



KAIZEN BLITZ PILOT

Report One

Prepared for:
Energy Trust of Oregon



Navigant Consulting, Inc.
One Market Street
Spear Street Tower, Suite 1200
San Francisco, CA 94105

415-399-7100
www.navigantconsulting.com



October 26, 2010

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Introduction

Energy Trust of Oregon (Energy Trust) is operating a pilot program within its Production Efficiency (PE) Program to test the Kaizen Blitz concept with a small sample of Energy Trust customers (Kaizen Pilot). The Kaizen Pilot is being implemented by Cascade Energy Engineering (Cascade) under Energy Trust oversight. The Kaizen Blitz initially targeted four to five sites in the warehouse or food processing industries with substantially sized refrigeration systems. Four customers ultimately participated (Cohort 1). A second cohort (Cohort 2) of five customers began in December of 2009.

The pilot program process consists of an initial on-site tune up (Kaizen Blitz) followed by technical support provided for a year. During the initial Kaizen Blitz, Cascade works intensively with the participant, on site, for up to a week to identify low or no-cost opportunities to reduce facility energy use through improvements made to the refrigeration, lighting, door, HVAC, and battery systems. Where possible, the recommendations are implemented on the spot. A final report (Final Report or Action Items Report) is prepared documenting the energy savings opportunities into an action plan for the following year. The report also identifies capital upgrade projects with good potential for producing an attractive return on investment.

Follow-up engineering support is provided periodically for a year to track the action items identified during the Kaizen Blitz but also to support the participants in developing a tracking system to monitor energy use performance. The objective is that through a combination of tools and coaching, the facilities can become somewhat self-sufficient at tracking energy. Approximately a year after the Kaizen Blitz, a final inspection is conducted and a report prepared to document the measures that were ultimately implemented and the resulting energy savings (Inspection Report).

Energy Trust pays 75% of the cost of the technical support provided by Cascade. The customer is required to pay their portion of the cost before work commences. An enrollment agreement between Energy Trust and the customer documents the incentive and the customer's obligations and must be executed prior to the Kaizen Blitz. The participants receive an incentive calculated based on the energy savings realized by the action items identified in the reports.

The customer’s obligations are to:

- Support the installation of meter monitoring equipment;
- Allow access to energy and production data;
- Allow facility access;
- Identify an energy champion;
- Authorize other personnel involvement throughout the project period;
- Pay their portion of the funding for the technical support; and
- Implement the action items identified during the Kaizen Blitz.

The Kaizen Blitz is conducted as soon a possible after the agreement between Energy Trust and the customer is signed. The Final Report documents the findings of the Kaizen Blitz in a twelve month action plan. The Final Report is usually delivered within four weeks of the Kaizen Blitz.

Table 1 lists the Kaizen Pilot participants for Cohorts 1 and 2, along with the key dates of the Kaizen Blitz process. Dates in *italics* are targeted dates.

Table 1: Kaizen Blitz Participants

| | Part ID | Facility Type | Kaizen Blitz Conducted | Final/Action Plan Report Date | Inspection Report Date |
|----------|---------|-------------------------|---|--|------------------------|
| Cohort 1 | 2353 | Distribution Center | May 5 - 9, 2008 | June 12, 2008 | September 11, 2009 |
| | 2366 | Dairy | June 3 – 6, 2008 | July 29, 2008 Rev. August 8, 2008 | March 9, 2009 |
| | 2482 | Distribution Center | September 29 - October 2, 2008 | January 5, 2009 | March 17, 2010 |
| | 1845 | Frozen Foods Processing | June - August, 2008 | Rev. Nov. 1, 2008 | December 18, 2009 |
| Cohort 2 | 2925 | Dairy | December 7 – 9, 2009 | February 11, 2010 | <i>February 2011</i> |
| | 2866 | Frozen Foods Processing | Sept. 22-23, Oct. 27 and Nov. 17, 2009 March 31, 2010 | April 21, 2010 | <i>April 2011</i> |
| | 2926 | Distribution Center | January 11 - 13, 2010 | February 15, 2010 Rev. March 31, 2010 | <i>March 2011</i> |
| | 2725 | Canning and Processing | May 3-6, 2010 | June 20, 2010 | <i>June 2011</i> |
| | 0001 | Dairy and Bakery | <i>September 1, 2010</i> | <i>September 29, 2010</i> | <i>September 2011</i> |

Staff Response Memorandum

Energy Trust of Oregon
851 SW Sixth Avenue, Suite 1200
Portland, Oregon 97204

Telephone: 1.866.368.7878
Facsimile: 503.546.6862
energytrust.org



MEMO

Date: October 4, 2010
To: Board of Directors
From: Philipp Degens, Evaluation Manager
Kim Crossman, Sr. Industrial Sector Manager
Subject: Staff Response to the Process Evaluation of the Kaizen Blitz Pilot

The Kaizen Blitz (KB) Pilot has proven to be an successful pilot that has proven a new approach that has resulted in engaged customers and significant low-cost energy savings.

The piloted services are now included as part of the PE program standard service offerings. Cascade continues to make incremental changes to the KB services that improve reporting (many of the changes recommended in the evaluation have been adopted or are being considered by Cascade) and are keeping the service flexible to meet customer needs (e.g. some of the initial site visits are spread out over a period of months). Cascade, the implementation contractor, is now an official Industrial Technical Service Provider (ITSP). The PE program released an RFQ for other ITSPs to see if similar strategic energy management services focused on the industrial and agricultural sector are available that would benefit program participants. A pool of 8 qualified ITSPs, including Cascade, has been formed to provide these types of services.

Evaluation Objectives and Approach

Evaluation Objectives

The main evaluation objectives for the Kaizen Pilot were to answer the following questions:

- What motivates customers to improve their efficiency and to maintain a higher level of efficient operation over time?
- Are the incentive levels adequate, low, or high? What were the keys to success? If a customer did not perform, why not?
- Did Energy Management software and support add value to the Kaizen Blitz process? Does it help track and maintain savings? Does the customer see the value? Does it help project and program evaluation?
- Are the savings levels sufficient to carry the added cost of services? Do the savings persist?
- Are there improvements to customer/program relationships through collaborative implementation of operational changes?

Evaluation Approach

To accomplish the evaluation objectives, Navigant Consulting conducted a review of the pilot materials, interviews with the Kaizen Blitz program management, and interviews with pilot participants as described in the sections below.

Pilot Review

Navigant Consulting reviewed each participant's project reports, evaluation reports, monitoring and verification plans and other data, as available. The purpose of the pilot review was to assess the general approach to developing the energy savings estimates for the action items identified during the Kaizen Blitz and the effectiveness of the report in meeting the needs of the participant, Energy Trust, and program evaluators. The review also addressed equipment baselines and savings calculation methodologies, including assessing standard assumptions used. The pilot review did not undertake to confirm that the actual calculations were performed correctly.

Program Management Interviews

Prior to commencing the participant interviews described in the section below, Navigant Consulting conducted interviews with the Energy Trust's Senior Industrial Sector Manager and Cascade Energy's Kaizen Blitz Program Manager.

The intent of the interview with Energy Trust's Senior Industrial Sector Manager was to solicit feedback on the Energy Trust's satisfaction with the pilot's results and understand whether the pilot was meeting its original objectives. Specifically, the interview sought to determine:

- Original objectives of the Kaizen Pilot and whether they've changed over time;
- The role of the Kaizen Blitz within the industrial sector;
- The role of the Kaizen Blitz within Energy Trust's industrial sector programs;
- Direct and indirect benefits realized by the Kaizen Pilot since its inception;
- Issues or conflicts as a result of the Kaizen Pilot; and
- The participant's overall satisfaction with the Kaizen Pilot.

The interview with Cascade included both a formal interview as well as follow up communications to clarify questions the team had during the course of the evaluation. Navigant Consulting also worked with Cascade to identify the appropriate interviewee for each participant. The purpose of the formal interview with Cascade was to:

- Understand the original objectives of the Kaizen Pilot and whether they've changed over time;
- Understand how the implementation of the Kaizen Pilot has changed over time and what lessons have been learned;
- Discuss how the Kaizen Pilot originally came about, how it has been implemented in other areas, and what lessons can be learned;
- Identify and discuss the successes and challenges of the various components of the Kaizen Pilot strategy:
 - Customer recruitment
 - On-site tune up

- Follow-up technical support and mentoring
- Energy management software
- Incentives
- Customer relationships/satisfaction

Participant Interviews

Navigant Consulting will conduct two rounds of interviews to obtain feedback from the Kaizen Blitz participants. The first round of interviews were conducted February through July of 2010. The second round of interviews will be conducted in February through April of 2011 and their results will be included in Report 2, due in May of 2011.

The first interview will be conducted within a month of the customer's receipt of the Final Report documenting the Kaizen Blitz. The reports are typically delivered within four weeks of the Kaizen event, therefore, the first interviews are conducted approximately eight weeks after the Kaizen Blitz. This timing will allow the evaluation team to capture the participant's recollections about the on-site Kaizen experience and the resulting action plan while they are fresh in their minds.

The objectives of the **one month interview** are to:

- Solicit feedback on the services received during the Kaizen Blitz.
- Determine the applicability of the information and services received during the Kaizen Blitz.
- Seek an assessment of the mentoring received by Cascade.
- Determine the outcomes of the recommendations and services.
- Find out the challenges the participants have encountered in achieving the goals.
- Document the participant's anticipated near-term and long-term project induced actions.
- Conduct an assessment of the pilot's strengths and weaknesses.
- Obtain recommendations for changes or augmentation to the pilot.

The objectives of the **one year interview** are to assess the near-term and long-term outcomes of the Kaizen Blitz:

- Retention of practices;
- Implementation of recommendations and forecast actions; and
- Recommendations for changes/augmentation.

Because the evaluation activities began at the end of 2009, participants of Cohort 1 were not able to be interviewed one month after their Kaizen Blitz. Their first interview was conducted at approximately the one year anniversary and included questions from both interview types. A second interview, conducted at approximately the **two year** milestone, will also be conducted with Cohort 1. The objectives of this interview will be the same as the objectives of the one year interview.

Although most of the participants in each Cohort received their Kaizen Blitz, and resulting reports, at the same intervals, some of the participant’s milestones were delayed. For this reason, the results of this report do not include interview results for participants #2725 or #0001 of Cohort 2.

Prior to commencing each interview attempt, Cascade sent an e-mail to the participants notifying them that a member of the Navigant Consulting team would be contacting them for a brief interview. This provided an introduction for the Navigant Consulting interviewer which greatly facilitated the scheduling process.

Table 2 indicates the date of each participant’s first interview. All four Cohort 1 participants and three Cohort 2 participants were interviewed. Multiple interview dates indicate that two individuals from the participant firm were interviewed on *separate occasions*.

Table 2. Participant Interviews for Report 1

| | Participant ID | Report 1 Evaluation Interview Date |
|-----------------|----------------|------------------------------------|
| Cohort 1 | 2353 | February 18, 2010 |
| | 2366 | February 19, 2010 |
| | 2482 | June 10, 2010 |
| | | June 14, 2010 |

| | | |
|----------|------|-------------------------------|
| | 1845 | February 17, 2010 |
| Cohort 2 | 2925 | May 3, 2010 |
| | 2866 | June 9, 2010 July 21, 2010 |
| | 2926 | May 5, 2010 |
| | 2725 | N/A |
| | 0001 | N/A |

Although the action plan for participant #2725 was completed on June 20, 2010, as of the end of June 2010, the report had not been presented to the customer. In order not to delay the report preparation and delivery, Truitt Brothers feedback was not captured for this report.

Technical Review Findings

This section summarizes the findings of Navigant Consulting's technical review. Only a sample of the participating sites' reports, those for participants #2353 and #1845, were selected for review.

The technical review focuses on the thoroughness of the data in order to facilitate three tasks:

- (1) Customer implementation;
- (2) Energy Trust and program administration support; and
- (3) Program evaluation.

To facilitate these activities the Kaizen Blitz reports, calculations and supporting data should be accurate, clearly presented and concise. The latter factor means that the users of the reports should not have to sift through extraneous data that might detract from the main thrust of the work and analysis and obfuscate the results.

Overarching Findings

On the whole the Kaizen Blitz approach is very appropriate in this sort of application. A high level of expertise is conveyed by Cascade to the participant without bogging down the project with too many details or engineering models and calculations that can cost more to complete than a given measure will save. Also the immediate implementation of some action items during the Kaizen Blitz generates potentially immediate cost savings. The level of detail and information provided in the reports is generally adequate, so that a customer and administrator can understand the assumed baseline conditions, the steps for implementation and the expected outcome. The project files also contain supporting documents and files including: pre-project communications, invoices, CAD drawings and calculations. In these respects the reports are well suited to the needs of the customer, administrator and evaluator.

Participant #2353

The reports for participant #2353 discuss 61 action items for improving energy efficiency that range from very minor to significant energy savers at the distribution center. In general, the two reports from the Kaizen Blitz, the Final Report and the

Inspection Report, are well written and presented with respect to the customer, who is most intimate with facility operations. Recommendations are clearly stated with implementation steps discussed in adequate detail.

The reports are also reasonably effective from the perspective of program administrators. Systems and action items are described with enough detail for a reasonably technically-astute reviewer. However, there remains some inconsistency whether action items have been completed. Action items that are recommended in the Final Report, but are not implemented for the Inspection Report because they are not feasible or found to be not relevant should be accounted for. We suggest that rather than mark as “complete” projects that are ultimately not feasible that “N/A” be used consistently to describe the fate of the recommendation. Table 3 below demonstrates the inconsistency with respect to whether measures are complete.

Table 3. Summary of Participant #2353 Distribution Center Action Items

| | Final Report | Inspection Report Table 1 | Inspection Report Table 7-8 | Inspection Report Section 5 |
|---|---------------------|----------------------------------|------------------------------------|------------------------------------|
| Immediate Implementation | 19 | 19 | 19 | 19 |
| Recommended – High Priority | 18 ^a | 18 | 18 | 18 |
| Recommended – Other | 24 ^a | 13 (inferred) | 14 | 17 |
| Not Implemented | NA | 11 | 7 | 7 |
| Not Feasible or Not Applicable | NA | | 3 | 0 |
| Total Recommendations | 61 | 61 | 61 | 61 |
| ^a recommended but not implemented at the Final Report phase. | | | | |

From the evaluation perspective, the fate of some measures is also not clear for the same reasons, but the details are not so critical. Ample supporting data are provided in files. The number of detailed calculations is relatively few, which is appropriate for the Kaizen Blitz approach. Simple set point changes that are known to make equipment

more efficient will save some energy, but the effort for detailed calculations is not supported by the savings. Ultimately project savings are based on billing records.

The Inspection Report asserts that weather influences on a same-month basis are minor and Navigant Consulting is inclined to agree with a facility of this type, but some supporting analysis would be helpful.

More importantly there is some question about the savings estimates due to baseline definition. The Final Report gives kudos to the site operations for prior work and notes continued energy savings and cost reduction over the last two years. Figures in Section 2.4 show the improvements with all 2008 (through May 2008) daily average consumption below same month 2007 consumption. The Kaizen Blitz took place May 5-9, 2008, and the Final Report clearly demonstrates week-over-week savings immediately after the Kaizen Blitz (Final Report page 12). Page 14 of the Final Report states that "... <participant> was already on a trend of improvement and the intent is to isolate the improvement specifically associated with the Kaizen Blitz effort." Our concern from the evaluation perspective (and the Energy Trust program perspective) is that isolation of the savings was not implemented or reported. Therefore it is not correct to attribute all year-over-year savings accrued by the customer to the Kaizen Pilot.

Inspection Report page 5 states that "The baseline is defined as the twelve months prior to the Kaizen Blitz." But the data show same-month savings occurring prior to the Blitz. Realizing that a detailed billing analysis is not part of the focus of the Kaizen Blitz, Navigant Consulting suggests that the Kaizen Blitz savings estimate discount the total site savings. If the program has an anticipatory effect (the participant makes changes in advance of the KB) this should be explained in the report.

Project Background Description

The brief facility description in the Final Report is mostly adequate for the needs of all three entities that will use the reports. All major energy consuming systems are concisely described.

Navigant Consulting believes that a simple drawing or process flow diagram with supporting text as a useful complement in these complex situations. Even a neatly hand-drawn and scanned drawing can be useful.

Action Items and Calculations

The descriptions of action items were both concise and adequate to describe the current baseline situation and the intended impact of the action items. All of the recommendations are based on sound engineering principles. There were only a few detailed calculations and these were scattered among files and directories. Navigant Consulting agrees that detailed calculations are not needed for every recommendation, but a concise table or file of calculations would be useful.

Analysis

Whole facility billing analysis (IPMVP option C) is the chosen analysis method for this project. This technique is appropriate for the menu of action items implemented. However, from an evaluation point of view the analysis is deficient for the reasons noted above.

Summary

From an evaluators point of view it is necessary to have certain elements clearly included in documentation. These elements and an assessment of them as applied to participant #2353's reports are presented in Table 4.

Table 4. Technical Review Elements for Participant #2353 DC Reports

| Review Element/Comments | Assessment |
|---|------------|
| A concise yet complete description of the facility | |
| This report succeeds with this criterion. The evaluator is clear about the processes that are done on site and the scope of the facility is presented well. | Good |
| The services rendered by equipment affected by the Kaizen Blitz | |
| A few well-rendered simple drawings would go a long way to adding more clarity. | Good |
| Recommended action items (purpose of changes, exact changes made, savings potential and implementation priority) | |
| For this reader this criterion is well met, but some verbiage that more simply describes the purpose of the measure would be helpful for non-engineer program administrators and evaluators. For example, the text might say that the set point was changed to improve the efficiency of the compressor by reducing the pressure difference between the suction and discharge sides of the compressor rather than just saying the set | Good |

| | |
|--|------------|
| point was changed from X to Y. | |
| Final disposition of each action item | |
| Each action item is clearly listed in the tables for these reports. As noted above, some of the measures were not implemented for different reasons or they were counted as completed even when they actually were not feasible or necessary. | Adequate |
| Baseline Assumptions for action items | |
| Action item baselines (as-found conditions) are well explained and detailed. This is important should there be a need to revert to those baselines for some un-foreseen reason. | Good |
| Utility Consumption Data | |
| The data were complete, accurately presented and used in the analysis. In a couple places the figures could note when measures were implemented or when the Kaizen Blitz occurred within the figure. | Adequate |
| Key implementation dates (measure installation and Kaizen Blitz period) | |
| These dates are clear in the report. As noted above, annotation within figures is helpful as well to remind the casual reader of the sequence of activities. | Good |
| Logically presented <i>ex ante</i> calculations for key measures | |
| Few were included with the supporting documents, but those that were appeared to be accurately rendered and adequately documented. A summary of the calculated results should be easy to locate. Again this thorough method is only necessary for anticipated large savings measures; otherwise the calculation effort is not proportional to the savings. | Adequate |
| Explicit baseline periods for comparison by billing analysis | |
| The baseline period used in the analysis is clear; however, the report does not state why that baseline was chosen. Failure to describe anticipatory effects of the Kaizen blitz participants confounds the analysis. | Needs work |
| Clear methods to determine <i>ex post</i> savings | |
| Like the baseline period comment just above the methods used to determine <i>ex post</i> savings are clear, but they are incorrect. Use of a billing analysis to determine the savings from the suite of action items is appropriate. However, in this case the method should include the effects of non-Kaizen Blitz measures. | Needs work |

Participant #1845

Among the reports reviewed for this assignment, this one needs the most work to fulfill its purpose to facilitate savings implementation and program evaluation. Compared to the other reports the recommendations for this site were not as well-described and documented. Possibly as a result of the reporting, participant #1845 implemented the fewest recommendations, saved less energy on a percentage basis than other Kaizen Blitz reports reviewed. Specific areas that need explanation and revision work include:

- The Blitz period lasted 3 months (June-August 2008) rather than the typical 3-5 days and was not explained or justified in the report.
- The Final Report makes reference to energy-related projects installed at an earlier date, but it is not clear when or what was done. It is possible that earlier projects affect proper implementation of new action items.
- Figures of annual energy use and production before and after energy projects are sometimes specific to the warehouses and sometimes might apply to the entire facility. Proper captioning and titles would help clarify these questions and facilitate data interpretation. Having consistent scales for figures would also aid in data interpretation.
- The discussion of site refrigeration equipment is complete, but can be confusing in places. Effort should be invested to make descriptions concise with emphasis on the most important aspects of the refrigeration equipment. Compressed air and lighting system descriptions are not informative enough without mention of operating hours, controls and uses.
- More effort is needed in the discussion and presentation of the energy profile. Perhaps a clearer linkage between meters to end-uses, processes or buildings would be useful. Extraordinary data in the energy profile such as July 2007 usage should be discussed.

The reports for participant #1845 discuss 22 action items for improving energy efficiency that range from very minor to significant energy savers at the facility. The level of detail and information provided in the reports do not adequately aid

implementation or evaluation. A couple of examples are listed here to demonstrate the situation:

- Action Item #1: Operate the Screw Compressors Using the Logix Control System & Increase the Suction pressure targets: this should really be four action items: one for proper compressor staging and three for discussing suction pressure set points for three different systems. Descriptions of the staging issue detracted from the set point issue. None of these action items were implemented when at least the set point changes should have been. If simplified and clarified, the motor start/stop issue measure might not have caused the degree of concern and resistance from the customer. Calling out the 'disagreement' surrounding the motor measure in the report might have served to harden resistance to the measure which is contrary to the purpose of the program. Effort should focus on engaging and persuading the customer to take an efficient course of action.
- Action Item #5: Change Warehouse Evaporator Controls: "The control dead bands for speed and liquid feed solenoids controls should be adjusted." From what? To what? Priority given to which setting? What optimizing routines could be implemented? More explanation is needed for effective implementation.

These same sorts of issues repeat throughout the section on action items.

From the evaluation perspective, ample supporting data are provided in files sent with the reports. The number of detailed calculations is relatively few, which is appropriate for the Kaizen Blitz approach. Simple set point changes that are known to make equipment more efficient will save some energy, but the effort for detailed calculations is not supported by the savings. Ultimately project savings should be based on billing and production records.

Analysis

The savings analysis seems to have a similar lack of focus, though the underlying data appear to be solid.

- Section 1.3 of the Inspection Report says that the baseline period is 2007 – presumably Jan-Dec. This baseline excludes program impacts for the period September 2008 – December 2008 after the Kaizen Blitz as part of the comparison

data. It seems that the baseline should be chosen to maximize the number of post-implementation months in the analysis. The authors should explain why they chose baseline periods as they did. Choice of baseline can have a large impact on savings estimates which are on the order of 3-8% of annual site energy use.

- Figure 1 in the inspection report shows annual energy use versus production for the refrigeration system. This is a great figure as it clearly shows a strong correlation between the variables before 2008 and a change in energy use after the Blitz. Subsequent daily kWh data figures and analysis are not nearly as useful. In these figures kWh/day averages are calculated and ‘trend lines’ plotted including days with and without production. From the description in the report, the savings seems to be calculated on these daily averages without considering the significant production changes. Data in Figure 1 shows a 4-7% annual decrease in production from the baseline 2007 through 2008 and into 2009.

Navigant Consulting recommends performing analyses for each meter individually, analyzing energy use for the production season (June-October) and the storage season separately. Trend-data for each prior to the Kaizen Blitz can be extrapolated to production levels (product storage) to the levels documented in 2008 and 2009. “Expected” consumption from this robust production vs. energy trend line could be computed and compared to actual energy use.

Summary

From an evaluators point of view it is necessary to have certain elements clearly included in documentation. These elements and an assessment of them as applied to the reports for participant #1845 are presented in Table 5.

Table 5. Technical Review Elements for Participant #1845 Reports

| Review Element/Comments | Assessment |
|---|------------|
| A concise yet complete description of the facility | |
| The description is mostly complete, but it could be structured better to facilitate further analysis. | Needs work |
| The services rendered by equipment affected by the Kaizen Blitz | |

| | |
|--|------------|
| Lighting and compressed air operations are incomplete. Refrigeration is more completely described, but it needs better organization. | Needs work |
| Recommended action items (purpose of changes, exact changes made, savings potential and implementation priority) | |
| Too much is written about measures without explaining what should be done and why with enough specificity to facilitate implementation. | Needs work |
| Final disposition of each action item | |
| Each action item is clearly listed in the tables for these reports. If action items were presented with greater distinction, more might have been implemented. Over-combining ideas in one action item makes it difficult to say one implemented part but not all of the action items. | Adequate |
| Baseline Assumptions for action items | |
| Action item baselines (as-found conditions) are not always explained and detailed. In many cases the reader had to look to other sections of the report to determine the baseline of an action item in the recommendation section. | Adequate |
| Utility Consumption Data | |
| Annual data and monthly data were both used, but it was not clear why one format was selected over the other on a case-by-case basis. Which meter or which service was being discussed or plotted also not clear on a case-by-case basis. | Adequate |
| Key implementation dates (measure installation and Kaizen Blitz period) | |
| The report should describe why the Blitz took 3 months. One action item was implemented during the Kaizen Blitz; in which month? When were the others implemented? Annotation within figures is helpful to remind the reader of the sequence of activities. | Needs work |
| Logically presented <i>ex ante</i> calculations for key measures | |
| Few were included with the supporting documents, but those that were appeared to be accurately rendered and adequately documented. A summary of the calculated results should be easy to locate. Again this thorough method is only necessary for anticipated large savings measures; otherwise the calculation effort is not proportional to the savings. | Adequate |

| | |
|---|------------|
| Explicit baseline periods for comparison by billing analysis | |
| The baseline period assumptions are clear but the report should explain why calendar years were chosen instead basing on production cycles. | Needs work |
| Clear methods to determine <i>ex post</i> savings | |
| The methods used to determine <i>ex post</i> savings are clear, but they are incomplete without consideration of production effects. | Needs work |

Participant Interview Findings

This section summarizes the findings from the participant interviews for each of the key research areas. Key conclusions and recommendations from Navigant Consulting are in the next section, “Conclusions and Recommendations”.

Motivation to Participate and Improve Efficiency

Participants are motivated to undertake the Kaizen Blitz by the potential for energy and cost savings, though other benefits provide additional support.

All but one of the participants was motivated to participate in the Kaizen Blitz by the potential for energy savings. One of these participants expressed their motivation in terms of achieving a return on investment of less than one year, which was their firm’s threshold. One Cohort 1 participant couldn’t recall what originally motivated them to participate in the Kaizen Blitz or what goals they’d hoped to accomplish when they began.

Some participants indicated that the Kaizen Blitz also supported their corporate sustainability efforts and one explained that the Kaizen Blitz would help them to meet sustainability targets imposed by their clients.

“Our continuing efforts toward sustainability...it was a tool we could use to further shift the attitude of our team to better look at operations and make a shift in our culture.”

“A lot of customers are requiring tracking and collecting of data about sustainability. Every year we’ve been having an audit...”

Other ancillary benefits that the participants mentioned were to help raise employee awareness of energy use and to identify opportunities to save energy. Another indicated that the Kaizen Blitz was beneficial in helping them to better understand their facility’s operations.

“We have an older refrigeration system...often times things that you overlook when you are running an older, larger facility, without current monitoring systems. Having someone go through and look at everything from their perspective...was interesting.”

Participants heard about the Kaizen Blitz through their PGE representative or from Cascade, though one participant couldn't remember. This was true across both Cohort 1 and 2.

Incentive Levels and Action Item Expenditures

The incentives were effective at reducing the return on investment to acceptable levels and motivating the participants to action. The value of the cost sharing aspect is less clear, with some participants indicating that they could have used those funds to complete additional action items.

All participants reported that the Kaizen Blitz costs are reasonable and that they have received good value for their money. One pointed out that the ultimate value of the Kaizen Blitz depends on them:

"Overall the value is largely determined by us and how we move forward and continue to sustain the program."

The majority of the participants indicated that it was not difficult to get the expenditures for the Kaizen Blitz approved, with several pointing out that this was because of upper management's involvement and support.

Only one participant indicated that there were concerns expressed over the expenditures.

"...there were a lot of questions and concerns that if we didn't get the results. So yes, there was some fear but they were willing to take the risk."

Another pointed out there was some resistance and skepticism expressed within their organization initially but that Cascade was effective at promoting the Kaizen Blitz' benefits.

"It did take some time to get the initial meeting with local management...but once Cascade did the initial presentation, no one ever doubted again."

Several participants indicated that they would have been more engaged if there was no cost sharing requirement, some noting that they could have spent the funds on implementing action items.

"If it had cost less, we would have tried to do more"

"Actually, if it was free, we would have been more engaged. If it was absolutely free, why wouldn't you do it?"

Most indicated that they were motivated by a combination of the incentives and energy savings. However, one participant values the energy savings higher because they will persist for as long as they occupy their facility.

Two participants complained about measures that did not qualify for incentives:

“The problem is that a lot of things don’t draw incentives. Priority is ‘urgent’ yet the energy impact is small and receives no incentive. I wasn’t real happy about that...Don’t call it ‘Urgent Priority’ with a small impact.”

“I think they need to broaden the scope of what they’re looking at. We’re a refrigeration facility but we need a new roof right now. They mention in the report the ‘refrigeration envelope’ I wish they would have looked a little more broadly at the refrigeration envelope.”

Energy Management Software

Set up and support for an energy management tool was included as part of the Kaizen Blitz package of services for Cohort 2. Though the participant’s experience with the tool is limited by time, early indications are that it’s easy to set up, easy to use, and of great benefit.

One participant has the tool in place but hadn’t implemented many action items yet, therefore hasn’t seen much difference yet. They indicate that it was easy to gather the necessary inputs and set the tool up.

Another participant is just entering their production season and is “just starting to get some more value” out of the tool.

The third participant indicates that they believe it will be a very useful tool in tracking their energy use and savings:

“I would like to see it projected on the wall in the offices so that people can see it. It works well.”

This participant reported that the tool was easy to set up and that it was easy to gather the necessary inputs. Cascade’s support was mentioned as sufficient. The only issue this participant reported was that their day to day production (both in terms of items produced and quantity) is quite variable necessitating that extra care is taken when creating baselines.

The final Cohort 2 participant reports that they use the tool “at least every other day and sometimes daily basis”. They also predict that they’ll continue to use the tool in the future and that other individuals in their firm want access to the output as well.

“Now maintenance supervisors and maintenance managers, they want access to this information online as well.”

They report that set up was easy but that much of the needed information was in binders and reports and was time consuming to pull manually. This participant has suggested to Cascade that the dates (month and day) be included on the tool’s graphs.

Persistence of Savings

Participants are confident in their ability to maintain the savings they’ve achieved during the Kaizen Blitz and the follow up period.

Cohort 1 participants spoke in the most specific terms about maintaining the energy savings, noting the following changes:

- Updating the standard operating procedures with new procedures and set points (three Cohort 1 participants mentioned this);
- Utility budgets reduced by energy savings;
- Conduct a system audit every 2-3 years to check set points;
- Monthly work orders for maintenance and calibration of the equipment; and
- Placing locks on thermostats.

All participants report that they are motivated to sustain the energy savings by the success they’ve achieved. One participant indicated that he’s motivated because his annual bonus is based on staying under the operating budget. Several participants mentioned the recognition they received for their accomplishments as a motivator.

“Now we’re kind of looking like heroes in the company.”

“Only thing I ever heard was ‘congratulations’. We got our pictures in the paper.”

Another participant noted that they are still pursuing lighting and boiler action items they weren’t able to complete during the Kaizen Blitz follow up period.

Improvements to Customer Relationships

The Kaizen Blitz was a positive experience for most participants and has made them more likely to undertake initiatives with Energy Trust and their Program Delivery Contractor (PDC) in the future. Six of the eight participant firms indicate that their experience with the Kaizen Blitz has made them more likely to work with Energy Trust and their PDC on other initiatives.

“More. This is my third Energy Trust program. Things don’t go perfectly smooth, but as long as the payback comes to the company...”

“More. It has made us be more supportive and to work more towards some of the suggestions they have.”

“The approval was easy and pretty straightforward. They provided the expertise, a good company like Cascade. It left a good taste with everybody.”

One of the eight participants indicates that they’ll check to see if they qualify for an Energy Trust incentive on any projects they undertake in the future. The final participant indicated they have haven’t made a determination “one way or other” but that they are already working with their PDC on capital projects. Both of these participants were in Cohort 1.

Cascade’s Influence

Cascade Energy’s involvement was a major reason that participants enrolled in the Kaizen Blitz and their unique expertise was driver of the success at the individual participant sites.

All participants interviewed indicated that they had heard of Cascade Energy prior to enrolling in the Kaizen Blitz. All of the participants also indicated that Cascade Energy’s involvement with the Kaizen Blitz influenced their decision to participate, to one degree or another. Several indicated that they’d worked on projects with Cascade Energy in the past with good results.

“It took me about 10 seconds to think ‘is this something we need to do?’ and just from having Cascade Energy as part of it, I felt we were going to receive a benefit from participating.”

"We heard about the program from PGE. We were already interested in doing it, then Cascade cemented the deal."

"Biggest incentive for going forward was the money we expected to save on energy. Second part was that we were going to be reimbursed for a fair portion from Energy Trust...And thirdly, Cascade's involvement made it attractive because they were already a proven entity."

"...did have a good experience with Cascade on a project in the late 90s. And when the utility said they'd be involved, I got more interested."

Several participants shared experiences about Cascade Energy's positive interactions during the Kaizen Blitz. Cascade Energy was effective across the participant organizations, from presenting the Kaizen Blitz to management and at building credibility with the engineering and maintenance staff.

"It did take some time to get the initial meeting with local management...but once Cascade did the initial presentation, no one ever doubted again."

"Having worked with Cascade on at least three other projects before, they are goal oriented. They don't come in and make many promises they aren't going to come pretty close to achieving."

"And one thing I've appreciated about Cascade is their ability to get to a point: 'That's not what we're looking for...' Some of those guys keep trying to give you the run around about things."

"Nice to be able to get a hold of them anytime and they always had answers."

"With my chief and lead engineers...all very skeptical at first that these gentlemen knew much about refrigeration...Dan Brown was very well-versed and had a good background to talk about it...He was a key player making sure we were on track and making suggestions when there was a hiccup"

Participant Concerns

Participants expressed very few initial concerns about participating in the Kaizen Blitz. Only one participant indicated that the initial cost was an issue because their firm is a cooperative business that operates on a thin margin. However, the short payback and Cascade's successful track record with other, similar businesses were sufficient to overcome upper management's resistance. A second participant recalled some concern that their staff would be open to the changes identified in the Kaizen Blitz.

Actual barriers experienced during the Kaizen Blitz were limited to staff's resistance to making changes, usually out of concern that the equipment will fail resulting in lost production or product.

As an example, one Cohort 1 firm had concerns about cycling off their compressors. They were afraid that their older equipment couldn't handle the starting and stopping. Cascade responded by taking on several efforts to overcome their resistance. They talked to the equipment manufacturers about expected performance, identified other firms who made the same changes, and held meetings with the participant to discuss staff concerns and present the findings from their research. Energy Trust helped support the participant's decision by pointing out that PE incentives were available on replacement compressors if the new settings damaged them. Ultimately, the customer agreed to move forward with the changes, despite the fact that the Energy Trust solution wouldn't overcome their biggest expense of lost product (which could be millions of dollars).

Other action items that caused staff resistance were:

- Locking the thermostat set point to 72 degrees: "...don't understand that if the air handling unit won't cool the space to 72 when its 100 outside, it's not going to achieve 72 because you set it to 50";
- Aggressive defrost times on freezer. There was resistance to this because they'd had some freezing problems in the past; and
- Recommendations to install lighting controls caused concern that the lamp life maybe shortened, resulting in more frequent replacements.

Several participants noted that once their staff understood the benefits, they embraced the changes, though one admitted that they didn't implement some of the action items because they didn't think they would work.

Only one participant indicated that freeing up the internal labor to perform the various action items was a challenge. They suggested that six months advance notice was necessary in order to schedule the appropriate resources to implement the changes using in house staff.

Other Findings

Participants are applying techniques and action items from the Kaizen Blitz at other their facilities.

“Everyone here, even corp. is on board. I’ve taken some of these same actions that we’ve done up to the facility in Washington and they’ve made the changes there.”

Participants had mixed opinions about the time frame required to complete the Kaizen Blitz action times, but the 90 day, 90% incentive structure was effective at motivating participants to expedite their efforts. Most participants indicated that 14 months was adequate time to complete the action items and could be shortened somewhat. However, one participant expressed that some projects, like changing out valves, take a considerable amount of time to undertake safely. Another pointed out that scheduling internal resources is difficult to do in a time frame shorter than six months. Some participants were reluctant to undertake controversial measures close to the start of their production seasons and chose to wait until there was adequate time to test changes without fear of production losses. Budgeting cycles were mentioned by two participants – one wanting to complete the Kaizen Blitz within the same budget cycle and another who needed adequate time to request and receive approval for the expenditures in the next cycle. One participant mentioned that a recent utility electric rate increase prompted them to redouble their efforts.

Interviewees reported that upper management or corporate support and corporate sustainability initiatives were characteristics of their firm’s culture that supported the success of the Kaizen Blitz.

“We had corporate involvement. My general manager, myself, corporate – we were all involved.”

“Corporate social responsibility...saw this and another one about water savings so that’s what we’re going to do next.”

“All the way up from corporate...we felt we were taking a risk, but they were really supportive of this.”

Conclusions and Recommendations

Conclusions

A technical review of two sets of Kaizen Blitz reports found that they are generally well suited to the needs of the customer, administrator, and evaluator.

Participants are motivated to undertake the Kaizen Blitz by the potential for energy and cost savings, though other benefits provide additional support.

The incentives were effective at reducing the return on investment to acceptable levels and motivating the participants to action. The value of the cost sharing aspect is less clear, with some participants indicating that they could have used those funds to complete additional action items.

Though the participant's experience with the tool is limited by time, early indications are that it's easy to set up, easy to use, and of great benefit.

Participants are confident in their ability to maintain the savings they've achieved during the Kaizen Blitz and the follow up period.

The Kaizen Blitz was a positive experience for most participants and has made them more likely to undertake initiatives with Energy Trust and their PDCs in the future.

Cascade Energy's involvement was a major reason that participants enrolled in the Kaizen Blitz and their unique expertise was driver of the success at the individual participant sites.

Participants expressed very few initial concerns about participating in the Kaizen Blitz.

Actual barriers experienced during the Kaizen Blitz were limited to staff's resistance to making changes, usually out of concern that the equipment will fail resulting in lost production or product.

Participants are applying techniques and action items from the Kaizen Blitz at their other facilities.

Participants had mixed opinions about the time frame required to complete the Kaizen Blitz action times, but the 90 day, 90% incentive structure was effective at motivating participants to expedite their efforts.

Recommendations

Energy Trust should continue to sponsor annual Kaizen Blitz cohorts implemented by Cascade Energy. The Kaizen Blitz should remain largely in its current form but Energy Trust should consider making the following changes:

- To expedite the achievement of energy savings, consider shortening the length of time to allowed to implement the action items to no less than six to nine months with flexibility allowed for participants to start their engagement around seasonal operations and budgeting cycles;
- Continue the 90 day/90% incentive kicker to realize faster savings;
- Consider removing the cost sharing requirement; and
- Because of Cascade Energy's excellent reputation, past positive experience working with many firms throughout the industry, and ability to work effectively across organizations, Energy Trust should carefully consider the PDC's role in the Kaizen Blitz process. Customer presentations, the Kaizen Blitz event, and follow up support should continue to be conducted by Cascade Energy. However, the PDC's should be positioned to leverage the goodwill generated by assisting the participants with logging and invoicing for the incentive payments.