

Industry in Vermont: Making It Successful for All of Us

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ABSTRACT

Efficiency Vermont offers far more than conventional Demand Side Management (DSM) resources to aid customers in improving the energy efficiency of their facilities and production equipment. Efficiency Vermont's custom approach brings flexible financial incentives, "on call" technical assistance, third party verification, and project financing to assist customers in incorporating energy saving measures into their planning and decision process. Our ability to work with industrial customers on a wide range of efficiency efforts has developed effective working relationships and increased their opportunities to reduce operating costs, all while strengthening their commitment to a positive impact on the environment.

Efficiency Vermont's relationship with companies like Husky Injection Molding Systems is helping to boost the competitiveness of Vermont industries in the national and global marketplace. While many energy efficiency programs are limited by their prescriptive approaches, the flexibility built into Efficiency Vermont's approach promotes a seamless relationship with large customers, such as Husky, that is compatible with corporate level goals. This is especially important when equipment choices are continually changing and customers continue to find creative ways to save energy and reduce costs.

Introduction

Efficiency Vermont takes a unique approach to meeting the needs of business customers. In order to best serve customers, maximize energy savings and achieve market transformation, Efficiency Vermont considers it extremely important to build long-lasting relationships with our customer base and the strategic partners that serve them.

We will illustrate this point by specifically highlighting our history with Husky Injection Molding Systems, a plastic injection molding equipment manufacturer located in northern Vermont. There is natural synergy between the corporate goals of Husky and that of Efficiency Vermont. This provides an optimistic illustration that economic competitiveness and respect for the environment are not diametrically opposed.

The Efficiency Vermont Model

Efficiency Vermont, the first dedicated Energy Efficiency Utility (EEU), began operation in March 2000. Vermont Energy Investment Corporation, doing business as Efficiency Vermont, is under a performance-based contract with the Vermont Public Service Board to fulfill the EEU requirement through 2005. Services for all residential, commercial and industrial electric ratepayers are funded by an Energy Efficiency Charge (EEC). With a few variations that include the City of Burlington, all Vermont electric ratepayers contribute to the EEC.

In 2004, Vermonters who worked with Efficiency Vermont to make cost-effective efficiency investments saved 58.4 million kWh in electric energy. Savings in 2004 met 44% of the growth in electrical energy requirements in Vermont during the year. These savings were achieved at an average cost of \$.028/kWh. This is 37% of the price of electricity purchased by electric utilities on the wholesale market. In addition, from an air quality perspective, these savings yielded a 500,000 tons reduction of greenhouse gases that would have been produced by conventional electric generation.

Supplying Energy Efficiency Products and Services

Efficiency Vermont builds and maintains strong working relationships with strategic partners that operate in the commercial market. This includes design professionals (e.g., architects, engineers), trade allies (e.g., electrical and mechanical (HVAC) contractors and suppliers, etc.) and trade associations. These strategic partners often make electrical and mechanical equipment choices on behalf of end-users with little regard to operating costs over the lifetime of the equipment. Efficiency Vermont acknowledges this significant detail and has dedicated substantial effort to build relationships and to encourage design professionals to specify high efficiency equipment. In addition, Efficiency Vermont places considerable resources in the marketplace to assist suppliers and contractors with the promotion, inventory maintenance and installation of high efficiency equipment.

Due to the competitive nature of business, low cost/low efficiency equipment is typically carried in stock by suppliers and installed by contractors. High efficiency equipment often requires a “special order” that could take days or weeks to reach Vermont. For projects with short timeframes, i.e., equipment failures, poor planning, suppliers will provide the standard efficiency equipment that is available “off the shelf.”

Efficiency Vermont staff continually seek to minimize lost opportunities by addressing market barriers that include lack of information, availability or funds.

Business Development Specialists (BDS) are in regular contact with strategic partners to inform them of equipment eligible for Efficiency Vermont incentives and how they can leverage the use of those incentives to offset the cost premium associated with energy efficiency. The use of BDS staff is instrumental in achieving greater market penetration on the design and equipment supply side of the market. Efficiency Vermont is also working upstream with distributors and manufactures to gain a better understanding of the supply chain and how to overcome barriers to availability.

Applying resources to assist in overcoming these supply chain barriers improves the effectiveness of Efficiency Vermont services available to large commercial and industrial customers. When project managers and customers specify a particular high efficiency improvement, it has greater likelihood for success when the benefits of the technology are understood and its installation is readily accessible from the provider.

Building Demand for Energy Efficiency Products and Services

Efficiency Vermont provides statewide technical and financial assistance for Vermont residential, commercial and industrial customers to increase energy efficiency and decrease operating costs. In the Business Services sector, Efficiency Vermont addresses the needs of the customer on a case by case basis.

Project-Level Assistance

For relatively uncomplicated equipment replacement projects, Efficiency Vermont has a range of prescriptive incentives available for the large and small commercial market: lighting, HVAC, refrigeration and motors. Commercial customers can receive incentives by submitting single page application forms for projects that can range from replacing a single fluorescent ballast to a new walk-in cooler.

For more complex, well -defined large commercial and industrial projects, a project manager is typically assigned to address requests for technical energy efficiency services. This would certainly include any large commercial and industrial customers and the design professionals and/or trade allies that provide construction services to them. The project manager determines the scope of the proposed project, the timeline and whether proposed equipment meets high efficiency standards. With sufficient lead time, a project manager will perform a site visit to verify the savings potential of the proposed installation and make additional recommendations based on information gathered from that visit. Suggestions could include:

- alternative measures that would garner more savings
- an increase in the project scope (additional measures) to maximize savings
- cash flow analysis that supports the additional investment
- project financing options

In order to better serve commercial and industrial markets, Efficiency Vermont provides customers with this customized approach to evaluate energy efficiency opportunities and solutions. Depending on the needs of each particular customer, Efficiency Vermont project managers will do “what it takes” to meet their needs to reduce operating costs through energy efficiency options. A range of services are offered, including: participation in the pre-design and development process; reviewing plans and specifications; assisting with product research and selections; analyzing energy savings; and verifying installation of specified measures. Efficiency Vermont offers financial incentives to reduce the potential of energy efficiency opportunities being “value engineered” out of the final scope of work. Solutions can range from single measure installations to comprehensive facility improvements that include lighting, HVAC and process system upgrades.

Efficiency Vermont has moved away from a program-centric to a more holistic markets approach. Our focus on markets gives a broader view point when considering efficiency improvements within a facility. Most programs focus at the equipment track level and fail to survey the market forces that influence a particular action. In Vermont, problems with this approach can be exemplified at Vermont’s ski areas. Equipment-level programs would require separate customer/DSM provider interactions for snow making operations, commercial kitchen equipment, commercial office lighting and space conditioning, recreation facilities (e.g., swimming pools or tennis courts), multifamily dwellings, and single-family residential.

In a markets approach, Efficiency Vermont delivers energy efficiency services to the entire market, consolidating energy assessment and financial services within the market, rather than via separate, constrained delivery vehicles. This markets approach enables Efficiency Vermont project managers to modify energy analyses to suit a particular application and to encompass the far reaching impacts from a customer’s energy decision. The traditional

prescriptive approaches to efficiency overlook significant energy efficiency opportunities, both in interactive effects as well as non-electric benefits.

To capture these missed opportunities, Efficiency Vermont utilizes a custom approach where both technical and financial services are leveraged toward the best energy efficiency opportunities. For large commercial and industrial customers, a project manager is assigned as a single point of contact with the customer and their construction team in order to reduce confusion. Efficiency Vermont then carefully matches levels of service to a given project to balance implementation costs with customer needs and energy efficiency opportunities. Project managers are not limited by the need to fit a project into a particular “Program” or prescriptive measure track.

Customer-Level Assistance

The key, however, to Efficiency Vermont’s ongoing success is our customer-level, rather than project-level, assistance. During its first four years of implementation, Efficiency Vermont realized that it was most successful in penetrating markets where staff built successful, long-term relationships. Delivering energy efficiency services beyond a “project-centric” approach provides an opportunity to develop a high level of confidence. Through this value-added approach, a designated Project Manager undertakes the “extra steps” needed to establish the level of customer communication that fosters a continuous dialogue regarding current and proposed projects.

Elements of this customer-level assistance include:

- ☑ Attending periodic meetings with a customer to get an overall sense of their facility plans, particularly any anticipated upgrades or expansions, as well as potential discretionary retrofit projects
- ☑ Following through on requests to evaluate potential opportunities or provide information to the customer on energy efficiency opportunities
- ☑ Initiating contact and discussion with a customer’s equipment and service suppliers on potential energy savings projects
- ☑ Maintaining regular communication regarding ongoing projects, including status updates and reiteration of information needs and next steps

This customer-level assistance works in concert with the project-level assistance (described previously) to provide a high level of sustained customer service, to build credibility and trust with the customer and to establish or to reinforce energy efficiency as part of the their business practices.

Husky Injection Molding Systems – A Case Study

In order to illustrate the effectiveness of this approach at Efficiency Vermont, we have chosen to highlight our working relationship with Husky Injection Molding Systems in Milton, Vermont.

Husky Injection Molding Systems Overview

Husky Injection Molding Systems is a manufacturer of comprehensive lines of plastic injection molding equipment. This international company was founded in 1953. Currently, Husky has manufacturing facilities on two continents. The primary locations are in Europe and North America with an expansion being completed in Asia. Corporate headquarters are found in Bolton, Ontario.

Simply stated, Husky's mission is to find innovative ways of keeping their customers in the lead. Their business started out by building molds and soon moved into building entire molding machines and designing total injection molding factories. In response to customer needs, they developed high speed and high volume systems. Their business model proved so successful that, soon after, they began to operate at the global market level offering international service support. From a consumer perspective, everyday examples of packaging produced by Husky's equipment are plastic soda, juice and water containers.

At Husky, minimizing impacts of their business on the environment plays an important role in critical corporate decisions. Husky personnel are committed to a wide range of programs that protect the environment, conserve natural resources and safeguard the health and safety of their communities. Corporate initiatives include the reduction of solid waste and hazardous materials, implementation of environmental management systems, optimization of energy use, and naturalized landscaping. One of the main themes associated with one particular initiative is the optimization of energy use. Husky uses a unique program called "GreenShares" to motivate their employees to take environmental and social responsibility beyond the workplace. Husky employees can earn "GreenShares" or shares of Husky common stock by taking personal measures to reduce their daily energy use around them. Actions such as car pooling to work, turning lights off, and purchasing hybrid vehicles are to name a few. Husky promotes environmental awareness as a shared goal and responsibility for their employees.

Husky's Vermont campus is located on 700 acres site in Milton, approximately 15 miles north of Burlington and 75 miles south of Montreal, Quebec. The company located at this site in 1998. Due to their location, in the rural state of Vermont, energy costs have been a concern from the beginning. The maintenance and engineering staff are continually investigating new ways to improve the bottom line. One way to achieve this is with the reduction in energy required for both the process and building systems.

Relationship Development

The partnership between Husky and Efficiency Vermont has grown over time. Husky was still relatively new to Vermont when the Efficiency Vermont contract was established. About the time of construction of the original facility, electric utility DSM programs in Vermont were in the process of being phased out. Efficiency Vermont was faced with establishing itself as a reliable resource on energy efficiency for Husky. Initially, this involved setting up channels of communication between Husky facility engineers and Efficiency Vermont.

Because Husky is a significant contributor to the Energy Efficiency Charge, their initial interactions with Efficiency Vermont staff were directed primarily toward maximizing any incentives for which they were eligible. Husky began to recognize the value of the technical assistance provided by Efficiency Vermont project managers and began to consult with them early in the design process of plant improvements.

The Husky-Efficiency Vermont relationship has recently evolved to the single point of contact model where the communication path is clear and direct. Using the flexible customer service approach, Greg Baker has taken on full responsibility to ensure that Efficiency Vermont services meet their energy efficiency needs.

Project-level assistance. Prior to establishing a solid partnership, many projects at Husky moved forward without significant Efficiency Vermont involvement. Through regular contact, Husky began to realize the depth of assistance available to them. As plans for a large plant expansion and HVAC improvement project began to develop, Efficiency Vermont was asked to review the projects for efficiency options and any available financial incentives.

Facility Expansion

Husky has made many improvements to their manufacturing facility in just a short time since beginning business in Vermont. In 2003, rising sales prompted an expansion that included adding new machinery and enlarged the building by 17,600 square feet. This brought the total area to almost 250,000 square feet. The total investment was close to \$13 million after completion.

The building addition contains high performance lighting, ventilation and thermal envelope construction. The lighting equipment chosen to illuminate the space was 320 watt pulse start metal halide, high bay fixtures with dual powered ballasts. The ability to reduce the lighting power density below ASHRAE/IESNA 90.1 2001 levels without impacting work quality at any station was an important consideration. The lighting fixture's dual powered ballasts are linked to optimally located daylight harvesting sensors within the space. If the lighting level exceeds certain pre-set limits, the sensors automatically power down the lighting fixtures to 50% light output. The large area of glazing in the space offers many daylight hours of opportunity to reduce the power input to the fixtures. The lighting measures in this project are estimated to save 149 MWH of electricity per year and \$114,000 in Total Resource Benefits (TRB)¹, which includes fossil fuel savings.

This project also included many new air handlers to supply large quantities of air to the manufacturing space. The supply and return fans for each unit were all equipped with variable frequency drives. This drive application is a very energy effective way to control room air temperatures. Reducing the speed of the fan saves a large amount of energy over the previous, damper control, method to control air flow into the space. In this particular project, 24, 50 hp supply fans and 12, 25 hp return fans were equipped with VFDs for a total electrical savings opportunity of 1,016 MWH per year and \$501,000 TRB. A total incentive of roughly \$29,000 was offered to Husky to offset the combined approximate incremental efficiency cost of \$148,000 for the new lighting and VFD equipment.

Focusing on one of Husky's core values, maintaining a comfortable and pleasing work environment, an Efficiency Vermont project manager worked with Husky personnel and their design consultants on balancing different equipment and control options for the proposed space. Efficiency Vermont was able to add a cost - benefit analysis that considered measure life, maintenance cost over the equipment life, savings opportunity, equipment costs and financial

¹ Total Resource Benefits (TRB) is the present value of the avoided cost for electrical and fuel savings over the lifetime of the equipment.

incentives. This evaluation helped rule out some options and gave further details on benefits of the measures being considered.

Space Cooling System Expansion

In another recent project, Husky needed to increase their comfort cooling capacity. Due to the uncertainty of the future growth, Husky decided to install seven, 80 ton modular water cooled chillers. The efficiency of these units was above the ASHRAE 90.1 level. This modular approach provides them the ability run the chiller loads closer to the actual cooling demand without turning on additional, unneeded capacity. The primary chilled water, evaporator and condenser pumps were all equipped with variable frequency drives in order to deliver exact amounts of cooling water to the supply network. This project will save approximately 175 MWH per year of electricity and \$74,000 in TRB.

At Husky's request, Efficiency Vermont project managers were charged with the goal to find alternative chiller designs and manufacturers that could provide the same operational benefits but save in operational costs. In many ways, Efficiency Vermont's technical assistance gave a different view of the equipment choice that can sometime get overlooked in the final selection. At the completion of the project, in addition to the technical assistance provided, Efficiency Vermont was able to provide an incentive of \$10,000 to help defray the roughly \$38,000 in incremental cost for all efficiency items.

Manufacturing and Assembly Process Improvements

Husky is always looking for ways to save energy in their manufacturing and assembly process. Many types of the new process equipment delivered to their plant have opportunities available as well. The mold manufacturing process employs many oil mist collectors in combination with the machining process. These mist collectors trap the oil vapor produced by the machining process before it escapes into the general room air. Each collector uses a fan to draw the oil vapor into a filter chamber. Approximately 50 of these fans were converted from running full speed continuously throughout the day to being controlled by variable frequency drives. Currently, through the use of the drives, the fan only operates at full speed when the machine door opens.

High speed rollup doors separating unconditioned and conditioned spaces were modified to respond optically to only fork lifts and not people, vastly decreasing the amount of time these doors are activated. The loss of conditioned air, both cooled and heated, was greatly reduced.

Even items as basic as toilet room operated hand dryers were modified from the typical time delay deactivation to an option of shutting the dryer off with the selector switch if the user is finished before the delay in activated. Miscellaneous projects such as these are normally overlooked due to their accepted nature in the workplace. This attention to even the smallest details in energy conservation and efficiency are what makes Husky an environmental leader.

Future Plans at Husky

In their continuing quest for lower energy costs, Husky has some aggressive future plans to save energy in their operation. As stated previously, much of the packaged injection molding equipment delivered to the plant for the manufacturing process has opportunities. Each injection

molding location is equipped with its own individual spindle cooler. Due to the uncertainty of the individual customer's situation all spindle coolers are delivered with direct expansion (DX) cooling available inside. In this large manufacturing setting, the availability of chilled water capacity may prove to be a large opportunity. The ability to tie into an already present chilled water network may exist at certain times of the year when capacity is available. The additional energy cost to run individual DX coolers instead of the small additional demand on an already operational water cooled absorption chiller is large.

Efficiency Vermont is a partner in these plans to lower energy costs beyond just financial incentives. In coordination with Husky, Efficiency Vermont has developed an action plan and is working with Husky's service suppliers to tackle these future opportunities in the facility that show merit. Husky maintenance personnel have requested an examination and correction of fan control issues associated with in the air handler units installed in the recent facility expansion project. In a joint effort between Efficiency Vermont and Husky's controls service contractor, an investigation of air distribution imbalances has commenced to ensure the facility achieves full savings potential.

In the times of reduced labor force and limited time to focus on activities other than production, Efficiency Vermont is lending its technical expertise to customers to move the decision-making process forward. This further demonstrates the way that the boundless custom approach to evaluating comprehensive, facility-wide improvements goes beyond the constraints of other programs.

Conclusion

Interactions such as these are helping boost the competitiveness of Husky and other Vermont industries in the national and global marketplace. Industry is sharpening its pencil when it comes to budgets and human resources. Efficiency Vermont has realized it can benefit large industry by lessening the facility engineer's work load related to the evaluation of energy cost savings measures. Efficiency Vermont is positioned to be a strong technical resource to companies that realize there may be potential savings opportunities but do not have the time and resources to track down the details.

In order for Vermont industry to compete with companies in lower overhead cost regions, they must devote their resources effectively. Supplying companies with different efficiency options for a particular improvement, life-cycle cost and cash flow analysis distinguishes the Efficiency Vermont approach from other programs. In general, industry wants to remain competitive by saving money through more efficient operation, the challenge for facility engineers is to present a convincing case that efficiency improvements are the most effective use of the company's dollars. By bringing this value-added process to corporate decision makers, they are prepared with sufficient data and analysis to make an informed decision.

At Husky, an atmosphere has been created to encourage employees to question operational efficiency and to promote environmental stewardship. Husky rewards employees who propose opportunities to reduce energy and other costs and who add value to their workplace and community. Efficiency Vermont is partnering with Husky in this positive, global approach and providing them with the tools to make informed decisions. Not all good ideas justify the investment of limited capital dollars; it is Efficiency Vermont's challenge to help make these decisions.