Evaluating a Three Year Continuous Energy Improvement Program

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ABSTRACT

A Continuous Energy Improvement (CEI) pilot program was designed and implemented in California from 2009-2012. Six projects were implemented: four food processors, the largest aluminum smelter in the West, and a global aerospace and defense manufacturer with 1000 employees. While the CEI Performance Improvement Plan was designed as a well-defined set of processes, additional qualitative and quantitative evaluations were added to augment the pilots based on five papers presented by the authors at AEE World Energy Conference and ACEEE Summer Study from 2005-2011. Since sustainability is a primary goal of the program, energy awareness and behavior change leading to energy savings were evaluated through several assessments. Energy treasure hunts were adapted from the work of General Electric and Toyota with excellent results. A summary of core documents is included that support ISO 50001 certification.

In addition, California Manufacturing Technology Consulting (CMTC), a private nonprofit organization and part of the Commerce Department's Manufacturing Extension Partnership, implemented another program over a ten year period, where reductions in resources used to manufacture products were calculated and utility incentives paid for savings through process improvement. The program was called Value & Energy Stream Mapping (VeSM™). This program is relevant to the discussion about CEI because many lessons learned about energy intensity were discovered over time. In addition, a major issue effecting energy intensity—demand variability—is presented as a concern for measuring sustainable GHG reductions.

Introduction

The Continuous Energy Improvement ("CEI") Program ("Program", "CEI Program") is a consultative service provided by third party implementers aimed at helping large commercial and industrial customers engage in long-term, strategic energy planning. The pilot version of the Program was funded through public goods funds and administered by Southern California Edison ("SCE") and Southern California Gas ("SCG") and conducted from 2010-2013.

The CEI Program pairs experienced CEI Advisors with commercial and industrial customers to develop a strategic approach to energy management that is both comprehensive and integrated into all levels and functions of the company. The CEI Advisor guides the customer through at least one complete cycle with the goal of providing the framework and training to enable the customer to be able to continue the CEI approach to energy management independently.

The CEI framework applies the principles of continuous improvement to corporate energy management and includes the following process steps: (1) Commitment, (2) Assessments: The core assessments were Envinta's One2Five Energy® Team Survey, and three year's energy metering and billing information. CMTC added three year production data to compile energy intensity profiles for gas, electric, and BTUs, and an Energy Treasure Hunt (3) Planning, (4) Implementation, (5) Evaluation, and (6) Modification. Together, these six steps make up a complete cycle of the CEI process. CEI establishes and maintains the importance of energy management through a comprehensive approach addressing technical opportunities and organizational change with executive level commitment.

An Energy Treasure Hunt Was Added to the CEI Engagement

At the aerospace manufacturing facility, the CEI client advisor, CMTC, and the energy management team decided to plan, develop and deliver an energy treasure hunt to identify opportunities in four categories: Behavior, Equipment, Operations, and Process Change including lean/sigma. The event consisted of 5 working teams of 5-6 team members to scout out possible energy savings in four of their factories and support energy/office areas. Each team, supported by utility account executives and five members from CMTC, had an hour and a half to identify areas in each of their respective locations, where the company could save on energy costs. The teams generated 129 savings opportunities. Prizes were given for most ideas, greatest energy savings, and most innovative opportunity. The teams then formed four implementation groups ranking projects into a cost/benefit matrix. An important follow-on project was designed to provide training to end users at safety meetings and install suggestion boxes with prizes given for the best ideas. The following questions were distributed to participants on each team with check sheets:

Ten (10) Gemba (Toyota Production System) Energy Walk Questions

1. What are the business issues with this product?" Inadequate return on investment? Poor quality? Inability to meet customer ship dates?
2. Who is responsible for the value stream for this product?
3. Where is the pacemaker process, triggered by these customer orders?
4. How are orders transmitted up the value stream from the pacemaker process?
5. How are materials supplied to the fabrication processes?
6. What equipment can be turned off and when?
7. What is the Overall Equipment Effectiveness of the equipment?
8. What are the scrap/rework rates for the process?
9. How are employees trained in lean/quality procedures and motivated to apply them?
10. What are the primary behavioral changes that will eliminate energy waste?

Treasure Hunt Project Deliverables

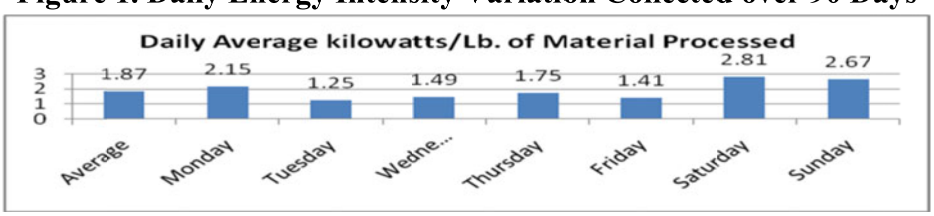
- Identify equipment upgrades with qualifying utility incentives
- Build awareness and create a standardized approach to energy savings
- Develop equipment maintenance program for motors, belts and general maintenance
- Turn off machines and lights in areas during "non-use"
- Improve AC maintenance and reduce air leaks
- Turn off fans when not in use
- Air compressor maintenance
- Install light motion detectors in offices and restrooms
- Create zones for lighting fixtures to eliminate electrical use in "non-use" areas
- Reduce manufacturing scrap and rework, and manufacturing bottlenecks
- Measure energy intensity of product output by shift and for each factory

Energy Intensity (EI) was Calculated to Evaluate Energy Consumption Patterns

EI, the amount of energy consumed per unit of output, was first analyzed by CMTC in a paper presented at the Association of Energy Engineers in 2005[1]. The analysis was refined through the development of an Energy Efficiency Calculator[2], which compared current state energy usage for equipment, a manufacturing process, or a whole building. Currently there are a number of commercially available tools to conduct similar analyses at the site level. EPA has developed a GHG calculator tool that is easy to use.

One of the most dramatic examples of energy intensity variation is shown Figure 1. It came from a thermoforming facility and shows the results of reviewing daily energy and production data. It was discovered that weekend shifts were running 28% of the manufacturing equipment but 100% of the support equipment.

Figure 1. Daily Energy Intensity Variation Collected over 90 Days



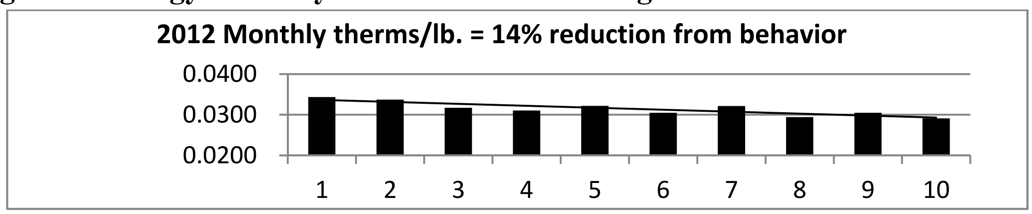
Two process improvement projects were conducted to improve manufacturing velocity. The first project was a single minute of exchange of dies (SMED) to reduce six hour machine changeovers to two hours. The second worked with assembly to improve throughput with simple

[1] Church, G., "Value and Energy Stream Mapping (VeSM) Linking Manufacturing Improvements to Energy Efficiency", Proceedings of the 2005 World Energy Conference, Lilburn, GA: Association of Energy Engineers.
[2] LaPalme, G., Prather, K., Ishii, A., Church, G. 2007. "Generating and Calculating Energy Intensity Savings from Manufacturing Productivity Improvement Projects", 2007 ACEEE Summer Study on Energy Efficiency in Industry, Washington D.C.: American Council for an Energy-Efficient Economy.

layout changes, adding two inexpensive portable drills, and reducing labor constraints by moving two people off the line. The net result was a 74% improvement in output. The two projects eliminated the need to run overtime hours, the highest energy intensity periods in the plant. While the energy savings was worth conducting for each project alone, the financial benefits coming from optimizing the manufacturing system was approximately 10 times greater.

From the aluminum smelter CEI project, the following chart in Figure 2 shows the potential to reduce energy intensity from changing behavior from just a small group of plant personnel. The plant demonstrated a 14% decrease in gas energy intensity over a 10 month period. The savings that came from reducing energy intensity was better management of loading and unloading of furnaces and ovens, and reducing idle machine time in the facility.

Figure 2. Energy Intensity Reduction from Changes in Behavior over 10 months

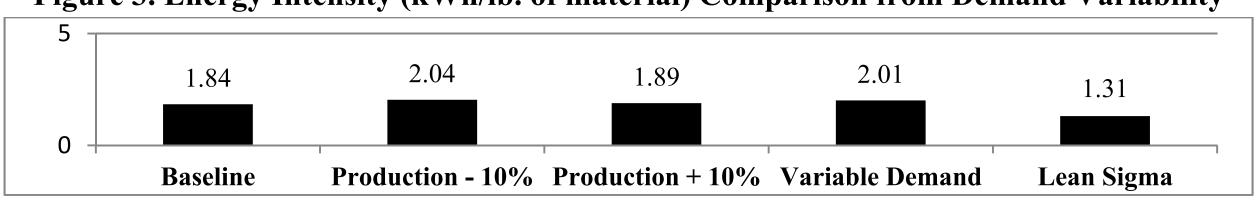


How Product Demand Variability Affects Energy Intensity

We later discovered how many variables affect energy intensity, and had to address a common problem seen in approximately 60 client projects over ten years, where energy savings calculations were complicated by product demand variability. To better understand what was causing the changes in energy intensity, we created four models from six months of production and energy usage data. We held everything constant and adjusted operating hours by the amount of time that was required to meet the demand variability.

Figure 3 shows the energy intensity variations. We discovered applying lean manufacturing principles dealt with demand variations the most effectively[3]. Of interest was that the worst energy intensity performance came from a 10% drop in demand followed by demand swings of +/- 10%.

Figure 3. Energy Intensity (kWh/lb. of material) Comparison from Demand Variability



[3] Church, G., LaPalme, G., "The Relationship between Manufacturing Efficiency and Energy Productivity", 2011 ACEEE Summer Study on Energy Efficiency in Industry, Washington D.C.: American Council for an Energy-Efficient Economy.

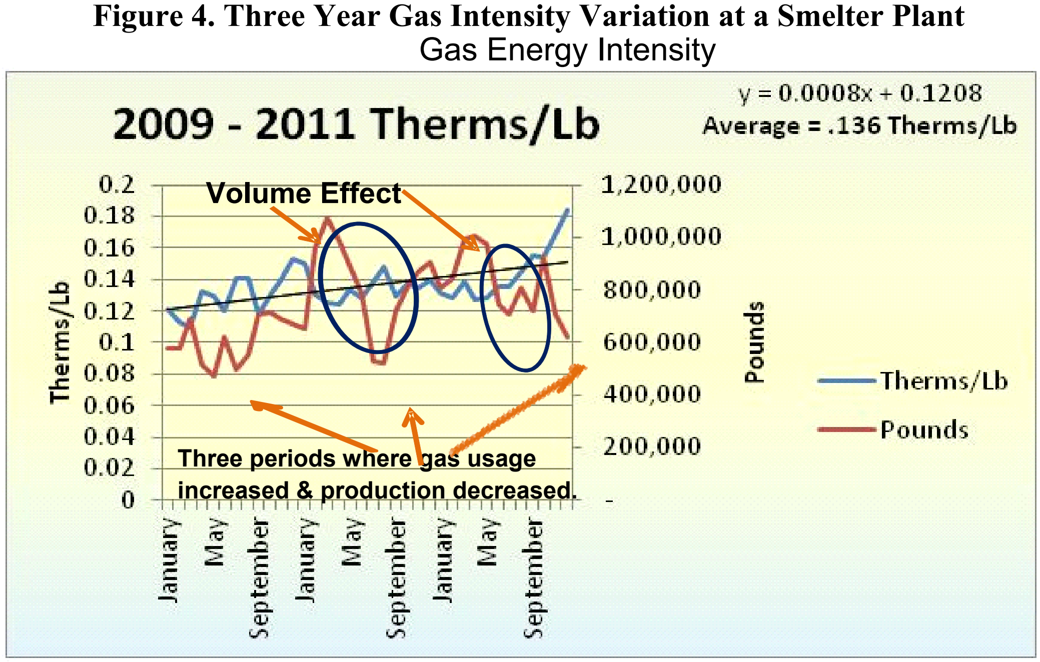
While the results for Lean/Sigma are noteworthy, it's important to note the words of caution supplied in the paper summary, "*Based on the author's experience and observations, while the Lean/Sigma results are impressive and similar results achievable in most manufacturing plants, a word of caution regarding implementing the changes is in order. In most cases, Lean/Sigma deployment is targeted at changing behavior that is often rooted in the manufacturing system. Adjusting the manufacturing system requires discipline and support from senior management if the changes are to be sustained. Due to this dynamic, the initial projects need to be selected based on reduced risk for generating positive results above targeting the largest energy savings projects with highest failure prospects. Finally, there are often energy efficiency equipment retrofits that will contribute both to energy savings and improvements in energy productivity. These projects should be located and implemented early in a plant's efforts to reduce energy intensity and improve energy productivity*."

Unexpected Energy Intensity Variations Discovered in CEI Engagements

In the early stages implementing energy savings projects, it was generally thought that an increase in production with existing manufacturing resources would provide a "volume effect" and energy intensity would go down. A volume effect is defined by the expected decrease in energy intensity that occurs with increased production. However, we found this characteristic will generally hold true only as long as the manufacturing system performance retains its efficiency.

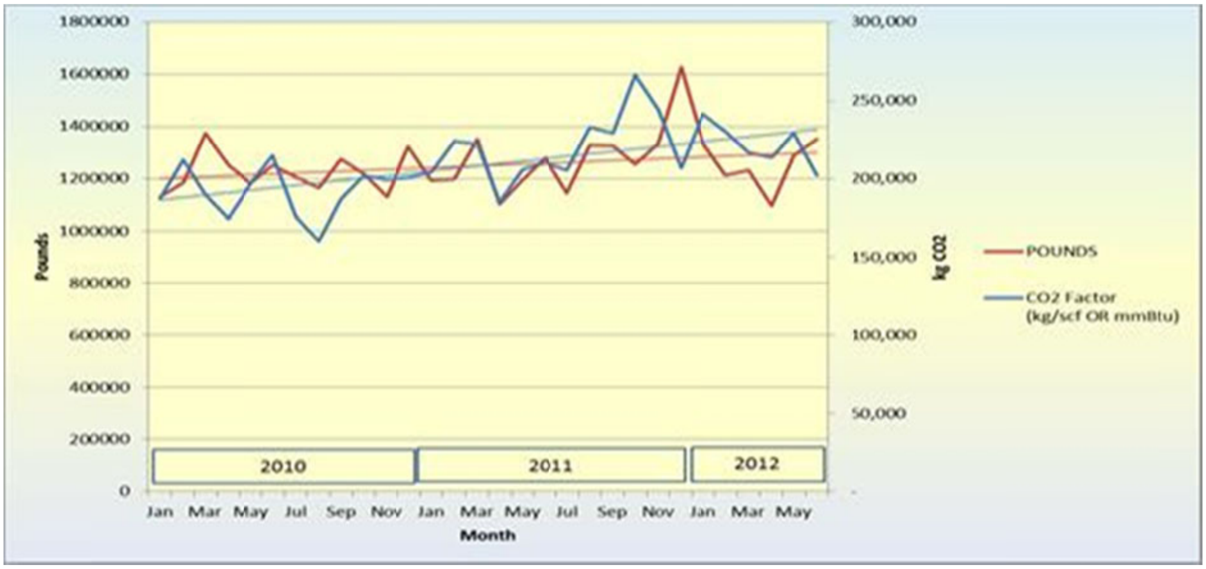
At the point that increases in labor and shifts are required energy intensity often changes direction and rapidly degrades. There is a less obvious problem when production decreases and energy intensity increases observed three times in Figure 4, and most dramatically at the end of 2011. Over many projects, it was discovered this problem's root cause is primarily centered on employee behavior with equipment performance playing a lessor role.

Figure 4. Three Year Gas Intensity Variation at a Smelter Plant



Variability in almost every measureable metric has been a constant in all the programs that CMTC has worked on attempting to reduce energy intensity (EI) for gas, electric, BTUs and carbon footprints. Figure 5 shows an unwanted trend from variable production levels with output swings in CO2. The most important element to control the undesirable swings is collecting sufficient data on a timely basis, when action can be taken, and before the problems become "standard work" in the manufacturing system.

Figure 5. Production and GHG Graph for Food Processor



CEI & Long Term Energy and GHG Reduction Goals

Looking again at the analysis done at the aluminum smelter, the following Figure 6 shows the smelter's 10 year electric and gas reduction goals for the site. The company was near the 25,000 metric ton limit for mandatory GHG reporting under California's landmark AB32 legislation. The company president was investigating installing a solar array at the site after reviewing a favorable return on investment analysis looking at future trends in demand charges, electric rates, and GHG trading credits. If they can meet these reduction goals after achieving a 14% reduction in the first year, the company will continue to remain a strong competitor in an international, commodity-based market.

Figures 6. Ten Year Program Electric and Gas Reduction Goals

Year	kWh/Lb. Produced	Elect. Reduction from Prior Yr.	Cumulative Annual % Reduction	Year	therms/Lb. Produced	Gas Reduction from Prior Yr.	Cumulative Annual % Reduction
Baseline	0.074385			Baseline	0.599822		
2013	0.072898	2%	2.0%	2013	0.587825	2%	2.00%
2014	0.071440	2%	4.0%	2014	0.057606	2%	4.00%
2015	0.070011	2%	5.9%	2015	0.564547	2%	5.90%
2016	0.068611	2%	7.80%	2016	0.553256	2%	7.80%
2017	0.067239	2%	9.60%	2017	0.542191	2%	9.60%
2018	0.065894	2%	11.40%	2018	0.531347	2%	11.40%
2019	0.064576	2%	13.20%	2019	0.520721	2%	13.20%
2020	0.63284	2%	14.90%	2020	0.510306	2%	14.90%
2021	0.062019	2%	16.60%	2021	0.500100	2%	16.60%
2022	0.060778	2%	18.30%	2022	0.490098	2%	18.30%

CEI Produced Similar Energy Savings Opportunities as Other Programs

In Figure 7 is a sample of the types of energy projects that came from the CEI program. Listed are projects that qualified for either retro-commissioning, designated as process optimization, or Integrated Demand Side Management (IDSM). Incentives were paid from $0.05 to $0.12/kwh annual electric savings. Gas savings earned $1.00 per therm. Attachment A outlines one CEI engagement and the calculated energy savings that came from it. Attachment B provides a CEI case study.

Figure 7. Energy Savings Projects from CEI and Other Programs

CEI Program	**Retro-commissioning Opportunity**	**Annual Retro-commissioning savings**	**IDSM Opportunities**
Aerospace & Defense	Set-up reductions, improve uptime with Total Productive Maintenance, reduce operating hours.	1,500,000 kWh	DSM project, cooling tower replacements, ISO 50001 interest
Smelter	1. Six Sigma project 2. Behavior related savings = 14% gas and 1% electricity over eight months	400,000 therms, 220,000 kWh	Metal Cleanliness Analyzer, 49,500 therms
Process Improvement Programs			
Battery Manufacturer	Rework reduction plate forming, reconfiguration and line balancing (65% improvement)	42,000 therms and 650,000 kWh	Lighting project, controls, waste heat recovery, major DSM project for battery charging

CEI Program	Retro-commissioning Opportunity	Annual Retro-commissioning savings	IDSM Opportunities
Tile Manufacturer	Six Sigma waste reduction	169, 250 kWh	Motors and compressors
Thermoforming Plastics	Productivity improvements, SMED, improve assembly throughput 67%	621,000 kWh	Controls to reduce weekend energy intensity by 80%
Injection Molding Plastics	Six Sigma project to reduce 10% cutting scrap	950,000 kWh	Review motor replacement strategy
Window Glass Manufacturer	Reduce scrap rates, improve production scheduling	484,000 kWh	Compressors, cooling tower, office & warehouse lighting

CEI Core Documents Were Developed that Supported ISO 50001 Certification

The CEI program generated six primary core documents to set the framework for ISO 50001 certification. These were consistent for easy transportability from ISO 9001, ISO 14001, and AS 9100 to this new energy management standard. The core documents:

1. CEI Roles and Responsibilities Matrix
2. Energy Goals and Key Performance Indicators Report
3. Energy Policy
4. Action Plan
5. Employee Awareness Plan
6. Sustainment Strategy

A gap analysis was created to convert from the most common ISO standards to ISO 50001. The joint sponsoring utilities, Southern California Edison, and Southern California Gas Company generously provided sufficient funding from the program to meet certification requirements. The biggest concern for manufacturers was maintaining the standard once it was in place. However, clients considered the benefits in managing their energy program through ISO 50001 to outweigh future labor costs.

CEI Pilot Program Conclusions

A key component for success in the CEI program was found to be active and sustained employee involvement in observing and reporting opportunities for energy savings throughout the facility. Plans were made to conduct periodic employee awareness events, provide training related to things to look for (the earlier-mentioned Treasure Hunt served this purpose) and a regular recognition-and-rewards presentation to employees who made contributions to success. This reinforcement from management proved to be a valuable contribution to the ongoing sustainment and progress of energy improvements even after the conclusion of the formal CEI program period.

While energy efficiency programs are growing in popularity around the United States, for the more aggressive objective to create sustainable manufacturing facilities, renewable supply side solutions are going to be needed to achieve this goal. In California, where the pressure to reduce GHG is already a factor, companies are asking for utilities and third-party providers to provide information about how much these systems will improve their carbon footprints. They also want to know about the full range of financial benefits from trading carbon credits to creating even greater savings from increasing energy costs.

Reducing energy consumed per widget from conducting simple and straight forward process improvement events was once again observed in the CEI pilots. At the same time, great opportunities arose from utility based demand and supply side programs. With the water/energy nexus becoming more important with current draught conditions throughout the U.S., it appears the time is right to support the manufacturing industry of all sizes with innovative programs designed to improve competitiveness, while reducing environmental impacts. It will be interesting to see if the utility industry can apply the same types of continuous improvement methods and rapid product development strategies, which manufacturers are adopting to stay in business, to their own portfolios. CMTC advocates on behalf of manufacturers to do this as soon as possible.

Attachment A: Impact of CEI Program on Utility DSM Program Participation

Energy Savings Projects - Implemented or Scheduled	kWh/yr	Therms/yr	GHG/CO2
Major Energy Projects Scheduled			
Upgrade burners and insulation on Shaker Furnaces		90,000	700
Items Identified @ "Treasure Hunt" (see note, below)			
Process Improvements	120,000		37
Maintenance-related (various) [20 items on list]	40,000	10,000	95
Equipment Upgrades (various) [60 items on list]	90,000	15,000	180
Air Compressors & Lines [7 items on list]	50,000		15
Operations/Training (various) [11 items on list]	80,000		25
Behavioral Changes (various) [21 items on list]	90,000	12,000	190
Electricity Self-Generation			
Installation of solar panels to reduce peak grid demand	300,000		90
Micro gas turbines for electricity generation	600,000		185

*Utility Programs List: Calculated and Deemed Incentives, Retro-Commissioning, Direct Install, Partnerships, Third Party and New Construction.

There were a number of retro-commissioning opportunities to reduce energy consumption through process improvement. These included a Total Productive Maintenance (TPS) project, set-up reductions, waste reduction, better inventory management, and productivity increases to reduce overtime. If applied to all three factories, a 10%-15% reduction in energy intensity was estimated to be possible.

Attachment B: A CEI Case Study

Continuous Energy Improvement Program
CEI Case Study: Lisi Aerospace, Torrance CA

Facility Summary

Location: Fontana, CA
Number of Buildings: 4
Total Square Feet: 1,220,000
Energy Use:
16,504,284 kWh
238,130 Therms

CEI Facilitator: CMTC
Account Executives:
Michael Yee, So Cal Gas Co.
Karen Kahn, Southern Calif Edison

Company Background

Lisi Aerospace is a multi-national company headquartered in France with operations around the world. The primary business is providing high-tech fasteners to aerospace, automotive, and industrial customers. The world market for aeronautical fasteners and assembly components is estimated at more than 2 billion Euros. LISI ranks third in the world with a 15% market share and is particularly favored by AIRBUS and European engine manufacturers. With the acquisition of Hi-Shear in the US, LISI AEROSPACE is strengthening its position with BOEING, and in the past few years, has become a partner with many US equipment and engine manufacturers.

The Torrance facility – formerly Hi Shear Corporation – produces many types of fasteners, all of which have been qualified by Boeing, Airbus, Bombardier, Embraer, and Lockheed Martin.

The Torrance campus contains three primary dedicated factories: Pins, Collars and Nuts. Within the factories are numerous energy-intensive processes using equipments such as Shaker Furnaces for heat treating, as well as plating and coating facilities.

Torrance has a goal to become more environmentally conscious and, with the CEI program, is working on reducing Energy Intensity and GHG emissions.

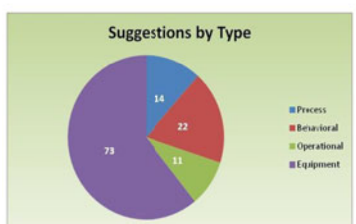
With over 1 million square feet of plant space, more than 500 employees and hundreds of pieces of equipment and processes, energy management and emissions controls can be a significant challenge. But the plant management has shown commitment to making improvements and becoming a world-class facility by implementing strategic planning models and techniques as provided by the CEI program.

Successful CEI Engagement

The CEI program at the Torrance plant commenced in February 2012 and ran through December 2012 with CEI Advisors. The 11-month engagement produced significant benefits to the energy management culture of the company.

During the CEI program startup, the team underwent an energy management baseline assessment using the EnVINTA™ software tool. The results of the survey indicated that while the facility has had an energy concern for some time due to corporate directives, the efforts were not previously focused on a strategic basis.

To focus on areas of energy waste, a plant-wide "Treasure Hunt" was conducted in which over 100 ideas for improvement were generated by employee teams. These ideas fell into the following categories:



As shown, many of the ideas reflect the need for behavioral changes which can come from improved energy awareness. For a large-scale improvement, the team selected a project to explore the benefits of a Honeywell Automated Demand Response Energy Management System. This system would allow improved participation in the DR program.

The structure is now in place that helps to ensure ongoing sustainment of the gains.

Quotes

General Manager

Peter Mehalcheko, the Lean Six Sigma Master Black Belt and energy champion at the facility has been highly involved in the CEI program since the kickoff. When asked for his impressions of the program he said, *"We like the fact that the CEI program has an approach based on proven Continuous Improvement techniques with measureable metrics, analysis tools, and reporting to management that supports projects and initiatives at the plant level."*

Account Executive

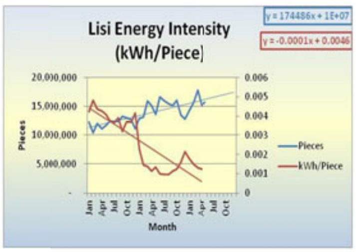
Karen Kahn, AE for So Cal Electric., observed that the potential for electricity savings is significant – both from improving equipment efficiency as well as from employee behavior and operational changes. She said, *"Helping the facility management understand the benefits of a particular incentive program or reduction initiative is always difficult but CEI provides the framework and communications channel to make these issues available and understandable."*

Energy Team Leader

Michael Lotito, the facility CEI energy team leader said,: *"The program provides a useful basis on which to provide direction for our energy team and for all plant employees to contribute to our energy improvement efforts and to contribute their ideas and suggestions in useable ways."*

Measurement and Energy Savings

The graph below illustrates part of the "Energy Dashboard" used at the facility to track the trends of Energy Intensity. As the plant produces more pieces, the energy per piece is reduced. The figure can be difficult to compute as a fixed level is used by the administrative section of the facility. However, the dashboard does show a trend reflecting the impact of the CEI-related improvements with better energy efficiency.



CEI has been so successful that Lisi Aerospace Senior Management has committed to the following 25% energy reduction for electricity over the next ten years.

Year	kWh/Piece Produced	Yearly % Elect. Usage	Overall % Elect. Usage
Baseline	0.4392513		
2013	0.4304663	98%	98.0%
2014	0.4218569	98%	96.0%
2015	0.4134198	98%	94.1%
2016	0.4051514	98%	92.2%
2017	0.3970484	98%	90.4%
2018	0.3891074	98%	88.6%
2019	0.3813252	98%	86.8%
2020	0.3736987	98%	85.1%
2021	0.3662248	98%	83.4%
2022	0.3589003	98%	81.7%

The chart below shows the statistical metrics that Lisi uses to validate their dashboard trends. Due to the complexities of their product mix and their production cycles, period-to-period comparisons can be difficult. With a six-sigma blackbelt on their team, statistics such as these can become valuable analysis tools. They provide methods for filtering out the natural variations in the data and the overhead components thus providing a better view of the true trending in their energy intensity component related to actual production processes.

Lisi	KW/Unit
Max	0.799101
Min	0.324637
Range	0.474464
Average	0.439251
Std. Dev.	0.101024
R^2	0.020895

Date of Report- 12/14/2012

Lessons Learned

The CEI program at Lisi Aerospace provided a number of valuable lessons that will enable the facility to continue its improvement efforts into the future. The employee awareness and behavior improvement initiatives are not only reducing energy usage and Green House Gas emissions but support a culture of energy savings. Periodic Energy Treasure Hunts are the source of many inexpensive, yet impacting, energy savings opportunities.

- Energy usage can be dramatically improved through the CEI principle of employee awareness and involvement. The Measurement and Savings section provides examples of plans for this type of improvement.
- Simple, inexpensive improvements can make significant contributions towards energy efficiency if time is taken to identify and prioritize them.
- A formal Sustainment Policy should be part of the formal handover process to the Account Executives and ongoing involvement from the AE's is a key component of the sustainability of the benefits long term.
- Institutionalized Systems will help sustain solutions permanently. These can include:
    - ISO 50001
    - EnVinta assessment results and recommendations.
    - Regularly scheduled Energy Team Meetings
    - Routine Senior Management Review
    - Regularly scheduled Energy Events
    - Standardized Monitoring Scheduled including what, when, who, measures and who uses the data and how.
    - Smart Goals
    - Energy Rewards and Recognitions Program
- Energy use analysis can provide some insights into patterns that are not initially apparent but can provide ideas for reductions and efficiency improvements. The interval data at Lisi showed that while total energy use was lower on weekends than during the week, but the kWh per Piece Produced was higher. This led to a Weekend Energy Treasure Hunt event that identified unseen areas of waste.

Best Practices

STRATEGIC ALIGNMENT

Lisi Aerospace Inc., is an international company that has been a highly-visible enterprise in the global marketplace for many years. Management wishes to continue to improve its image as a socially conscious company. It has adopted the principles and methods of the CEI program to direct their efforts and the program has become a valuable vehicle to provide improvements in energy and environmental performance with metrics to confirm that their goals are being met.

ENERGY TEAM FUNCTIONS

The CEI program has created, trained and tasked a team within the facility to foster energy awareness among all employees and to identify areas where energy improvements can be implemented. The Energy Team is a cross-functional team with members from various levels of the organization.

INVOLVEMENT OF ACCOUNT EXECUTIVES

The CEI program has provided a vehicle for communications between the AE's and facility management that greatly enhances their access to information that will benefit energy management.

ENERGY TREASURE HUNTS

Energy Treasure Hunts are quick, inexpensive events that expose many improvement opportunities in a very short period of time, usually between one and a half and two hours. Several teams will survey an area in search of conditions causing energy waste. These are reported by each team and discussed for additional inputs.

These opportunities are then placed into a Kaizen Matrix, categorized and ranked by Impact and ROI. The opportunities are then prioritized to provide the improvement teams with a list of projects, the benefits and a assigned in a Responsibility Matrix. These are then reviewed and progress discussed on at each Energy Team Meeting.

EMPLOYEE BEHAVIOR IMPROVEMENT REGARDING ENERGY

As a result of the findings from the energy treasure hunt activity, the team has concluded that many of the changes that will produce energy savings will be achieved through improved employee awareness and modified behavior. A program to promote awareness is being implemented.