Strategic Energy Management: A Framework Approach

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ABSTRACT

In an ideal world, all companies would incorporate energy management as a way of doing business. Some pioneering organizations are beginning to do just that and are at the forefront of strategic energy management (SEM) programs. This presentation describes an SEM model, highlights our experiences working with clients on implementing it, and provides lessons learned from enrolling and supporting customers in a strategic management approach. Utilities will understand elements to consider when designing and implementing successful strategic energy management programs in their portfolio.

Over the last two years, Ecova has developed an energy and sustainability model consistent with the ISO 50001 standard endorsed by the U.S. Department of Energy (DOE). The model consists of five critical elements—data, people, infrastructure, marketing and reporting, and continual improvement—that are orchestrated for holistic strategic energy management. Two nationally-recognized retail organizations will be used as case studies to illuminate how utilities can successfully approach and implement SEM programs for commercial and industrial customers.

This paper discusses the corporate drivers for energy management and how they can be leveraged for energy savings. The five critical SEM elements will be further broken down into 21 best practices, ranked in terms of indispensable program requirements, ease of adoption and implementation, and contribution to driving energy savings. Finally, it will outline the opportunities and challenges of a full SEM approach as well as possible selective and phased options. Attendees will come away with tangible insights to inform utility-sponsored SEM programs.

Introduction

In order to meet financial, regulatory and environmental objectives, electric utilities must achieve deep, consistent and reliable reductions in energy demand over the long term. Up until now, the vast majority of utility programs have emphasized savings through project-based capital improvements, particularly the replacement of existing equipment with more efficient models—an approach that leaves deeper energy savings and customer engagement opportunities on the table. A new approach is needed: one that combines energy efficiency, behavioral changes and integrated demand side management to holistically and continuously examine and manage a customer's energy usage in pursuit of deeper, long-term savings.

The business community shares this desire for a systematic approach. Businesses want to improve margins, manage regulatory risk and incorporate sustainability into their daily businesses. A holistic energy management approach can help reduce and more accurately predict energy costs, helping businesses to achieve their goals through strategic planning.

Over the last five years, utilities and businesses have explored a variety of approaches to gain predictable and reliable results. For robust strategic energy management (SEM), ISO 50001[1] has served as the guiding structure and has been deployed using a variety of implementation approaches. This paper uses experiences in Northwest and California utilities and private sector engagements to identify common attributes and opportunities for early successes, as well as how SEM approaches can be incorporated into a utility program portfolio.

Defining SEM

SEM employs a holistic approach to managing energy use. It aims to continuously improve energy performance and sustain energy and cost savings over the long term. SEM does not emphasize a technical or project-centric approach. Rather, it focuses on business practice change—shifting how organizations get things done, improving their capacity for reducing energy waste and improving energy intensity from the C-suite to the shop floor.

In the framework of ISO 500001, SEM is an adoption of traditional total quality management (TQM). It follows the "plan, implement, evaluate and modify" cycle of TQM, and is thus in many ways a familiar concept with a new application for the enterprise.

When fully implemented, SEM provides the following benefits:

- It equips and enables plant managers and staff to use energy more efficiently through behavioral and operational change.
- It provides structure to develop an ongoing pipeline of retrofits and capital projects
- It creates a framework for managing investments in efficiency, distributed generation, demand response and renewables

While the industry may agree on a standard definition of SEM, its application in energy saving programs varies greatly. Energy management approaches can be visualized on a spectrum from informal to formal, with the majority of organizations distributed somewhere along this continuum. On one end, some organizations take a less-structrured approach to incorporating energy saving practices into their operational and purchase decisions. At the other end, they take a comprehensive, proactive approach that is linked to an explicit management practice.

Energy management that isn't consciously managed often manifests as a reactive, stimulus-response cycle. As energy costs rise, the affected group attacks the issue. In the short run, energy demand flattens or falls, and the problem is deemed fixed, if only for the moment. Facilities or operations managers move on to the next crisis. Yet without a coordinated SEM approach, opportunities for long-term savings fall between the cracks or get pushed aside by these shorter-term fixes. Managers miss opportunities to change culturally ingrained behaviors, take a pass on long-term capital-planning projects, and fail to institute a systematic process to obtain reliable, consistent results. Before long, energy expenses creep up again and the rollercoaster cycle repeats.

At this point, organizations often attempt a concerted energy management effort. Unfortunately, many businesses find that they lack the ability to manage the complexity of the program or to fully articulate its value to company stakeholders. Struggling with the sheer

[1] ISO 50001 is the International Standards Organization (ISO) prescribed energy management system. It incorporates organizational policies, processes, measurement tools and project management to continually improve energy management.

multitude of required steps, businesses may cut their efforts short and drop the continuous improvement approach as too difficult.

A designated structure for such programs provides the ability to create and manage reliable energy savings on a long term basis.

Key Drivers for Utilities and Businesses

Understanding the drivers behind energy management initiatives is crucial to effectively designing a program, and ensures that the enterprise perspective is at the forefront of program design. As the list below shows, there is significant overlap and congruence in motivations.

Table 1. Utility vs. enterprise energy management drivers

Driver	Utility Perspective	Enterprise Perspective
Cost Management	At the management level, ranking protocol for energy sources puts energy efficiency and energy management first. On a programmatic, tactical level, sustained and holistic engagement may reduce start/stop administrative costs.	Utility costs are typically one of the top five controllable expenses.
Investor Expectations	Investors are aware of the increasing need to manage carbon risks. Demand management mitigates the cost of building new infrastructure.	Enterprises experience an increasing need to manage risks associated with energy and carbon
Regulatory expectations	Utilities have energy efficiency goals and, increasingly, goals for renewable and integrated demand side management.	Enterprises face energy reporting requirements[2] and increased attention to greenhouse gas emissions.
Green brand management	Utilities need to show customers, management and regulators that innovative ideas are being considered.	72 percent of consumers would recommend a company that supports a good cause over a company that doesn't (Edelman 2012), and an increasing number of companies are asking for supplier chain energy and sustainability disclosures.
Resource scarcity/physical risks	Strong demand side management reduces the need for building new power plants.	Enterprises share the goal of reducing brown-outs, blackouts and power disruptions.

2 Examples of this increased pressure include: 1) The United Kingdom's mandatory reporting for all companies listed on the London Stock Exchange, effective as of October 2013 (Carbon Trust 2014), 2) Multiple regional mandatory carbon regulation systems cropping up across the world—including China, which is currently implementing a pilot emission trading scheme (ETS) in Shenzhen (J.P. 2013), and 3) The European Union's Emissions Trading System which has been active since 2010 (European Commission 2014).

Notice the commonality between the business and utility drivers for strategic energy management—namely the desire to effectively and reliably manage cost, risk and regulatory changes while ensuring customer satisfaction.

On the other hand, utilities and enterprises prioritize these attributes differently. It is also important to note that cost savings are the main driver for enterprises's immediate action, while utilities are more interested in guaranteed measure life and institutional proof that systems are in place and will be kept in place.

SEM bridges these concerns by providing a framework through which utilities can support their customers in managing energy use. Utilities that encourage this framework will increase customer engagement and satisfaction. Using an SEM approach, both utilities and businesses can nurture their key drivers and reach their strategic objectives.

Additional polling conducted in 2013 revealed an even deeper alignment between key energy management drivers for businesses and SEM approaches. Ecova conducted a polled of nearly 500 energy and sustainability professionals, ranging from energy, facility, engineering, accounting and procurement, on their energy outlook for 2014. The results, shown below in Table 2 , revealed an emphasis on low- and no-cost efficiency efforts and behavioral changes, as well as a notable interest in the use of energy data to identify and implement capital expenditures to realize energy efficiency improvements.

Table 2. 2014 energy outlook polling results

What is your top priority for leveraging your energy data in 2014?		
Answer Options	Response Percent	Response Count
Implement no-cost, low-cost efficiency efforts	45.1%	201
Identify and implement capital expenditures to support energy efficiency projects	33.6%	150
Leverage for internal training and awareness to drive behavioral changes	13.2%	59
Other (please specify)	8.1%	36
Answered question		446
Skipped question		17

The survey results revealed an important commonality between utility and business drivers for energy management—namely a desire to use information and energy data in support of a systematic and holistic energy management approach. Further, both utilities and businesses desire early savings. These shared objectives naturally align with SEM methodologies, which emphasize data-based decision making as well as low- and no-cost improvements and engagement efforts to realize immediate and persistent savings. While many utilities are hesitant to count behavioral savings as "real" energy savings, from a business point of view, they are no-cost and help fund other opportunities. Increasingly available research on the lifetime of behavioral savings will help utilities understand the potential cost-effectiveness of these savings and determine whether or not to pursue them.

Delivering SEM

Standard SEM Program Implementation

SEM programs follow a traditional "plan, implement, evaluate and modify" cycle. The ISO 50001standard may or may not be the ultimate goal, but many utilities and consultants have used a process that is very similar. SEM programs typically include the following key steps:

- **Commit:** Commitment from top management, including goal setting, communication, resource allocation, success recognition and use of energy data in long-term planning and decision making
- **Assess:** Development of energy use and organizational baselines
- **Plan:** Building an infrastructure for SEM implementation, including establishing a team and determining accountability and communication plans, as well as development of energy intensity reduction goals and implementation plans
- **Deploy:** Implementation of identified projects, including capital investments, O&M improvements and behavioral initiatives
- **Evaluate:** Measuring and communicating progress to employees and top management
- **Modify:** Adjusting implementation plans and project prioritization based on results

Programs are implemented using either a one-on-one or cohort engagement model. The former is as it sounds—a direct, individual engagement between the program and the participant to implement SEM practices. The latter, involves multiple participants engaging with the program simultaneously, sharing their successes and challenges so that participants may learn from one another in order to refine their individual approaches.

SEM Implementation using a Framework Approach

While SEM engagements are certainly effective, the heavy emphasis on process and paperwork can prove challenging for some organizations. Also, while the project management cycle may be implemented, many organizations don't follow through. Ecova's work with retail clients has found that addressing the structural needs greatly improves adoption of SEM practices. This Five Keystone Framework Approach consists of five SEM elements, representing the five categories that best capture the necessary focus areas for building effective energy management programs. The Keystone Framework Approach assumes that an organization has a program management approach for identifying and prioritizing energy saving opportunities. The keystones are:

- **Data Keystone:** Data empowers intelligent decision-making. In turn, this helps organizations focus resources on high-impact areas and provides quantitative feedback essential for making adaptive management decisions. Creating an organizational and energy-use baseline establishes current performance and tracks trends over time.
- **People Keystone:** Leadership, communication and employee engagement are critical to the success of any change initiative that relies on sustained organizational commitment and continual improvement to push long-term success. The process must start with top management commitment, but it must then filter throughout the organization rather than be relegated to the energy manager silo. Work on energy management is a cross-

functional exercise in continual improvement. Two-way internal communication programs promote stronger buy-in from participants and generate feedback to improve programs.

- **Infrastructure Keystone:** Effectively managing and modifying the physical and operational elements that influence energy consumption is imperative for meeting energy management goals. These include buildings, equipment, and operational protocols. Infrastructure and operations innovations create new opportunities to build organizational value through new practices and investments in efficiency, renewable energy and closed-loop material flows.
- **Marketing & Reporting Keystone:** Communicating accurately and effectively with customers, shareholders and other external stakeholders maximizes energy and sustainability efforts by enhancing brand image and increasing transparency.
- **Continual Improvement Keystone:** Given daily advances in the drivers and techniques for energy management, as well as the endless changes in business operations to respond to changing markets and customer needs, ensuring success will be predicated on organizations' adoption of continual improvement process management.

The keystone approach incorporates the elements of the ISO 50001, but differs from in a few critical ways. First, it doesn't require a lot of the paperwork that is required of ISO 50001 and that is often included in utility programs, focusing instead on results. Second, the keystone approach is more holistic in its view, which enables an organization to think through and coordinate before problems occur. Third, it works with existing organizational structures, language, processes and culture which leads to higher adoption. SEM is a change management process, so leveraging existing structures improves success.

With clearly articulated strategies for each of the five SEM elements, a business is better equipped to build the foundation necessary to support long-term program success and persistent energy reductions.

21 Supporting Best practices

The five SEM elements are further broken down into 21 best practices. Very few organizations have implemented all of these, but incorporating as many as possible into existing practices provides a robust energy management structure. Organizations with an overall focus on sustainability often have additional best practices integrated into their internal processes.

Table 3.

Keystone	Supporting Best Practices
Data	Portfolio/asset data management
	Smart meter and submeter deployment
	Multipoint variable normalization
	Internal and external benchmarking
	Reporting and review responsibilities
People	Leadership commitment
	Cross-functional team development
	Ongoing outreach and engagement
Infrastructure	Facility outlier analysis

	Facility and operation audits
	Project evaluation and prioritization
	Capital improvement plan development
	Operation protocol modifications
	Remote monitoring and response
	Project monitoring and modification
	New construction guidelines
Marketing and Reporting	Reporting strategy and protocol selection
Continual Improvement	KPI and baseline development
	Trending, forecast and scenario analysis
	Opportunity evaluation
	Strategic plan implementation

Results

This section discusses the successes and challenges experienced during two private-sector SEM engagements, and identifies lessons learned as a result. It also further addresses the potential energy savings identified during SEM engagements for Northwest and California utilities.

Case Study #1

Arby's Restaurant Group, Inc., is a leading international quick-service restaurant company operating and franchising more than 3,400 restaurants worldwide. Energy represents Arby's third-largest controllable expense and, like many organizations, Arby's was facing rising energy costs. To counter this trend, Arby's leaders realized the need to devote more attention to improving operational efficiencies. The company had successfully implemented energy projects in the past but now needed a comprehensive energy management plan and a deeper evaluation of energy cost drivers.

Arby's began its SEM engagement in 2012, using the Five Keystone Framework Approach to develop an SEM plan heavy on both behavior change and retrofit investment opportunities. Management was concerned with driving savings that were immediate, reliable and lasting. The Arby's plan focused specifically on reducing and managing energy and water consumption, while ensuring that energy management became embedded into company culture and operating procedure.

Implementation is ongoing and has garnered the following results:

- Projected annual energy savings of over $1,000,000 from behavior based energy efficiency—essentially modifications to equipment on/off schedules—savings that will persist over time
- Identified over $5.5 million in potential annual savings using a combination of capital projects and behavior initiatives
- Shifted internal capital expenditure focus from replacement-as-needed to proactive management, and developed a multi-million dollar capital expense program that generated an internal rate of return of approximately 97 percent

Perhaps most importantly, Arby's strategic energy planning process resulted in a clear, data-driven, actionable roadmap. This provided the business case to gain executive approval of capital expenditures required to support energy reduction goals. "The benefits of what we are doing are being seen from the boardroom to the restaurant level," said George Condos, Arby's Chief Operating Officer. "Our strategy was clearly articulated, and gave visibility to empower team members all the way down to the restaurants, where the general manager has the ability to improve his or her store profitability." Additionally, this roadmap explicitly guides Arby's through any challenges that may arise as Arby's moves forward with program implementation and continuous improvement. Overall, the five keystones present a more detailed approach of the essential elements for success than the classic plan-do-check-act, which is mainly embedded in continual improvement.

Case Study #2

In 2012, a western hotel chain with approximately 30 corporate owned sites across ten states completed a strategic planning process to guide the implementation of a company-wide energy and sustainability program. The hotel chain's objective was to reduce energy consumption by 10 percent in five years. To achieve this goal and with limited capital investment resources available, the hotel chain recognized that it needed a comprehensive and strategic approach that emphasized employee engagement to meet energy reduction and cost control targets. The Five Keystones Framework Approach enabled the hotel chain to focus on the energy management elements that made the most sense for their organization, given their needs and available resources. Below are some highlights of the issues the hotel chain encountered during plan development and examples of implementation responses to those issues. However, it is important to understand that the success of this program was driven by utilization of selected best practices in all five Keystones.

Commitment needs to equal accountability. The plan established regular and transparent performance reporting across the various sites (Data Keystone) to drive accountability and competition, tying the cost of resources used to the job responsibilities of general managers and facility managers, who have responsibility for budgets impacted by energy, water and waste services. While adding this level of accountability, clear guidance was provided on how to manage these resources (People Keystone).

Focus training efforts on highest impact employee groups. Key impact groups, such as facility managers and housekeeping staff, were provided with very direct and actionable guidance, training and expectations (People Keystone). For example, housekeeping staff received training, tools and oversight to help them reach the company's energy and sustainability goals through their day-to-day tasks. These efforts ensure that the simple activities—such as turning off lights in unoccupied areas—are reliably integrated into the housekeeping routine. The hotel chain also implemented a visual weatherboard system, which helps the housekeeping employees easily identify how to adjust the room thermostats based on the day's outdoor temperature (Infrastructure Keystone – operational protocols).

Target employee communications to maximize effectiveness. By working with the organization's communications and training teams along with department leads, the hotel chain

found opportunities to integrate guidance into existing culture, process and communications channels. For example, the hotel chain began incorporating energy into their "values statement," which is regularly referred to by all employees, and added energy topics to regular General Manager and site focused team meetings and communications (People Keystone).

Follow up with performance reporting. The hotel chain continues to engage their staff through trainings, sharing of performance metrics, and highlighting successes of individual properties through a well planned communications campaign. Additionally, the hotel chain annually surveys employees to evaluate their awareness of energy and sustainability efforts and goals, enabling them to see where targeted efforts are having impact and to identify employee groups or locations that may need further assistance. Most importantly, the hotel chain regularly shares performance results all employees to bring home the message that performance is a direct result of every employee's efforts, every day (Continual Improvement Keystone).

Through this focus on operational changes and employee engagement, alongside other elements of the strategic resource management plan, the hotel chain was able to save six figures and reduce energy consumption by 6.5 percent (as measured by weather and calendar normalized utility bills) just two years after implementing the plan. With this strategic and holistic approach, which involved everyone from executives to frontline employees, the organization managed to achieve a true cultural shift that is instrumental in reaching their energy and sustainability goals and providing long-term commitment to ongoing attention and action in this area.

The Energy Savings Are Real

In addition to the case studies described above, Northwest and California utilities have implemented a number of SEM engagements, focusing on commercial and industrial facilities.

In all cases, the primary immediate energy savings achieved in these programs were derived from operation and maintenance (O&M) or behavioral energy saving initiatives. Energy savings of between 2-8 percent[3] were derived by the systematic implementation of straightforward practices such as changing set-points, shifting hours, and turning off lights or other equipment when not in use.

Having a formal SEM plan, with leadership support and employee engagement, was critical to the implementation of these initiatives and realization of resulting energy savings. In non-SEM programs, O&M savings degrade without reinforcement (Kramer 2014). Having institutionalized policies in place—like those found in SEM engagement—is critical to ensuring reliable and persistent energy savings from low- and no-cost improvements, like O&M and behavioral changes.

Conclusion: Integrating SEM into Utility Program Portfolios

The following section describes several key lessons—identified by comparing utility and private sector SEM engagements—for utilities looking to integrate SEM programs in their portfolios.

[3] Information on the impact of behavioral savings is increasingly available. Arby's has realized between 5-8 percent operational savings. A retail chain found that they achieved 8-10 percent savings through O&M. PSE cites 3-5 percent savings from their SEM engagements.

- **Timeframe for energy savings:** It is possible to realize immediate energy savings from behavioral and O&M improvements, such as shifting lighting and HVAC practices, within one year of agreement to adopt an SEM framework. However, energy savings from capital expenditures, such as retrofits or incorporation of new technologies (e.g. renewable, distributed generation) need time to be realized. Leading utilities provide at least a two-year and ideally a fove-year period to see savings above and beyond traditional programs.
- **Recruitment:** Since SEM demands a high and ongoing organizational commitment, it is not a quick decision for many businesses. It can take several months for a decision to be made. This doesn't seem out of line given the thoughtfulness and long-term view that is required, but needs to be considered when designing an SEM program.
- **Energy Savings:** The primary perceived value from end customers is in the energy savings. SEM engagement participants appreciate the baseline, recommendations and monitoring aspects of the engagement. While they understand the organizational components, it takes active effort to get those activities incorporated into business practices.
- **Process:** An ISO 50001 SEM approach requires significant paperwork. A common observation among participants is that this is inconsistent with other management practices—for example, arguing that "We don't have this level of documentation and process for HR-related activities." Further, participants generally want to see the benefits of participation before fully committing to a process.
- **Behavioral savings or not?** Utilities can continue the ongoing dialogue about whether behavioral savings are persistent. Keeping them as part of a program design and promotional activities is a good idea because businesses find them valuable. Persistence isn't the critical issue for businesses, and once change is in place, utilities will garner the benefit whether they are counted or not.
- **Employee Time Commitment:** SEM requires a significant investment on behalf of the organization. However, businesses that are generally accustomed to utilities providing most of the resources for energy efficiency programs may be surprised at the the employee time required to make the engagement successful. To counter this, it is critically important for utilities to help businesses frame the costs and benefits of an SEM engagement, which will help ease their suspicions.
- **Timeframe:** The relatively short, bounded timeframes of traditional utility programs are clearly different from the long-term view utilities are asking businesses to take when adopting SEM. To help businesses adjust to this new way of thinking, utility programs need to consider SEM as a mechanism to engage in customer relationship management. Traditional, project-based programs put pressure on businesses to sign up and deliver savings, which can inadvertently cherry-pick the organizations that already leaning towards institutionalized energy management—an interest that is better suited to the optimized long-term savings found in SEM engagements, rather than the short-term focus of traditional project-based programs.
- **Short-Term vs. Long-Term Cost-Effectiveness:** Ironically, most utilities are looking for a shorter payback in terms of cost-effectiveness than private enterprises when it comes to SEM engagements. SEM programs require a significant time commitment from participants. This means that the enrollment process is more complex and time consuming compared to other programs, causing a potential problem for utilities that

want to achieve energy savings immediately. Short implementation periods force activities to focus on the short term at the expense of building the organizational business infrastructure needed to get the deeper and more persistent energy savings the utility wants on the table.

- **Measurement & Verification:** Most utility program designs require organizations to sign up for a very concrete and high administrative burden while promising less concrete benefits. As an alternative, utilities might consider using milestones with deemed savings to reduce the administrative burden on participants, leading to higher customer satisfaction and propensity to participate.
- **Corporate versus local leadership:** A critical aspect of SEM is leadership. Without it, the business practices cannot be implemented. ISO 50001 requires full senior level support and a full organization wide integration of people, management, etc. Most large, multi-site organizations are not willing to be driven by regional utilities for enterprise-wide strategies. Conversely many small/medium size businesses will not commit the time or resources for a full-fledged engagement. By focusing on regional senior management, rather than national management, utilities may increase propensity to participate by targeting applicable decision makers with a direct vested interest in the particular sites being targeted.

Going forward, SEM has the opportunity to become a critical element of utility program portfolios. In the early days of energy efficiency, straightforward rebate programs were a cost-effective means of picking the low hanging fruit. As the industry moves to gaining deeper and more complex savings, new approaches, like SEM and the Five Keystone Framework Approach, are needed. That being said, one size does not fit all. There are many levels of strategic energy management, from basic energy plans to ISO 50001. New ideas and configurations are being tried in many places. SEM emphasizes using data and information to develop a personalized energy management approach—one that can sustain an organization for the long term. Utilities, in integrating SEM into their program portfolios, should take a similar approach—identifying and utilizing the components of various SEM approaches to provide the model best suited to their individual strategic goals and integrated energy management portfolio.

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