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Energy Audits Provide the First Step Toward Sustainability

BY ROY W. HALLER

Energy audits and assessments are wide-ranging first steps to creating energy-efficient business models and supporting sustainable practices. By assessing energy usage, analyzing internal processes, and calculating energy inefficiencies, audits provide a custom blueprint to help businesses of all types recognize opportunities to achieve immediate and long-lasting financial savings. Insight derived from an energy audit delivers a comprehensive approach to energy conservation.

Utility companies encourage and support the use of energy audits to provide their commercial and industrial customers with strategic solutions and action plans.

Whether implemented altogether or in multi-phased approaches, the custom plans encompass equipment, processes, and environmental changes.

The benefits of an energy audit can be achieved by entities of any size or nature—everything from small retailers and restaurants, to major manufacturers, municipalities, medical facilities, and academic institutions have experienced high-impact results suited to their unique needs and budgets. The expert insight and full service solutions are invaluable tools, opening the door for efficiency improvements, education, and financial assistance that may have not been available otherwise.

Small Business Energy Solutions

Mica Corporation, a family-run company in the flexible packaging industry, had always taken an ad hoc approach to its energy efficiency by manufacturing environmentally friendly products, making responsible packaging decisions and monitoring and reducing waste. Since 2007, Mica had collaborated with New Haven, CT, utility, The United Illuminating Company (UI), on a variety of additional efficiency projects, including lighting upgrades, but felt there lacked a systematic energy management system (EMS). Seeking a more focused approach to sustainability, the company again partnered with its local utility, this time for a comprehensive energy audit.

Upon completion of an audit in Mica's Shelton, CT, facility, UI developed a custom framework to improve energy performance, recommending 16 potential energy-saving projects that could translate to an estimated \$14,000 annual savings. Based on the recommendations, Mica is already moving forward with seven efficiency projects covering LED lighting and upgraded HVAC equipment and control systems.

Energize Connecticut is a state-funded initiative that provides technical resources and financial incentives for businesses of all sizes to make easy and affordable energy efficiency upgrades to their facilities. As administrators of programs under the Energize Connecticut umbrella, UI helped Mica utilize assistance to move projects forward, including securing an estimated \$25,000 in incentive payments through another partner, the Connecticut Energy Efficiency Fund.

"As a small business, we don't necessarily have the financial or technical resources in-house to introduce advanced energy efficiency improvements into our facility," says Bill Giannetto, site compliance coordinator and process engineer at Mica. "The funds and assistance from Energize Connecticut allowed us to proactively undertake some significant upgrades, and the resulting financial savings absolutely help to keep us viable in today's competitive market."

"An audit is generally eye opening for small businesses; the process creates an action plan for improvements they never before considered—for instance, a restaurant looking beyond refrigeration upgrades to see the value in high efficiency outdoor lighting," says Amy McLean Salls, program administrator with UI. "Our Business Sustainability Challenge provides a comprehensive strategic framework for customers of various sizes and sectors to make sustainability accessible, achievable, and profitable."

Municipalities Address Aging Equipment

For the City of Shelton's Water Pollution Control Authority (WPCA), cost-effective energy management has always been a priority. In its continued efficiency efforts, the city recently conducted an audit on its Water Pollution Control Facility.

Encompassing a review of the plant processes and facility equipment, the energy audit identified several potential cost savings opportunities. General equipment, lighting, and heating upgrades were all identified as effective projects to lower energy usage, as were operational changes to reduce the

pressure of the plant water system and run the motive pumps at a slower speed.

Based on the findings, Shelton is in the process of implementing several plant-wide SCADA improvements, including advanced aeration blower controls based on ORP sensor readings, and off-peak sludge storage tank aeration abilities. Future facilities planning and long-term improvements will address two systems integral to wastewater treatment at the plant: the inadequately performing jet aeration system in each of the Sequential Batch Reactor tanks and four inefficient 50-HP motive pumps. The city is currently soliciting bids for the replacement of the plant water system and plans to upgrade the system with lower horsepower pumps controlled by new variable frequency drives.

The new system will fix plant water reliability issues while shaving peak demand usage. In addition, the Shelton WPCA will save more than \$48,000 annually in operating costs when it implements all of the recommendations of the energy audit.

The audit had been triggered by the recent replacement of the facility's aging main SBR blower and odor control system. Due to the many contributing inefficiencies, the city replaced the blowers with new high efficiency technology. UI assisted the Shelton WPCA in securing \$156,000 from the Energy Efficiency Fund to put toward the blower replacement, covering a significant portion of the equipment cost.

"The facility energy audit, which was covered entirely by a \$7,000 incentive from the Fund, helped us successfully lower energy usage, reduce operating costs, and improve our treatment plant operations," says Garritt Ogden with the City of Shelton Water Pollution Control Facility. "Most importantly, we are able to continue servicing the residents of Shelton in a cost effective, environmentally friendly way."

Energize Connecticut programs provide a variety of technical and financial resources for municipalities. With projects ranging from new construction and additions, to retrofits and renovations, operational and equipment cost-savings opportunities for municipalities are vast.

"Municipalities have a responsibility to taxpayers to justify expenditures for facility upgrades and equipment," says Will Riddle, manager of commercial and industrial engineering team at UI. "Energy audits provide an external resource and plan of action to help decision makers and residents understand the monetary and environmental benefits of energy efficiency measures. The clear cost savings calculations and financial incentives provided can help municipalities plan immediate and long-term projects with tangible evidence of their effectiveness."

Bringing Together Internal Energy Advocates

The Schick facility in Milford, CT, where the brand name shaving products are manufactured, as part of Energizer Holdings Inc., has long partnered with UI on its energy efficiency projects. Since the early 1990s, more than 75 conservation projects have been implemented at the company's 53-year-old facility.

In the past, most initiatives were driven by a small group of engineers with an established understanding of the company's energy usage. As the company's commitment to sustainability continued to grow, that core group of efficiency ambassadors recognized a need to get all departments involved.

"With our efficiency goals evolving, we knew we needed a more company-wide, collaborative approach," says Jeff Wilson, Schick plant services manager. "We were looking for a cross-functional team to serve as an internal energy advocacy group to help keep our long-term conservation projects on track."

UI piloted an Energy Kaizen event—a methodology for strategic energy production improvement—for Schick, helping them to develop a multi-disciplined team of engineers and trade and lean technicians with the know-how to identify energy waste and determine implementation measures to reduce energy usage. As part of the Kaizen event, a complete audit was conducted on the 425,000-square-foot-facility.

Goal setting, baseline measurements, training, and implementation were the foundation of the Kaizen event. The project mission was to reduce energy usage, to prioritize viable conservation projects, and to educate colleagues. Teams focusing on motors, lighting, compressed air, and HVAC were trained to make key measurements using occupancy sensors, flow meters, combustion analyzers, and infrared thermometers. Schick also applied principles of a sleeping plant to idle areas of its 24/7 facility, gaining insight on non-value added energy usage and correcting deficiencies like compressed air leaks and stuck dampers.

Following the two-day Kaizen event, which was supported entirely by the Fund, UI presented 60 significant cost-effective opportunities to decrease overall energy usage and operating costs. Recommended projects included HVAC, chilled water and steam system upgrades, and a comprehensive lighting overhaul. Lean manufacturing process tools were also reinforced.

Schick has already implemented

some of the efficiency measures involving HVAC, compressed air, motors, and lighting, resulting in an estimated \$166,700 annual savings. When the entire spectrum of projects is completed, the estimated annual savings will grow

stats. The upgraded automated controls streamlined maintenance and facility operations, while keeping the office temperatures consistent and comfortable. Trending data can also be displayed through the system, providing a snap-



UNH Westside Hall interior

The University of New Haven

to \$590,000. Schick expects all of the projects to cost roughly \$287,000, giving the program a payback period of less than one year.

Once a business fully commits to becoming as energy efficient as possible, energy usage consideration becomes priority in every aspect of the strategy, from immediate operational changes, to long-term growth planning.

Taking the Next Step in Sustainability

As a manufacturer of energy-efficient architectural and office space lighting, The Lighting Quotient always believed in conservation but never fully participated in a formal efficiency program. In 2011, the West Haven, CT, company began taking steps to reduce its carbon footprint, completing multiple facility upgrades through Energize Connecticut programs over the past few years.

Most recently, The Lighting Quotient installed new HVAC equipment with an energy management system, allowing the facility to have one central system instead of 64 individual thermo-

shot of temperatures throughout the facility and identifying any individual unit problems that may arise.

The Lighting Quotient projects a combined \$36,000 annual energy savings due to the implemented gas and electrical measures. It also received \$111,000 from the Energy Efficiency Fund to assist with the project's cost.

Recognizing energy efficiency is a continuous process, The Lighting Quotient has also worked with UI to collect data for an optimization plan.

"We knew we were a business poised to operate more sustainably and through the energy audit, we've not only achieved a greener workplace but now have a strategic path forward," says Brian Simpkins, The Lighting Quotient facilities manager. "We will continue to look ahead to incorporate energy-efficient measures with all future building space retrofit projects and expansions."

Leading by Example

The University of New Haven (UNH) plans to expand campus-wide sustainability programs and, moving forward,

also has committed to construct US Green Building Council buildings no less than LEED Silver compliant. UNH will work closely with its local utility to determine resources available to help them achieve these goals.

The university has utilized Energize Connecticut programs for years to support its proactive commitment to smart energy usage, clean energy, green building, waste reduction, and recycling. The program recently funded an energy audit project to benchmark, track, and manage energy consumption of all UNH buildings. Tracking a building's energy performance provides necessary insight on energy usage and how best to reduce energy waste. UI assists UNH in its campus sustainability planning by assessing opportunities for efficiency improvements and providing utility data.

UNH recently participated in the Zero-Emission Renewable Energy Credit (ZREC) auction available through its local utility to help support solar PV, wind, hydro, and fuel cell projects. The university successfully gained funding for a 60-kW solar generation system for a new LEED gold-certified residence hall, a project initially developed by UNH students. The system is expected to provide significant savings to the university.

The incentive funds available through Energize Connecticut have been a key support component to UNH's sustainability efforts. The university is on track to receive a \$398,000 incentive to help cover some of the costs of a newly constructed dorm, and it will likely receive additional funding to support a retrofit project of The Graduate Center.

"As a higher education institution that continues to grow, we see vast opportunity to strengthen our environmental performance and sustainability," says Louis C. Annino, Jr., associate vice president for facilities at UNH. "We

strive to be leaders in economical energy efficiency while maintaining a world-class academic environment for our students to learn by example."

Taking the First Step

Energy audits provide the path to achieve optimal energy efficiency. They offer businesses of all types the unique opportunity to access energy expertise

and customized efficiency improvement plans to suit the needs of the customer. Audits clearly spotlight the cost and environmental advantages, grabbing the attention of businesses to get them on track toward sustainability. **BE**

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