complementary approaches to helping industrial customers develop more robust systems to achieve on-going, significant energy savings. These programs also provide a snapshot of how utilities can develop and launch new SEM programs, while adapting and refining them over time to enhance customer satisfaction, energy savings, and cost-effectiveness.

In July of 2013, PacifiCorp/Rocky Mountain Power (Rocky Mountain Power) launched a suite of new energy management program offerings, including an SEM program, for its customers in Utah. Inspired by the successes of SEM programs in the northwest, Rocky Mountain Power's SEM program aims to help large customers develop systems to achieve on-going energy savings, including operations and maintenance (O&M) savings. Xcel Energy/Public Service of Colorado continues to refine its Process Efficiency program, a comprehensive program for industrial customers. This program helps large customers develop a 2-3 year energy management plan and offers an assessment of the company's efforts towards SEM. Xcel Energy has been offering this program in Colorado since 2009, with excellent results in energy savings achieved and cost-effectiveness.

## **SEM Landscape**

A growing number of utilities are offering strategic energy management (SEM) programs to their industrial and other large customers. According to CEE, there are now at least 15 utilities that offer SEM programs in the U.S. and Canada, compared to 12 in 2013 (CEE, 2015). These utilities are seeing some of the benefits of SEM programs – improved customer satisfaction and loyalty, and additional cost-effective energy savings for the utility. However, SEM programs can be challenging to develop and deliver, and achieving all these benefits requires skillful planning and execution.

Two utilities in the Southwest, PacifiCorp/Rocky Mountain Power (Utah) and Xcel Energy (Colorado), have developed their own take on SEM programs, demonstrating some of the options available. Xcel Energy's Process Efficiency program is a comprehensive technical assistance and custom efficiency program coupled with several key elements of SEM. In operation in Colorado since 2009, this program has been very successful. Rocky Mountain Power's new SEM program offerings are much newer, only coming online in 2013, but customer participation and the program's energy savings are growing. Rocky Mountain Power's program demonstrates an approach to starting and developing an SEM program gradually.

## **What is Strategic Energy Management?**

From the customer's point of view, SEM helps companies put systems in place to allow them to achieve significant, on-going energy savings over a period of five years or longer. SEM is essentially a continuous improvement approach to energy management, similar to the "plan, do, check, act" approach that has been successfully applied to quality improvement in manufacturing for many years. Based on the experience of utilities in the Northwest and the work of the Consortium for Energy Efficiency (CEE), there are four key elements of strategic energy management that allow an industrial company to continuously improve its energy performance (Wallner 2011, CEE 2014):

1. Obtain management support for long-term energy reduction goals
2. Dedicate staff, including an energy champion, to oversee and monitor energy management planning and implementation
3. Develop and regularly update energy management plans
4. Implement a system for tracking energy use and quantifying energy savings

Utilities take different approaches in helping industrial or other large customers adopt these key principles. Some utilities provide detailed assistance, training, and incentives to individual companies or groups of companies. Some provide incentives and assistance in installing an energy management information system (EMIS) to help identify energy saving opportunities and measure savings. Some offer incentives and training to help companies hire a full- or part-time energy manager to help the company implement projects and to develop a more strategic approach to energy management. The potential benefits to utilities of developing an SEM program (of any of these types) include the following (BPA 2012):

- Increased number and size of traditional energy efficiency projects implemented
- Measurement of operations and maintenance- based energy savings
- Increased likelihood of high-complexity or process- oriented projects.
- Greater persistence of energy savings.
- Greater customer satisfaction.

## **Xcel Energy Process Efficiency Program**

Since its launch in Colorado in 2009, the Process Efficiency (PE) program has consistently demonstrated its value as an SEM tool not only for its contribution to Xcel Energy's overall portfolio Demand Side Management (DSM) goals but also by satisfying the needs of its large customers. The program, now in its sixth year, continues to see increases in participation and continues to exceed the program's ever- increasing goals while maintaining cost effectiveness (see Table 1).

The current version of the PE program in Colorado was adopted from Minnesota where it was first introduced in 2006. The development and expansion into Colorado, as was the case in Minnesota, was in response to program management research that revealed industrial customers were participating in offered DSM programs in proportionally smaller numbers in comparison to their overall energy and demand usage. The traditional approach of providing technology and financial incentives to assist in project completion was not enough for this segment. Xcel Energy recognized the need to further engage industrial customers and develop an SEM approach - promoting operational and behavioral changes, rather than focusing on individual projects. Prior

to the development of the Process Efficiency program, many custom projects which had been identified and preapproved were not being implemented. Additionally, many other customers who participated in Xcel Energy- funded engineering studies were not implementing the identified measures. Xcel Energy began to realize that DSM offerings needed to go beyond simply identifying potential projects for customers or offering incentives.

The current version of Xcel Energy's process efficiency program, a more proactive and holistic partnership, was developed to overcome these issues. Through the Process Efficiency program, Xcel Energy is able to provide identification of opportunities through study funding, technical support and attractive incentives, and external energy project management expertise. In addition the program includes system optimization bonuses to encourage a culture of sustained energy efficiency and behavior change throughout the customer's organization. In sharp contrast to the traditional custom incentive program and other Xcel Energy study- based programs' with conversion rates as low as 50%, the Process Efficiency program has a conversion rate of approximately 90% of all identified projects (Tetra Tech 2012). This higher conversion rate reflects the financial, technical and project management resources available to support implementation through the project team efforts.

### **Participants and Eligibility**

Currently the program has approximately 25 engaged participants who are actively contributing to the program's savings target of 35 GWh for 2015. This number of participants represents roughly 30% of the total number of customers in Xcel Energy's Colorado territory that are currently eligible to participate in the program.

On average the program adds five to six new customers a year with an average energy savings potential of 2 GWh. Potential customers are required to have 20 GWh in annual consumption, with an estimated potential savings of 10%. In addition to the eligibility requirements, the customers that make the best participants in the program have several common characteristics including:

- energy-intensive manufacturing
- significant energy saving potential and limited strategy on how to attain savings
- desire to lower energy costs
- access to resources for energy efficiency improvements - both financial and labor

### **Overview of Program and Phases of Customer Engagement**

The PE program is a collaborative partnership, which begins with conducting a one day Phase 1 meeting and energy management assessment. Phase I engages with the customer's upper management and begins the process of gaining their support through a diagnostic assessment of current energy management practices through EnVinta's One-2-Five® software tool. The EnVinta One-2-Five® energy management diagnostic session assesses current business practices related to energy usage at the facility, and prioritizes actions necessary for improvement. The session also benchmarks the customer's energy management practices in relation to peers within their industry.

The most effective EnVinta sessions involve a cross-functional team that includes the customer's upper management and its designated energy management team, and the full Xcel Energy project team including the customer's account manager, the PE program manager, the

sales engineer, and is facilitated by the program's technical service provider, Graphet Data Mining (Graphet). Although the EnVinta session's objective is to gain a complete understanding of current energy management practices to identify areas for improvement, a side benefit is often an open dialogue in which the customer is truly driving the discussion and reaching consensus among its assembled team.

Upon completion of the diagnostic session the Xcel Energy project team in conjunction with the key facility operations team, tours the customer's facility for an to gain an understanding of its operations. It is during this tour that the Xcel Energy project team begins to identify potential energy saving opportunities. After a brief break, the project and customer teams reconvene and the Xcel Energy project team presents the EnVinta One-2-Five® outcomes. This presentation includes the prioritized recommendations for improved management practices and preliminary energy savings measures based on utility bill analysis, and the walk-through assessment. The Phase 1 results are a key element in driving consensus and gaining upper management support and encouraging the organization to move to the next phase of the program, setting the stage for developing a culture of continuous improvement. The PE program has a success rate of nearly 100% in motivating customers to proceed to the second phase, which demonstrates the importance of this initial phase.

After the initial identification, Phase 2 begins the process of scoping potential projects and developing the multi-year implementation plan. Through an energy data mining strategy, detailed identification of technical projects begins with metering and monitoring of the customer site to confirm baselines and define conservation opportunities. This strategy serves to reinforce the relationship between the program team and customer energy management team. The customer uses the analyzed data to make informed decisions regarding their energy management plan. Additionally, the project team identifies technical opportunities, with Xcel Energy providing study funding of up to 75% of the study cost capped at \$7,500 of customer contribution.

Phase 3 includes the development of a long-term energy management plan that outlines what projects will be completed over a three to five year timeline. The Xcel Energy project team in collaboration with the customer team organizes projects in the implementation plan into short, medium and long term goals according to the customer priorities, payback criteria and business goals. The project team works together to develop the business case to obtain management approval for project implementation. To further drive project completion at this stage, the program supports all pre- and post-monitoring activities during this implementation phase in addition to ongoing technical and project management support. Rebates are provided for capital projects and system optimization bonuses are available once all projects within a system or process are completed. Bonuses are also available for exceeding energy saving targets through implementation of additional projects within an agreed upon timeframe. These bonuses can be upwards of 30% in addition to the standard rebates. After the initial energy management plan is implemented, the program initiates the cycle to begin again with another EnVinta One-2-Five® session and repeating the cycle of scoping, identification and implementation phases.

## **Results**

Table 1 shows the participation in the Process Efficiency program, and energy savings achieved since 2010. With a few exceptions, most customers that enrolled in earlier years (e.g.,

2009-2010) are still participating in the program and achieving additional savings each year. As shown, the total energy savings has increased significantly from 2010-2014.

Table 1 –Process Efficiency Program Results

	2010	2011	2012	2013	2014
Number of new participants*	9	4	3	7	5
Total energy savings (MWh)	2,640	6,496	6,484	13,790	26,003
Benefit-Cost Ratio (TRC)	2.0	3.0	1.8	2.2	2.3

\* This is the number of new participating companies added each year.

### Biological Products case study

A biological products manufacturer headquartered near Denver, Colorado, has been a participant in the PE program since 2013. The company has completed the first two-phases of the program and is in the process of finalizing its energy management plan to implement additional identified improvements.

To date, this customer has realized 789,000 kWh in savings with annual cost savings of \$52,000. Xcel Energy has provided rebates totaling \$86,600. As is the case for many PE customers, the company has chosen to implement the lower cost projects first, and is now in the process of considering deeper, more complex energy efficiency opportunities. These include lighting retrofits, HVAC system optimization, and motor and equipment upgrades that when implemented will save the company approximately 2,110 MWh and \$177,000 annually.

### Success Factors and Strategic Elements

There are several factors contributing to the success of the Process Efficiency Program. The phased program delivery is a unique approach designed to overcome many of the identified barriers that often impede large customers' implementation of energy efficiency projects. As described above, the PE Program's phased approach begins with engaging the customer's upper management, a key to gaining approval to devote money and staff resources to energy efficiency efforts and projects. Beginning with the Envinta assessment, the program helps educate the customer's management on the benefits of the more strategic approach to energy management, including a commitment to achieving continued energy savings over a two- or three-year period.

In addition the PE Program addresses several other elements of SEM, including energy monitoring and tracking, and developing a multi-year energy plan. Along with helping the customer to identify potential energy efficiency projects, the program implementer, Graphet Data Mining completes an analysis of the customer's energy consumption and demand data. Graphet educates customers on the benefits of a data-driven approach to energy management, through the

transformation of vast amounts of energy data into easily understood and useful visual representations.

The phased approach is crucial in helping the customer develop a longer-term energy plan, and it further reinforces the collaborative partnership between Xcel Energy and the customer. The program provides continuous support toward developing an actionable energy management plan, with each subsequent phase building upon the results of the previous phase. Each phase is considered a checkpoint where the customer agrees to commit to the next phase through signing a memorandum of understanding (MOU) that defines scope, identifies expectations and assigns accountabilities to various members of the team. Through obtaining the customer's buy-in at each phase of the project, the energy management plan becomes much more manageable and less daunting to the customer. Presenting the multi-year plan to the customer's management, with Xcel Energy's proposed project incentives, is another key to gaining management's approval and ultimately getting energy efficiency projects implemented.

The program has reached the stage in its lifecycle where some of the first program participants have begun to implement the large custom projects identified at the beginning of their program participation. The program is realizing higher conversion rates as these customers move to implement these longer-term projects requiring higher capital outlay. This trend toward higher conversion rates is reflected in the average project size being completed. In 2009 the average project saved 257 MWh per year, while the average 2014 project saved 845 MWh per year. As the level of savings per customer increases, this also improves the overall cost effectiveness of the program.

The success of the program can also be attributed to the uniqueness of the program components including bundling strategies, bonuses and energy management expertise offered to participants. Bundling strategies provide additional leverage to complete comprehensive improvements, by combining projects with shorter paybacks with additional projects that alone may not meet their financial performance criteria. The bonus structure unique to this program within Xcel Energy's efficiency portfolio is another component that appeals to potential customers. Customers are eligible for system optimization and annual achievement bonuses up to 30% in addition to the standard rebates. The bonus encourages additional project implementation as they are available within a set time frame and customers tend to internally approve the eligible projects quickly. The program also serves as an outsourced energy management team providing independent, objective and neutral information to further influence the customer decision making. These three elements encourage participants to implement their energy management plans.

Another key strength of Xcel Energy's Process Efficiency program is the building and maintaining of relationships between the customer and Xcel Energy and its contractor. Account managers assigned to large customers have the responsibility of not only assisting the customer in energy efficiency projects, but are the main point of contact and main interface between Xcel Energy and the customer's energy related needs. Account managers integrally know their customer's unique business and processes in addition to owning the relationship with the facility's main point of contact. Because of the long project cycle required for each of these participants, Graphet also becomes very familiar with the customer and its facility and operations. Graphet has proven to be a trusted energy partner through its technological expertise and knowledge of industrial systems and processes.

## **Future Program Enhancements**

The following are anticipated enhancements to the PE program pending regulatory approval, with an anticipated launch date during the third quarter of 2015.

Expansion of Program to Mid-Tier Industrial Customers. Based on lessons learned from successfully delivering this program in Colorado for the past six years to large industrial customers, beginning in 2015 Xcel Energy will launch a mid-tier offering targeting medium sized manufacturers and designed to address their unique challenges. Program design will follow a similar path as the large customer offering but the minimum annual consumption requirement will decrease from 20 GWh to 2 GWh.

Capturing Behavioral Opportunities. While the PE program currently identifies behavioral opportunities through energy usage awareness and training and examining operating procedures, Xcel Energy has not been able to capture and claim savings achieved through these types of opportunities. To address this exclusion, in 2015 program management is launching a new Energy Management Information System (EMIS) offering. EMIS will offer tools for visualization and analysis of real-time energy data to help customers capture low-cost energy saving opportunities from re-commissioning and behavioral and operational changes. This new offering will be positioned as either a stand-alone program to both commercial and industrial customers or as an enhancement to the PE program.

Xcel Energy's Process Efficiency program has remained an important component to the overall success of Xcel Energy's DSM Colorado portfolio since its inception in 2009. Overall the original elements that were put into place at the beginning of the program are continuing to prove their value and driving the program to meet saving targets. The partnership that the program team has developed with customers is continuing to show results as more customers participate in the program and as legacy customers complete larger and more complex projects.

## **Rocky Mountain Power SEM Program Offering**

Rocky Mountain Power, the customer-facing name for PacifiCorp's operations in Utah, Wyoming, and Idaho, has had years of success in achieving goals within its business program. In 2012, Rocky Mountain Power initiated a program design to establish energy management program offerings, based on the following reasons:

- The energy efficiency market was maturing, with much of the low hanging fruit for energy measures being exhausted from previous program efforts
- Energy management offerings had proven successful elsewhere to the point that PacifiCorp could be confident in the program approaches being proven out
- While previous customer satisfaction levels had been high, there was an interest to continue to deepen customer relations

In this program design, Rocky Mountain Power's energy management offerings were delineated between Re-commissioning, Industrial Re-commissioning, Persistent Commissioning and SEM. Based on experience deploying the program, Rocky Mountain Power realized that the delineations were somewhat artificial and not in the customer's best interest. Recently, Rocky Mountain Power realigned the offerings to be one energy management offering that focuses on system level optimization on a shorter term basis, typically shorter than one year. Customers who can commit to more widespread changes and address organizational issues through a longer

duration engagement are considered more appropriate for Rocky Mountain Power's SEM offering.

## **Customer Engagement**

To be eligible to participate in Rocky Mountain Power's SEM program offering, customers must be in an eligible rate class and can come from an industrial, institutional or commercial background. Ideal candidates for the SEM program offering have some of the following attributes:

- Size, ideally with larger than 300 kW peak demand
- Experience with strategic initiatives across multiple sites
- Commitment to sustainability
- Customers in regulated industries that have familiarity with process improvement
- Well- established management systems for quality or safety, or with continuous improvement practices like Lean or Six Sigma
- Customers who actively participate in Rocky Mountain Power incentive offerings
- Companies in a stable growth mode

Rocky Mountain Power program managers target these customers to participate, and gain preliminary interest to participate in the SEM program offering.

The SEM provider conducts a preliminary walkthrough to assess customer viability and readiness, and from this they propose a scope and budget to engage the customer. This walkthrough captures:

- Organizational information. Level of executive support for energy efficiency, willingness/ability to change, presence of management systems
- Technical information. Facility magnitude and energy using systems, improvement opportunities, variability of operations.

The Rocky Mountain Power program manager works with the customer to sign an SEM program commitment letter that describes customer expectations within the effort.

## **Phases of Implementation**

With the customer committed to participate, the SEM provider begins its implementation effort. While this is somewhat customized from one customer to another, the common phases are Ramp-up, implementation, and Ramp-down.

Ramp-up. The SEM provider implements tools to establish baseline conditions. This includes:

- Baseline establishment: the SEM provider gathers and records energy and driver data from the baseline period to create a predictive energy consumption model. In addition, the SEM provider gathers qualitative information including previous history with projects, previous challenges and successes
- Customer kickoff: the SEM provider conducts a kickoff meeting with the customer to confirm timelines and to set expectations for the customer's energy team members

Implementation. Over the course of ten to twelve months, the SEM provider conducts a series of activities to implement SEM concepts with the customer. These activities are ordered to produce the optimal results for the customer. These activities include:

- Workshops: the workshops dive deep in certain topics, including employee engagement, technical models, and opportunity identification
- One on one consulting: individualized consulting is provided over the phone or in-person, targeting improvement areas where the customer has particular challenges or prioritized improvement areas
- Energy Walkthrough and Model Development: energy walkthroughs identify behavioral and operational savings that are beyond Rocky Mountain Power's existing program offering. Alongside this walkthrough, the SEM provider creates a predictive statistical model used to demonstrate energy savings.
- Energy Management Assessment: the SEM provider facilitates an assessment of how energy is integrated into the customer's business practices to help the customer understand current state and to identify and agree upon priority focus areas

Ramp-down. After completing major SEM implementation, the SEM provider executes a series of activities to solidly close out the engagement. These include:

- Energy Program Review: the SEM provider supports the customer's energy champion and team to conduct a formal review of their accomplishments and coming year's plans for the customer's executives.
- Transition Meeting: the SEM provider conducts a meeting with the Rocky Mountain Power program manager to debrief on the customer's successes and challenges and to make plans for how to best engage the customer after their completing the SEM offering
- Final SEM Report: the SEM provider creates a report which includes estimated energy savings based on savings numbers accrued through the end of the reporting period using the statistical model created during Ramp-up

## **Program Results**

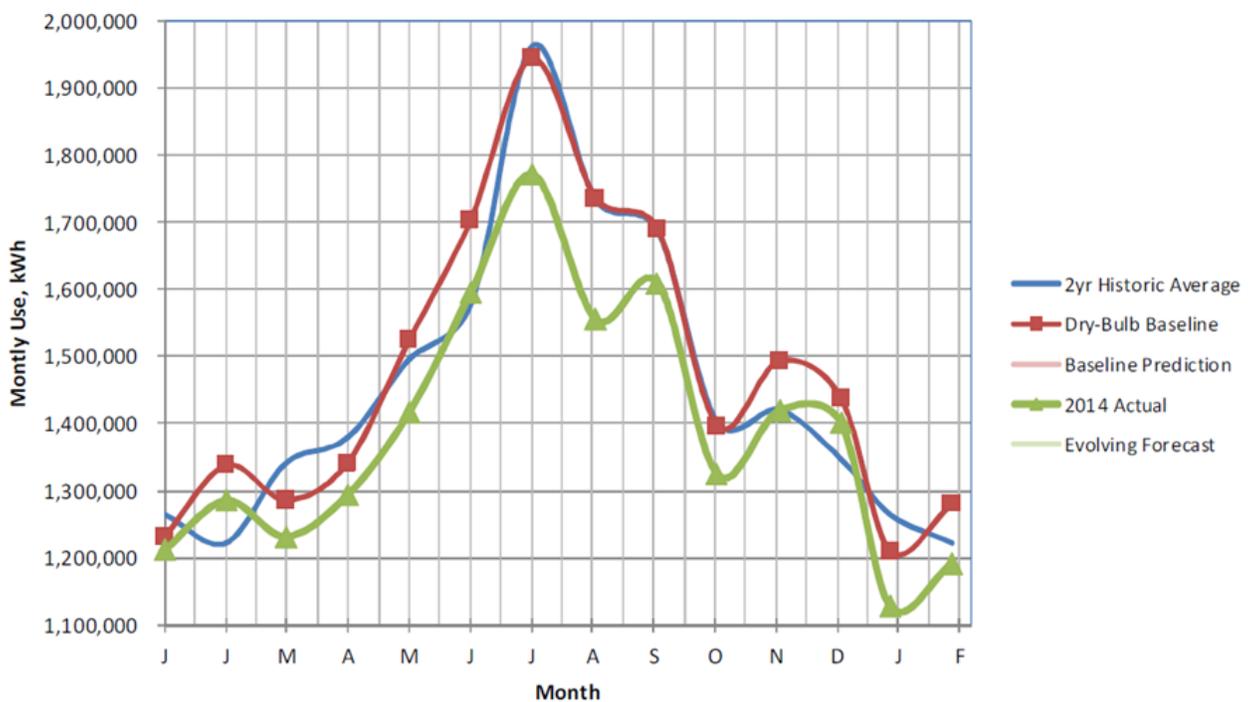
After completing a thorough program design process, Rocky Mountain Power launched its SEM offering in 2014. As of spring 2015, five organizations are engaged in the SEM offering. Some participants will close their SEM engagements in 2015, while others are just beginning down the implementation path.. All of these customers have the following attributes:

- Positive customer satisfaction from their experience
- Statistically sound energy models to estimate savings
- Behavioral and operational measures identified that the customers are acting upon
- Solid progress in implementing organizational change actions

Rocky Mountain Power has found varying results within different segments and customer types. Particular success has been found in the healthcare industry and water/waste water fields. Healthcare institutions to date have saved more than 1,000,000 kWh onsite in the first 12 months

with minimal capital investment.<sup>1</sup> The below chart illustrates a year over year improvement on one hospital campus. SEM measures identified and implemented include items such as programming changes to the chiller plant, fountain pump timers and economizer and mixed air controls as well as adjustments to AHU fan and space temperature schedules and VAV system airflow setpoints.

Rocky Mountain Power has also found that water purveyors find great value in participating in a cohort model of SEM with other like water systems. Each cohort to date is poised to save 1.5-2 million cumulative kWh. The existing cohorts have anywhere from 3-5 water utilities participating. Through this model Rocky Mountain Power has been able to engage high energy intensity customers with higher levels of potential savings. The cohort model has provided opportunities for customers who are not large enough to engage in SEM based upon their sole usage, but in an aggregate model bring great value.



A more careful and specialized approach has been found necessary in large industrial customers in order to retain program cost effectiveness. Due to the competitiveness of private industry a cohort approach has not gained footing. SEM’s time commitment has also been a deterrent to participation. Rocky Mountain Power currently has two large industrial customers participating and is actively planning to evaluate the engagements to learn further administrative lessons.

The estimated kWh savings for the five current SEM engagements at project close is about 7.5 million kWh, or 1.5 million kWh per engagement (first year savings). Rocky

<sup>1</sup> Although healthcare is not an industrial sector, these findings also apply to and help inform Rocky Mountain Power’s efforts with its industrial customers.

Mountain Power expects these projects to over deliver due to the customer buy in and culture of continuous improvement being installed in the participant base.

## **Future Program Steps**

Rocky Mountain Power is currently looking to be more strategic in its SEM program offering, and potentially expand the numbers of customers engaged in SEM. This will support energy savings goals that are continuing to increase across Rocky Mountain Power's jurisdictions. Rocky Mountain Power is considering how to further utilize the the multiple customer cohort model, which has been demonstrated successfully in the Northwest, as well as examining how an EMIS program may integrate into the SEM offering. In addition Rocky Mountain Power will utilize a small number of very specialized SEM program administrators to implement the SEM program, creating an additional level of focus. This will support Rocky Mountain Power's balanced outcomes:

- kWh Savings: producing cost-effective energy savings
- Prudent Processes, Policies and Cost: ensuring that the processes and other efforts are both technically sound as well as appropriate for the level of savings that will result; an outcome of this will be positive evaluation outcomes
- Regulatory Integrity: conducting the SEM engagements according to the program filing and at a level that can stand up to any evaluation scrutiny
- Customer Satisfaction: conducting the SEM engagements so that customers will see short and long-term value from their relationship with Rocky Mountain Power
- Culture of Continuous Improvement: executing the SEM program engagements with program management metrics and processes to drive improvement

Rocky Mountain Power looks forward to the SEM program offering delivering a growing part of overall commercial and industrial energy savings in coming years.

## **Lessons for other Utilities**

There is no one standard formula for developing a successful SEM program. Xcel Energy has entered the SEM program area by adding strategic elements to a technical assistance and custom incentive program for industrial customers, its Process Efficiency program. The program has continued to build participation and energy savings. Xcel is also considering adding incentives for energy management and information systems, which also would help Process Efficiency and other industrial customers move towards SEM.

Rocky Mountain Power has entered the SEM field by offering incentives for measured energy savings from operations and maintenance improvements, and customized training in the principles of SEM. It has started by engaging a relatively small number of customers so far, but it is preparing to scale the programs up in a way that works for the utility and its customers.

Rather than following a standard approach, these two examples demonstrate that it is possible to be creative in developing an approach or a suite of SEM programs that make sense for the utility. With a host of new utilities entering the SEM area, no doubt other unique approaches are also being developed, as the benefits of SEM for industrial companies and their utilities continue to spread.

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