

FACILITY ENERGY & RESOURCE MANAGEMENT CASE STUDY (LARGE INDUSTRIAL FACILITY)

Situation

The energy intensive industrial facility needed to reduce their energy and operating related cost to increase profitability. The effort was for energy related opportunities, however, operating and production parameters were also considered. This provided a focus on overall improvement for the facility and not a limited view of just the energy component of the opportunities. The goal was to find opportunities that included both low cost opportunities in addition to capital opportunities for the reduction in facility costs. The desired goal was to have an overall reduction below a 2 year simple payback. This included operational savings that had a very short payback and capital opportunities that had up to a 3 year payback.

Description of Facility

Large heavy industrial facility, 565,000 sq. ft. consisting of

- Production Areas
- Central energy plant
- Administrative Offices
- Warehouse

Annual Energy Spend > \$5,000,000

Annual Energy Cost Savings = \$306,784

Total Turnkey Installed Cost = \$152,000

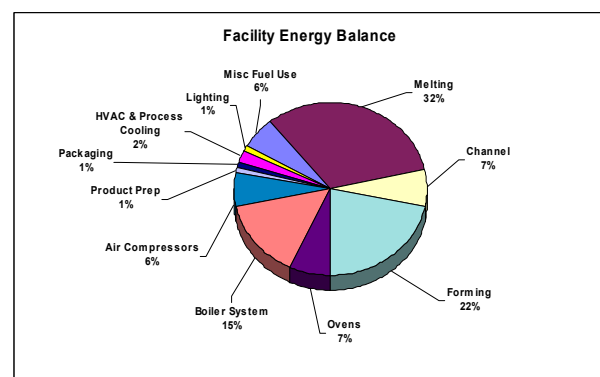
Simple Payback = ½ year

Averaged IRR = 200%

The Methodology

The methodology required utilizing a different process than is utilized when only looking at energy reduction opportunities. The process was more time intensive in the identification, analysis, and development stages because it looks at the way that the facility systems are operated in addition to looking at the opportunity to improve the efficiency of the system and equipment. This requires an evaluation of the operating parameters and methodology that is utilized for the operation of the systems to determine the opportunities for decreasing the combined energy, operating, and maintenance cost. The evaluation looked at items such as operating set points, shift to shift variation, equipment operating schedules, and maintenance practices, in addition to opportunities to install more efficient technology or equipment

The first step in the analysis was to perform an energy balance to determine where the greatest opportunities existed. The energy balance provides information on how much energy is being consumed by the systems and was used as a “baseline” condition. The pie chart to the right shows the results of the facility energy balance. Although no systems were ignored, it is obvious that the large energy users provide the greatest potential for improvement and cost reduction.



A preliminary identification of opportunities was performed and the opportunities were prioritized and reviewed with the facility personnel. The team then agreed upon which areas to focus on first. The opportunities that were given the highest priority were those which could be developed and implemented fairly quickly and those which provided the larger savings opportunity. Once those opportunities were in development process the lesser priorities were worked on.

The second step in the process was to perform the opportunity development. This step provided the details necessary for the implementation of the opportunities, including data gathering, monitoring if necessary, savings analysis, and pricing of the implementation. At the conclusion of the detailed development phase the opportunities were ready for final approval and implementation.

The final step in the process is the actual implementation of the opportunities. The implementation can take on several forms depending on the type of opportunity. It included the writing of an operational procedure and training of operators to modify an operating practice, the implementation of a maintenance practice for systems such as compressed air, and it included the installation of more efficient equipment such as boilers and heat recovery equipment. All of these types of opportunities provided the basis for the overall facility resource improvement and cost reductions.

The Results

The results of the efforts in this case were cost reduction savings that exceeded the cost to development and implement the opportunities. This facilities' return is higher than what would normally be expected but magnifies what can be achieved by teaming up with Solution Dynamics to take the time and effort to perform a detailed analysis of all of the different aspects of the facilities costs.

Summary of Implemented Energy Conservation Opportunities

The table below is a listing of the types of opportunities that were identified and implemented in this particular facility

<i>Compressed Air</i>	<i>Ovens</i>	<i>Steam System</i>	<i>Process Improvements</i>	<i>Lighting Systems</i>
<i>Control Optimization</i>	<i>Burner Tuning</i>	<i>Boiler Operation Optimization</i>	<i>Optimize Equipment Operation</i>	<i>Higher Efficiency Lamps and Ballast</i>
<i>End Use Modifications</i>	<i>Air flow reduction</i>	<i>Repair/Replace Failed Traps & Return Condensate</i>	<i>Modification of Operating Set points</i>	<i>Evaluation of lighting requirements / De-lamping in over-lit areas</i>
<i>Air Leak Remediation</i>		<i>End Use Modifications/ Elimination</i>	<i>Improved Operating Methodology Across Shifts</i>	<i>Occupancy Sensors</i>