

Energy Trust of Oregon
Strategic Energy Management Intro Pilot
Evaluation Report

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MEMO



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To: Energy Trust Board of Directors

From: Kathleen Belkhat, Commercial Sector Project Manager
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Subject: Staff Response to the Commercial Strategic Energy Management
Introductory (SEMi) Pilot Evaluation Report 1

The Commercial Strategic Energy Management Introductory (SEMi) Pilot is Energy Trust's first attempt to engage smaller commercial customers to teach them basic SEM concepts. The idea behind the pilot was to provide customers that were not good candidates for the full Commercial SEM offering with light SEM training on a much more limited basis. The pilot also attempted to apply a prescriptive savings approach with semi-deemed savings to lower the cost of delivery, rather than modeled savings based on billing analysis.

The pilot was not offered in 2014 as a result of preliminary and anecdotal feedback and evidence that substantial refinement would be needed before expanding this offering. In addition, the other components of the SEM program were in flux, making it unclear how this offering would fit with other potential offerings. This type of program offering will be put on hold until 2015. In the meantime, the program is putting in place new SEM curriculum, delivery contractors, and delivery methods to streamline SEM to be more standardized. At the same time, the program plans to offer SEM as a continuum to fit the needs of specific customers. An introductory approach to SEM may fit somewhere along that continuum.

The program plans to make a number of enhancements to the introductory approach to SEM tested in the SEMi pilot, in response to this evaluation. Moving forward, any

introductory offering will be at least 6 months instead of 3, to allow ample time to implement recommended measures. Energy Trust staff and contractors will anticipate the necessary recruitment time to ensure full commitment, including the appropriate level of staff involvement, prior to a scheduled launch. Energy Trust plans to reinforce the time commitment and required customer staff participation prior to enrollment. This would include designating executive level participation in the organizational assessment to set the stage for implementation, and energy champions at each site to complete energy conservation measures in a timely fashion.

In order to provide useful recommendations and encourage progress with energy management strategies in a cost-effective manner, Energy Trust plans to revise the savings methodology prior to rolling out an introductory SEM offering in 2015. Documentation of potential energy savings per energy activity is one way to do this and to help customers prioritize implementation. Energy Trust will also explore prescriptive methods to disaggregate facility-specific energy usage possibly by applying an algorithm that takes into account individual equipment and building type. Other strategies will also be explored that provide the level of detail and accuracy useful to provide customers guidance that will help them prioritize implementation of SEM activities.

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Executive Summary

This report presents the results of the evaluation of Energy Trust of Oregon's Strategic Energy Management Introduction (SEMi) pilot as implemented in the last three months of 2013. SEMi is a light-touch, event-based program offering designed to introduce strategic energy management (SEM) to customers who do not meet energy usage or organizational commitment screening criteria for the full commercial SEM engagement. Over the course of 12 weeks, participants participate in a variety of events, including an Opportunity Assessment, Energy Day, and Organizational Assessment, designed to identify opportunities to save energy. Participants qualify for incentives based on the number of energy saving measures implemented and the priority and level of effort required to complete each measure.

The first and only participant in the SEMi engagement implemented a total of 5 different electric measures and 1 gas measure at 6 of its grocery stores. Because the participant did not implement the minimum number of measures required by the program to qualify, they did not receive any incentives. For those energy savings actions that were taken during the implementation period (roughly mid-September to mid-December), estimated savings are 248,300 kWh and 114 therms, with 95 percent of kWh savings being accounted for by adjustments to refrigeration control systems.

This evaluation included both process and impact elements. The process evaluation sought to analyze the delivery process and how the SEMi pilot was perceived by program staff as well as the initial program participant. The impact evaluation reviewed the savings methodology used and the resulting savings values. The program estimated savings for SEMi by applying a percentage reduction to the baseline usage attributable to a specific end use (e.g., refrigeration, lighting) as determined by the end use breakdown for food stores in the 2003 Commercial Building Energy Consumption Survey (CBECS) data. Impact conclusions and recommendations are presented below.

Impact Evaluation

Conclusion: The savings estimation method used for the SEMi pilot appears to have provided reasonable savings estimates for the limited number of measures implemented by the single participant, but there is little confirming evidence from other published sources for the percentage savings associated with individual actions or measures.

Recommendation: In future engagements, we recommend that the implementation team try alternative methods such as disaggregating facility-specific energy usage based on an audit or using a simple engineering algorithm when equipment type and capacity data are available.

Conclusion: Approximately 95 percent of the claimed savings were due to adjustments to the participant's refrigeration controls systems, which were identified as an opportunity only because the refrigeration contractor for the store chain was participating in the walk-through.

Recommendation: When refrigeration accounts for a large percentage of energy usage (as with restaurants and groceries), it should be standard practice in all SEM engagements to have the refrigeration contractor (or an in-house engineer, if available) participate in the walk-through.

Conclusion: While only a limited number of measures were implemented within the 12 week timeframe, the SEMi engagement appears to have helped the participant identify additional operational adjustments and capital projects that will be pursued in the future.

Recommendation: Consider tracking implemented measures beyond the initial participation period, as is done with the full commercial SEM program.

In addition to reviewing program plans, progress reports, and documentation, the process evaluation used staff and participant interviews and participant feedback forms to analyze the effectiveness of program delivery. Process conclusions and recommendations are presented below.

Process Evaluation

Conclusion: Participant and implementation contractor staff said that the effectiveness of the SEMi engagement was limited by its brief duration, and that twelve weeks is simply not enough time, unless participants do extensive preparatory work before the official engagement starts.

Recommendation: Commit to a longer engagement period, with several weeks upfront to set up the needed organizational structure and up to several additional months after the Energy Day to allow time to implement recommended measures – even if program staff are not extensively involved in the latter months. For optimum effectiveness, both engagement length and timing should be tailored to the characteristics and needs of the participant.

Conclusion: Engagement of multiple employees at all levels of the company was not possible in light of the short time frame, the time of year when SEMi was initiated for this participant, and participant-specific issues regarding operations and maintenance staff turnover.

Recommendation: Ensure that all sites that are expected to participate commit to having at least one representative at the Energy Day. Also, provide participants with a checklist of who should be involved and a reasonable estimate of the amount of time they will need to commit.

Conclusion: The Organizational Assessment is more useful if participants are prepared and if the appropriate number and level of decision makers are involved. This was not the case for the participant.

Recommendation: Enable participants to review the questions and issues discussed in the Organizational Assessment ahead of time so that they can provide more thoughtful, accurate

responses. This would also ensure the involvement of the appropriate management level representatives whose input is necessary to gain meaningful feedback on these questions.

Conclusion: The broad characterization of opportunities by priority and level of effort is useful as a screening tool, but does not provide participants with much guidance in determining which measures to implement first.

Recommendation: To facilitate prioritization of recommended measures, the implementation contractor should conduct a post-Energy Day analysis giving the participant the tools to conduct a cost-benefit analysis. This could be done by providing a rough estimate of potential savings for each measure based on the importance of the end use and the likely percentage savings. Existing data sources (e.g., DEER database, Technical Reference Manuals from other states) could be used to provide order of magnitude estimates of associated costs.

1. Introduction

This report presents the results of the evaluation of Energy Trust of Oregon's Strategic Energy Management Introduction (SEMi) pilot as implemented in the last three months of 2013. SEMi is a light-touch, event-based program offering designed to introduce strategic energy management (SEM) to customers who do not meet energy usage or organizational commitment screening criteria for the full commercial SEM engagement.

To deliver the SEMi pilot, Energy Trust contracted with Ecova -- one of the two Commercial Technical Service Providers (CTSPs) currently delivering the "full" commercial SEM program to large, multi-site customers. As the name suggests, the SEMi pilot was meant to introduce SEM to smaller customers who have multiple, relatively similar sites but are not willing or able to commit to full SEM implementation. In contrast to the full year of participation required for commercial SEM, the SEMi engagement was designed to last approximately 12-14 weeks. The engagement begins with initial organizational and planning work, leading to a full-day customer training session known as an "Energy Day" where SEM concepts are introduced and savings strategies discussed. In addition to an assessment of organizational energy management practices, the Energy Day incorporates Opportunity Assessments based on walk-throughs of one or more sites, and the resulting findings form the basis for recommended operational improvements.

The rationale behind the SEMi approach was that targeting restaurant, grocery, and hotel chain customers would make it possible to leverage results from a single site where savings opportunities are identified and implemented. Replicating those actions and savings at multiple locations would help address the high cost of achieving savings using Ecova's one-on-one approach relative to the alternative cohort approach¹. For the SEMi pilot, an overall 2 percent reduction in portfolio energy usage was set as the goal for each participant.

Incentives are offered based not on actual or estimated savings, but on the number of energy saving measures ("activities") implemented at each eligible site as identified in the Opportunity Assessment based on results of the previous walk-through, excluding any that are eligible for incentives through other Energy Trust commercial offerings. The incentive amount is based on the priority and level of effort required to complete each energy savings measure, per the matrix in Exhibit 1-1.

¹ As reported in the first year evaluation of the commercial SEM pilot and shown in Exhibit A-1 of the Appendix, average costs of first year SEM savings were about \$57 per MMBTU for the one-on-one approach, compared to about \$13.50 per MMBTU for the cohort approach.

Exhibit 1-1 – Incentive Structure



To qualify for incentives, customers must implement a minimum average of 10 measures per site, including an average of at least 5 high priority measures per site. Customer incentives are capped based on the energy use of all participating facilities, as shown in Exhibit 1-2.

Exhibit 1-2 – Incentive Caps

Electric Use	Gas Use	Incentive Cap
8,000,000-15,000,000 kWh	> 60,000 Therms	\$4,000
15,000,001-25,000,000 kWh	> 60,000 Therms	\$6,000
> 25,000,001 kWh	> 60,000 Therms	\$8,000

Savings are estimated from a top down analysis of behavioral and operations and maintenance changes. For each measure, percentage savings estimates are applied to the applicable end use share of overall usage, based on the results of the 2003 Commercial Building Energy Consumption Survey (CBECS).

2. Program Activities

The sole participant in SEMi operates over ten grocery stores in Oregon, all of them in Energy Trust territory. While all stores were eligible, measures were implemented at only 6 of the stores.

Implementation timeline

Exhibit 2-1 presents the time frame for the SEMi engagement with the participant.

Exhibit 2-1 – Implementation Timeline

Event	Date
Recruitment Presentation	8/22/2013
Enrollment and Executive Commitment	9/13/2013
Pre-Energy Day Site Visit	9/23/2013
Energy Day – Organizational Assessment	10/4/2013
Energy Day – Opportunity Assessment	10/4/2013
Spot Check of Implemented Measures	12/12/13
Final Report	12/20/13

The 12-week implementation process led to a compressed schedule, with time constraints being exacerbated by the fact that the end of the year is the busiest season for food stores. In fact, the spot check of implemented measures was delayed at the participant's request until after Thanksgiving because of the holiday rush.

Measures Implemented and Estimated Savings

A total of 4 different electric measures and 1 gas measure were implemented at 6 of the participant's stores. Because not enough measures were implemented, the participant did not qualify for any incentives. For those facilities where energy savings actions were taken during the implementation period, annual baseline usage and estimated savings are summarized below in Exhibit 2-2.

Exhibit 2-2 – SEMi Pilot Electric and Gas Savings

Store No.	Electric Baseline Usage (kWh)	NG Baseline Usage (therms)	Refrigeration System Controls Savings (kWh)	Kitchen Hoods Turned Off Savings (kWh)	Dishwashers Turned Off Savings (kWh)	Air Curtain Savings (therms)	Lighting Shutdown S.O.P. Savings (kWh)	Electric Savings Total (kWh)	Electric Savings %	NG Savings Total (therms)	NG Savings %
Multiple	7,922,400	172,060						0	0.0%	0	0.0%
1	2,216,500	52,256	63,264	2,109			4,891	70,264	3.2%	0	0.0%
2	1,635,200	39,560	46,673					46,673	2.9%	0	0.0%
3	1,964,700	62,062	56,077					56,077	2.9%	0	0.0%
4	1,341,000	29,908	38,276					38,276	2.9%	0	0.0%
5	1,087,800	19,455	31,049					31,049	2.9%	0	0.0%
6	1,763,000	34,193		1,677	428	118	3,890	5,996	0.3%	118	0.3%
TOTALS	17,930,600	409,494	235,339	3,786	428	118	8,781	248,334	1.4%	118	0.0%

Note that the vast majority of savings came from adjustments to refrigeration systems controls. The adjustments were made by the refrigeration contractor, who was present for the preliminary walk-through conducted at one of the stores. If this individual had not been present and noticed that the floating head and suction pressure set points had been improperly adjusted or overridden, this opportunity would not have been identified and savings would have been very small indeed.

3. Evaluation Goals and Scope

The goals of the SEMi pilot evaluation are to determine whether this “light touch” approach is viable for introducing SEM to smaller customers. The evaluation is designed to help Energy Trust decide whether this approach should be tried again, either modified or in its current form, or whether it simply is not practicable. As part of those overarching goals, the evaluation had the following objectives:

- Documenting processes and project costs for the SEMi pilot as delivered to the first participant, particularly in comparison to the initial implementation plan.
- Assessing customer satisfaction, engagement, and success with various aspects of the SEMi pilot, barriers to achieving goals and potential changes to the program design that might help overcome barriers.
- For the multiple sites operated by the participant, assessing whether SEM practices are being transferred to all locations.
- Assessing the energy savings calculation methods and assumptions used by Ecova to ensure that they are using a valid approach and providing credible savings.
- Determining the extent to which senior management at the participating firm has adopted SEM plans and procedures as an integral part of their business.

This evaluation does not address persistence of savings and follow-through with investment in capital energy efficiency improvements, which were outside the evaluation scope.

4. Methodology

Since only a single firm participated in the SEMi pilot, the evaluation focused on the collection and analysis of customer- and project-specific information. By assessing how this individual customer participated in the pilot, what actions they took and what savings they reported, we were able to understand both the processes and results of the initiative. Both secondary and primary data were used to support this analysis.

A) DOCUMENT REVIEW

For this evaluation, we reviewed program documents, materials, forms, monthly reports, invoices and project tracking data. The aim of this review was to thoroughly understand the pilot goals and processes and how SEMi fits with Energy Trust's overall strategy for commercial sector energy savings. Specific items reviewed include:

- Program results describing the participant's enrollment and actions taken.
- Documents showing the participant's plans to implement SEM.
- Workshop/meeting notes and presentations, as well as workshop/meeting evaluations completed by the participant after the Energy Day session, including comments and suggestions for improvement.
- A list of recommended actions developed by Ecova and participant staff following the Opportunity Assessments conducted at the Energy Day.
- Participant savings estimates, including a description of the underlying assumptions and data sources used to estimate savings compared to the regression-based savings methodology originally proposed.

B) PRIMARY DATA

Primary data were collected through interviews with five program staff and the participating firm. We interviewed staff at both Energy Trust and Ecova. It should be noted that while the Energy Champion at the participating firm was interviewed in detail, the Executive Sponsor and two other individuals involved in the Energy Day provided relatively limited feedback, despite efforts by the Energy Champion to encourage their cooperation.

5. Results

A) IMPACT EVALUATION

Unlike most impact evaluations, where the evaluator develops an independent estimate of energy savings, the goal in this evaluation was to review the approach used to calculate claimed energy savings and determine whether or not the savings estimates are reasonable. While the original program design anticipated that savings for the SEMi pilot would be estimated using regression analysis (as is done for the full commercial SEM program), Energy Trust realized that this approach would be data intensive, costly and difficult to implement. As a result, an alternative method, discussed below, was used to develop savings estimates.

Review of Savings Approach

Based on the final report and savings estimates workbook, electric savings were claimed for a total of six facilities, as shown previously in Exhibit 2-2. The claimed savings level varied based on the location and ranged from a minimum of 0.3% of store usage to a maximum of 3.2% of the store usage. Only one facility claimed gas savings. The savings for this location was 0.3% of the facility gas usage.

The savings for each location were based on the total usage of the facility and the specific measures claimed for that location. For each measure type, the claimed savings were based on the total facility usage, the expected percentage of usage associated with the end use (lighting, HVAC, refrigeration, etc.) where the savings will be seen, and the expected percent reduction in usage for that end use.

Approximately 95% of the claimed savings were due to refrigeration controls. Based on the documentation provided, it is not clear what upgrades were made to the refrigeration systems, other than that the controls and pressure set points were evaluated and the bandwidth was increased. Floating head and suction pressure controls were mentioned in the Estimated Savings Methodology section of the savings calculation workbook, but it was not clear if the facilities already had floating head/suction pressure controls that were repaired or revised, or if these controls were installed for the first time. It is also not clear what other controls or updates were completed.

For each facility, the refrigeration system usage was assumed to be 57% of the total facility usage, based on data from the 2003 Commercial Building Energy Consumption Survey (CBECS). This approach does not account for any variability for these sites from the average CBECS facility usage, which are based on national averages. Additionally, for each site, the savings are assumed to be 5% of the refrigeration system usage, regardless of the specific site conditions or controls upgrades implemented. Because of the minimal information, it was not possible to fully evaluate the accuracy of the claimed savings, but it is possible to say that the

claimed savings are not unreasonable when compared to other sources. For example, according to a recent report on supermarket refrigeration by the California Utilities Statewide Codes and Standards Team the expected savings due to the implementation of floating head pressure controls at a typical supermarket was approximately 80,000 kWh, depending on climate zone. Approximately an additional 30,000 kWh of savings can be achieved due to the installation of floating suction controls. An average of 47,000 kWh of savings per store was claimed for the SEMi project reviewed. While this value would be conservative for the installation of new controls, it is probably high for modifications to existing floating head/suction pressure systems.

Approximately 2% of the claimed electric savings were due to turning off kitchen hoods at two stores during hours that the stores are closed. Based on the provided documentation, it appears that kitchen hoods were being left on approximately 25% of the time the store was not open. No information was supplied on the kitchen hoods that would indicate sizes, cubic feet per minute (CFM) levels, or any other characteristics.

Turning off the kitchen hoods was assumed to save 1% of the cooling and ventilation energy for the store. The cooling and ventilation energy usage was assumed to be 10% of the total facility usage based on the CBECS data. Again, this approach does not account for any variability for these sites from the average CBECS facility usage, or the expected savings due to the actual measures completed. Because of the minimal information, it was not possible to fully evaluate the accuracy of the claimed savings. However, it is possible to say that the claimed savings are not unreasonable. A small supermarket kitchen exhaust hood may be 5,000 CFM and have a 2 HP motor. The reduction in direct usage for this system, based on 8 hours per day of “closed” time and the unit being turned off 75% of the time in the base case, is approximately 1,300 kWh. This is approximately 30% less than the average savings of 1,893 kWh claimed for this measure; however, additional savings would be expected due to reduced cooling load due to reduced ventilation and infiltration. Additionally, the size of the average kitchen exhaust hood for a supermarket can be significantly greater than 5,000 CFM. Insufficient information was available to characterize this measure with any greater degree of certainty.

Approximately 0.2% of the claimed savings were due to turning off the dishwasher at one store during hours that the store is closed. No information was supplied on the quantity, model, size, type, or any other characteristics of the dishwasher that was turned off.

Turning off the dishwasher was assumed to save 0.5% of the “other” energy usage for the store. The other category usage was assumed to be approximately 5% of the total facility usage based on the CBECS data. Again, while it was not possible to fully evaluate the reasonableness of the claimed savings, we can say that the claimed savings are likely conservative. Current Energy Star criteria for low temperature, under-counter commercial dishwashers are that the unit must have stand-by losses of less than 0.5 kW. All other dishwasher types have higher standby losses than this. Based on this value, and 8 hours per night of reduced idle savings, the projected savings for turning off one dishwasher are approximately 1,460 kWh, approximately 3.4 times

the claimed savings. It should be noted that basing the savings for turning off a dishwasher on the total facility energy usage is likely not the most appropriate method to determine the savings. A more appropriate method may simply base the savings on the dishwasher type and the hours turned off, which would be a relatively simple calculation.

The remaining 3.5% of the claimed electric savings were due to turning off lights in produce and other spaces during overnight hours when the store was closed. No information was supplied on the quantity, model, size, type, or any other characteristics of the lighting that was turned off.

Turning off the lights was assumed to save 1% of the lighting energy usage for the store. The lighting category usage was assumed to be approximately 22% of the total facility usage based on the CBECS data. While it was not possible to fully evaluate the reasonableness of the claimed savings, the claimed savings may be conservative. If the “turned off” areas are assumed to be 5% of the total store area, with a lighting power density of 1 Watt per square foot, the projected savings, at 8 hours per night of reduced lighting operation, are approximately 20% more than the claimed savings.

Only 118 therms of natural gas savings were claimed. The gas savings were due to an adjustment to a heated air curtain. It appears that the adjustment was due to the air curtain temperature being deemed excessive, however, this is not clear and the adjustment made is also not described. Based on this, no assessment of the gas savings could be made.

Analysis Method Conclusions and Recommendations

Despite its limitations and lack of precision, the estimation method used for the SEMi pilot appears to have provided reasonable savings estimates for the limited number of measures implemented by the single participant. However, as the number of measures increases, estimating savings as small, relatively random, percentage reductions in the usage attributable to a specific end use based on aggregate national data is likely to become less credible, particularly if multiple measures are implemented within a single end use and interactive effects come into play. In future engagements, we recommend that the implementation team try alternative methods such as disaggregating facility-specific energy usage based on an audit or using a simple engineering algorithm when equipment type and capacity data are available. These results can always be compared to the current CBECS-based approach and could either validate it or suggest that an alternative should be employed.

Cost of Savings

As part of the assessment of cost-effectiveness, we compiled the costs and savings associated with the SEMi participant. Because no incentives were paid, only non-incentive costs are included, as shown in Exhibit 5-1.

Exhibit 5-1 – SEMi Pilot Costs and Savings

Non-incentive cost	Incentives	Elec. Savings (MMBTU)	Therms Savings (MMBTU)	Total (MMBTU)	Non-incentive cost per MMBTU	Total cost per MMBTU
\$24,637	\$0	847.3	11.8	859.1	\$28.68	\$28.68

The results show a cost of savings lower than roughly \$57 per MMBTU for the one-on-one approach in the full commercial SEM, but higher than the \$13.50 per MMBTU for the cohort approach for a full-year engagement.

B) PROCESS EVALUATION

The process evaluation focused on analyzing the delivery process and how the SEMi pilot was perceived by program staff as well as the initial program participant. Following a summary of how the actual implementation process differed from what was originally envisioned, results are presented below.

Implementation Variances

For a variety of reasons, the implementation of the SEMi pilot with the participant did not go exactly as planned. Issues affecting program delivery included:

- The two Ecova staff members who had come up with the concept for the SEMi pilot and who had worked with Energy Trust to obtain approval left the company shortly before the implementation start date. While other staff at Ecova capably took over the marketing and delivery of the program, continuity was lost and delivery was somewhat delayed.
- Because Ecova and Energy Trust wanted to roll out the SEMi pilot and field test it before the end of 2013, the 12-week pilot had to launch by the end of September. Unfortunately the last three months of the year are the busiest time for food stores, making it more difficult to engage store level operational staff who would be responsible for implementing the SEMi measures. In addition, both management and operations staff are generally very busy at this time of year, so that simply scheduling meetings becomes a challenge.
- Another problem was that the 12-week implementation period didn't fully account for the time needed to secure the participation of both upper level management and store level operations staff. One of the key features needed for SEM to be effective is to be able to leverage activities across sites by having individuals from various buildings involved in

the process. Once participation was agreed to, securing the engagement of both levels of staff took longer than anticipated, not only because of the time of year but because this part of the process appears to be inherently more time consuming than planned.

- The organization selected for SEMi was an appropriate candidate in that it has multiple sites, meets the size/usage criteria set forth by Energy Trust and was already committed to “green” operations – although with less of a focus on energy than on waste management, water usage and overall sustainability. In addition, the organization had a recently hired sustainability manager who was interested in stepping into the role of Energy Champion for the engagement. On the other hand, the Sustainability Manager’s relative newness to the position may have limited their ability to draw others into the effort. In addition, having all program interaction with Ecova going through one individual at the participating firm appears to have slowed down some aspects of program implementation.
- The plan called for significant preparatory activity prior to the Energy Day where SEM opportunities are discussed and selected. Originally, Ecova planned to conduct a walk-through on the Energy Day itself at a single facility, and have all the Energy Day participants accompany the Ecova representative as opportunities were pointed out and evaluated. This approach was revised when it was determined that a walk-through with too many people would be counter-productive and limit the actual exchange of information and learning provided to the participants. Instead, a walk-through was done at a site before the Energy Day, with dozens of photos taken and presented to participants during Energy Day. This appears to have been very effective, and considered a better alternative by both participants and Ecova staff.
- The Energy Day itself had fewer participants than planned. The intent was that multiple representatives from the operations teams at various stores would attend, but only two stores were able to spare staff to participate. In addition to the overall volume of business for the season, recent staff departures/turnover had left the participating organization relatively short-staffed, and recently hired technical staff were not yet up to speed on the various aspects of store operations that would be discussed at the Energy Day. The individual with overall responsibility for store operations was preoccupied with training new staff; moreover, as a long-time employee, the individual was somewhat resistant to making changes to operations for small energy savings gains.
- Far fewer than the 30 non-capital opportunities identified during Energy Day were actually implemented. As described in the Impact Evaluation section previously, a total of 4 different electric measures and 1 gas measure were implemented at 6 sites. While the participating firm has indicated that they intend to implement additional measures in

2014 and even incorporate some of them into their Sustainability Plan, this initial SEMi pilot require measures to be implemented before the end of the 12-week participation period in order to be able to claim savings.

- For those measures that were implemented, the mandatory post-installation inspection had to be postponed beyond the initial participation period because of the holiday season rush at participating stores. While this did not limit the validity of the inspections (which confirmed that measures had been installed and were still in place), it highlights the limitations of the 12-week participation period.

Program Staff Feedback

As noted before, Ecova staff responsible for implementing SEMi were not the same people who had developed the concept. Nevertheless, Ecova staff who worked on the project believed that the general SEMi approach of a light-touch, short-term introduction to SEM had merit, and most felt that the engagement with the participant was at least partly successful. Issues raised by program staff regarding implementation tended to focus on the following concerns.

- The 12-week timeframe was considered to be too short to be effective by all the program staff interviewed. As one staff member noted: “If it were 12 weeks from the Energy Day through the last day of implementation and then a few weeks for admin pre and post, that might work, but it can take 2 weeks just to schedule the Energy Day, plus we need a report at the end of 12 weeks, so you’re down to 6 weeks when they can get actual work done – which is hard because it’s not that high a priority for them.” Another respondent said “It’s not just extra time for the guidance up front to get the organizational issues addressed, but adding time on the tail end. Even if we are not working with them closely, we need to give them some more time to get it going.”
- In addition, the time of year was seen as posing an additional challenge. There was a sense that the engagement was rushed in order to meet the deadline of finishing prior to the end of 2013, which affected both the preliminary organizational steps and the post-Energy Day implementation of recommended measures.
- Too few people attended the Energy Day session. The minimal involvement of senior management, overall operations staff, and store-level employees limited the effectiveness of both the Organizational Assessment and the Opportunity Assessment, and also limited the number of individuals with “ownership” of the recommended measures who could take the lead in implementation.
- Specific organizational issues within the participating firm may also have hampered the implementation process. The Energy Champion was dedicated and enthusiastic, but was

new to the organization and did not have direct authority to mandate store participation and Energy Day attendance. As a result, the workload associated with participation was more than expected for the Energy Champion, and the fact that all communications went through this individual sometimes created a bottleneck. Moreover, interviewed staff mentioned the turnover in the maintenance and operations department, which limited the availability of both new and established staff.

One respondent who was very involved in program delivery said that despite the shortcoming, “I think this is a nice sneak preview without having to commit to the full SEM package, which is pretty labor intensive. This gives an introduction; it’s very high level but the Organizational Assessment is really useful for insight into SEM and the Opportunity Register is also useful, because it gives them the tactical measures to get rolling.”

Participant Feedback

Participant feedback was obtained from interviews and from evaluation forms completed by those who attended the Energy Day event, including the virtual walk-through, the Organizational Assessment and the Opportunity Assessment.

A fundamental concern for participants was the timing of the initiative. Echoing several of the issues mentioned above (length of time, participation coinciding with the holiday season) the Energy Champion noted that “We would have preferred to do it after the first of the year, but that wasn’t an option², so we didn’t have time to get good buy-in from folks.” The Energy Champion also said that the time commitment required ended up being much greater than anticipated, explaining that, “When I approached our operations team with the proposal, we said we would pick one suburban and one urban store, but Energy Trust and Ecova wanted an energy champion at every store, but we didn’t have an Energy Champion for every store.” Because one person ended up with implementation responsibility for almost all the stores, much more time was required than the 8-12 hours that had been planned at the time of enrollment.

Energy Day Overall

Those who attended Energy Day generally viewed the activity favorably, with all three participants rating the usefulness of the Energy Day 4 or 5 on a 1 to 5 scale. When asked what aspect of the Energy Day they found most useful, respondents offered the following:

- Organizational assessment and HVAC.
- Discussions about things I consider fairly trivial that are major ways energy is lost/wasted.

² Energy Trust had required the end-of-year completion in order to allocate available funds and claim associated savings from the pilot.

- Seeing systems and opportunity areas that aren't readily apparent.

None of the three respondents provided any answers on what part of the Energy Day they considered least useful.

When asked if any activities or information had been missing, only one participant offered a suggestion: "I would love more specific dollar savings estimates from different measures at Energy Day to help with prioritization."

All three participants offered responses to the question, "Following Energy Day, how can we best help complete your SEMi activities?"

- Provide recommendations, follow-up.
- Continue to provide communication and energy savings tips.
- Help with documentation and cost/benefit, example scenarios/methods to give to team.

All these recommendations seem to recognize a need for additional support, particularly in quantifying and analyzing the recommended actions. While this was done to some extent, the limited number of measures implemented suggests that more assistance (and time) would have been helpful.

Organizational Assessment (EnVinta)

One of the key aspects of the Energy Day and of the SEMi initiative overall is an Organizational Assessment of the participating firm's energy management practices. The EnVinta One2Five assessment is a proprietary tool that guides participants through a comparison of their energy management efforts against "best practices" through a set of questions. Responses are tabulated to create a score, which provides the organization with a good understanding of where they stand and what areas need to change. Participant ratings of the Organizational Assessment aspect of the Energy Day are presented below.

For each statement, indicate your level of agreement on a scale of 1 to 5, where 1 is "strongly disagree" and 5 is "strongly agree."	Participant 1	Participant 2	Participant 3
Information provided during the Organizational Assessment was valuable.	4	5	4
Information provided during the Organizational Assessment was easy to understand.	4	4	4
The Organizational Assessment facilitator was effective and capable	5	5	4
What did you like/dislike about the Organizational Assessment?			
The assessment had little relevance to me as a store level employee.			
Would love more advance notice of agenda specifics to persuade leadership to attend.			

While individual participants all agreed that the Organizational Assessment was valuable and effective, the fact that only three individuals provided input severely limits the usefulness of the process (and of the ratings). Again, a review of this kind is more effective in the context of a longer-term engagement, when the implementation contractor can work with key individuals at

the participating firm to identify shortcomings in current practices and help them initiate new policies and procedures in support of SEM. In a 12-week time frame, when there are only 6-8 weeks of participation after the Organizational Assessment is conducted, opportunities for making significant changes are limited.

Both the Executive Sponsor and the Energy Champion said that the Organizational Assessment could have been more valuable with advance notification regarding the topics to be covered. The Executive Sponsor suggested that “in future engagements you provide the questions in advance to the Executive Sponsor, so they have the opportunity to gather information as necessary from other subject matter experts. This should result in a more accurate picture of the organization’s practices.” Similarly, the Energy Champion commented that “if we had an agenda and a good understanding of what we would have been talking about a few weeks in advance, we would have been able to get someone from the leadership team to come,” which would have made the session more useful.

Site Assessment and Planning Session

Not as detailed as a full-blown retro-commissioning study, the site assessment nevertheless has a similar goal of identifying operational changes that will result in energy savings. The original approach was revised when it was determined that a walk-through with too many people would be counter-productive and limit the actual exchange of information and learning provided to the participants. Instead, a walk through was done at a site before the Energy Day, with photos taken and presented to participants during Energy Day as a “virtual walk-through,” which both participants and Ecova staff considered a better alternative.

Again, all participants expressed their satisfaction with this aspect of the program, although one store level employee thought the site assessment was not detailed enough.

For each statement, indicate your level of agreement on a scale of 1 to 5, where 1 is "strongly disagree" and 5 is "strongly agree."	Participant 1	Participant 2	Participant 3
The information provided from the site assessment was valuable.	5	4	3
The information provided from the site assessment was easy to understand.	5	5	4
The technical advisor/facilitator was effective and capable.	5	5	4
As a result of the Energy Day, I feel confident in my ability to implement energy saving activities at my site .	4	5	5

The Energy Champion explained that the “virtual walk-through” was very useful, including both the pictures that were used and the comparison of usage per square foot to other stores. Another employee said he believed the site assessment would have benefitted from more planning, and suggested “better communication and preparation before the initial visit, with a preliminary walk-through with one SEM manager and one engaged and knowledgeable manager from the business, followed up by a site visit plan and schedule for the initial assessment that is in harmony with the operation of the business. There should be a clear plan of expectations and

potential ROI to spare both parties wasted time and confusion. Case in point— we couldn't save water with low-flow aerators at hand-wash sinks due to food-safety concerns.”

Implementation of Measures

While acknowledging that only a handful of the actions identified at the Energy Day had been implemented in just six of the company's stores, the Energy Champion explained that the company had plans to implement significantly more in 2014. The fact that the participating firm received no incentives because the minimum number of measures had not been implemented was not a major concern. The Energy Champion explained that they knew this would likely be the case early in the engagement, and that “our team said even if we didn't get the incentives, there would still be a lot of value because it would set us up to have actions and goals we can implement.”

In fact, several measures will be incorporated into the company's sustainability plan to be developed this year, the Energy Champion notes. One thing that would have helped the implementation process would have been if “we would have cost-benefit for recommended actions so we could choose. To get our leadership team to commit to that without that data is difficult. We did get to where these are the areas with the biggest benefit, but there were no hard numbers provided.”

Another employee at one of the participating stores noted that “a number of the options we had devised to improve our efficiency were not things we could implement for various reasons regarding clearing things with facilities maintenance and store support. Some of the ideas we decided to put into place were simple things that we still had to go through store support for, and as such, they took much longer to implement than I felt necessary.”

Tracking of Savings

Before participation in the SEMi pilot, the participating firm did not have a formal system for tracking energy usage. According to the Energy Champion, “We had someone who pays the utility bills and used to monitor them, but we now have 13 stores, so they just pay the bill. Now we have a great baseline and great goals, so we should be able to make reductions and track progress toward our goals.”

Additional Savings and Capital Projects

According to some of the staff interviewed, 6 of a total of 36 opportunities identified during the walk-through and Opportunity Assessment turned out to be capital projects that might be eligible for an Energy Trust incentive. The Energy Champion says they are pursuing at least some of those opportunities, including aerators and LED lighting. “They [Ecova] put us in contact with an Energy Trust lighting expert who came out to check daylighting and provided us with the Energy Trust lighting tool for an LED retrofit. We have decided that we want to do LED retrofits

and in new stores, but we also had to bring in our construction and merchandising team to work with a lighting consultant to help design lighting for future stores. We would not do LED retrofits before that.”

Organizational Changes

The participating firm had “green teams” in place at each store at the time of their participation in SEMi, but those continue to be more focused on waste and water management than on energy. There are no plans to develop a formal energy team, but several of the recommended measures – both operational and capital – are expected to be incorporated into the firm’s Sustainability Plan for 2014.

Finally, one employee emphasized that even the limited SEMi engagement had been very valuable in raising awareness of energy issues. “Employees store wide have been made more aware of how their individual actions can work toward making a big difference in the amount of resources we consume, and reduce the cost to our company, which helps the environment, as well as helps to raise our company profits.” He added that he personally was paying much greater attention to energy use at his store, noting that, “The SEM program encouraged me to actually spend some time thinking about ways to improve our methods of energy and resource conservation. It was something that I actually found interesting, and I was excited to do a little ‘detective work.’ ... It really encouraged me to think outside the box, and actively seek information from associates as to what may have not been optimal in their departments.”

6. Conclusions and Recommendations

Overall, our evaluation indicates that 12 weeks is not sufficient to lead to the kind of operational, organizational and behavioral change that characterizes the true application of SEM to a commercial customer. While some of the shortcomings of SEMi were the result of unique issues of timing and personnel availability for the selected customer, both program staff and participants agree that the 12-week timeframe simply is not optimal. Moreover, more than 90% of the estimated savings from this engagement happened only because the firm's refrigeration contractor participated in the site visit and walk-through – something that is not a required feature of the current implementation process.

Specific conclusions and recommendations are presented below.

Impact Evaluation

Conclusion: The savings estimation method used for the SEMi pilot appears to have provided reasonable savings estimates for the limited number of measures implemented by the single participant, but there is little confirming evidence from other published sources for the percentage savings associated with individual actions or measures.

Recommendation: In future engagements, we recommend that the implementation team try alternative methods such as disaggregating facility-specific energy usage based on an audit or using a simple engineering algorithm when equipment type and capacity data are available, or deemed savings values when applicable data are available.

Conclusion: Approximately 95 percent of the claimed savings were due to adjustments to the participant's refrigeration controls systems, which were identified as an opportunity only because the refrigeration contractor for the store chain was participating in the walk-through.

Recommendation: When refrigeration accounts for a large percentage of energy usage (as with restaurants and groceries), it should be standard practice in all SEM engagements to have the refrigeration contractor (or an in-house engineer, if available) participate in the walk-through.

Process Evaluation

Conclusion: While only a limited number of measures were implemented within the 12-week timeframe, the SEMi engagement appears to have helped the participant identify additional operational adjustments and capital projects that will be pursued in the future.

Recommendation: Consider tracking implemented measures beyond the initial participation period, as is done with the full commercial SEM program.

Conclusion: Participant and implementation contractor staff said that the effectiveness of the SEMi engagement was limited by its brief duration, and that twelve weeks is simply not enough time, unless participants do extensive preparatory work before the official engagement starts.

Recommendation: Commit to a longer engagement period, with several weeks upfront to set up the needed organizational structure and up to several additional months after the Energy Day to allow time to implement recommended measures – even if program staff are not extensively involved in the later months. For optimum effectiveness, both engagement length and timing should be tailored to the characteristics and needs of the participant.

Conclusion: Engagement of multiple employees at all levels of the company was not possible in light of the short time frame, the time of year when SEMi was initiated for this participant, and participant-specific issues regarding operations and maintenance staff turnover.

Recommendation: Ensure that all sites that are expected to participate commit to having at least one representative at the Energy Day. Also, provide participants with a checklist of who should be involved and a reasonable estimate of the amount of time they will need to commit.

Conclusion: The Organizational Assessment is more useful if participants are prepared and if the appropriate number and level of decision makers are involved. This was not the case for the participant.

Recommendation: Enable participants to review the questions and issues discussed in the Organizational Assessment ahead of time so that they can provide more thoughtful, accurate responses. This would also ensure the involvement of the appropriate management level representatives whose input is necessary to gain meaningful feedback on these questions.

Conclusion: The broad characterization of opportunities by priority and level of effort is useful as a screening tool, but does not provide participants with much guidance in determining which measures to implement first.

Recommendation: To facilitate prioritization of recommended measures, the implementation contractor should conduct a post-Energy Day analysis giving the participant the tools to conduct a cost-benefit analysis. This could be done by providing a rough estimate of potential savings for each measure based on the importance of the end use and the likely percentage savings. Existing data sources (e.g., DEER database, Technical Reference Manuals from other states) could be used to provide order of magnitude estimates of associated costs.

Appendix

Exhibit A-1 – Cost of Savings – 2012 SEM Commercial Pilot

	Non-incentive cost	Incentives	Elec. Savings (MMBTU)	Therms Savings (MMBTU)	Total (MMBTU)	Non-incentive cost per MMBTU	Total cost per MMBTU
SEG	\$294,340	\$131,375	19,333	12,694	32,028	\$9.38	\$13.49
Ecova	\$72,152	\$4,300	346	1,136	1,482	\$54.11	\$57.15
Total SEM	\$366,492	\$135,675	19,679	13,830	33,510	\$10.94	\$14.99