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Case Study:
Unilever Canada

Team approach to energy savings

Since 1999, Unilever Canada's Rexdale plant has undertaken 128 energy efficiency projects, from a major boiler-room reverse osmosis (RO) project that saves the company hundreds of thousands of dollars a year in energy costs to a lighting upgrade that saves the company a few thousand dollars a year.

These improvements were a result of launching a highly effective in-house energy-conservation program in 1999. Thanks to the Watt Watchers Energy Team program, Unilever employees have become adept at finding ways to save energy and improve the company's bottom line. "Building on success" is the catch phrase that employees at the Rexdale, Ontario, plant use to describe the enthusiasm driving this program.

This enthusiasm has led Unilever Canada to become an active participant in Natural Resources Canada's (NRCan's) Canadian Industry Program for Energy Conservation (CIPEC). CIPEC is a voluntary partnership between industry and the Government of Canada aimed at improving energy efficiency in Canada's industrial sector. Through CIPEC, Unilever Canada has taken advantage of the support and assistance offered by NRCan.

Highlights

- $4.2 million in savings since 1999
- Greenhouse gas emissions reduced by 20 million kilograms per year
- Hundreds of staff-inspired ideas for energy efficiency projects, large and small

Objective

When management at Unilever Canada launched the Watt Watchers Energy Team program in 1999, its primary goal was to reduce operating costs by decreasing the plant's consumption of fuel and electricity. At the Rexdale plant, Unilever manufactures margarine under the Becel and Imperial brands. There, rising energy prices have added even more pressure to the plant's bottom line. Energy efficiency initiatives have helped the company relieve some of this pressure, as well as reduce its production of greenhouse gas emissions.

CIPEC
Canadian Industry Program for Energy Conservation

Canada

Company profile

Unilever, one of the world's leading manufacturers of consumer goods, is a multinational company with headquarters in the Netherlands and the United Kingdom. It has operations in 151 countries, employs 265 000 people and generates annual revenues of nearly $57 billion.

Unilever is committed to managing its social and environmental impacts reponsibly. As such, it supports eco-efficiency, that is, producing the same product with less energy, less material and less waste.

Unilever's Rexdale, Ontario, plant is a 12 542-square-metre (135 000-square-foot) facility that employs 170 people. Built in the 1960s, it produces 85 000 tonnes of margarine a year. Rising energy costs and increasing competition have made it more important than ever for Unilever Canada to increase production efficiencies.

Energy use profile

Unilever Canada spends more than $5 million a year on energy. Most of this buys 7.5 million cubic metres of natural gas to power the plant's margarine-processing equipment. This includes a boiler for steam processing, batch kettles to clean and heat vegetable oil and operating deodorizers. The remaining funds go toward purchasing 17.5 million kilowatt hours per year of electricity.

Project profile

In 1999, Unilever Canada launched the Watt Watchers Energy Team program by inviting employees to submit ideas to reduce the plant's consumption of electricity and fuel. Employees later attended Dollars to $ense, NRCan's energy-management workshops, and identified further opportunities to improve energy efficiency.

The company relied heavily on CIPEC's Seven Steps template, which spells out what you need to know, what you need to do and how to do it.

The seven steps are as follows:

Step 1: Understand your energy costs
Step 2: Compare yourself
Step 3: Understand when energy is used
Step 4: Understand where energy is used
Step 5: Eliminate waste
Step 6: Maximize (system) efficiency
Step 7: Optimize your energy supply

Once Unilever Canada obtained buy-in from head office and virtually all employees, the company identified and implemented many projects that have affected the plant's bottom line. Throughout, a team approach has dominated the culture of the Watt Watchers program.

Annual audits

A critical feature of Watt Watchers is an annual audit of all operational systems, including the plant's insulation, steam traps and lighting. As a result of these audits, many plant employees have come forward with energy efficiency ideas, large and small, for management to consider.

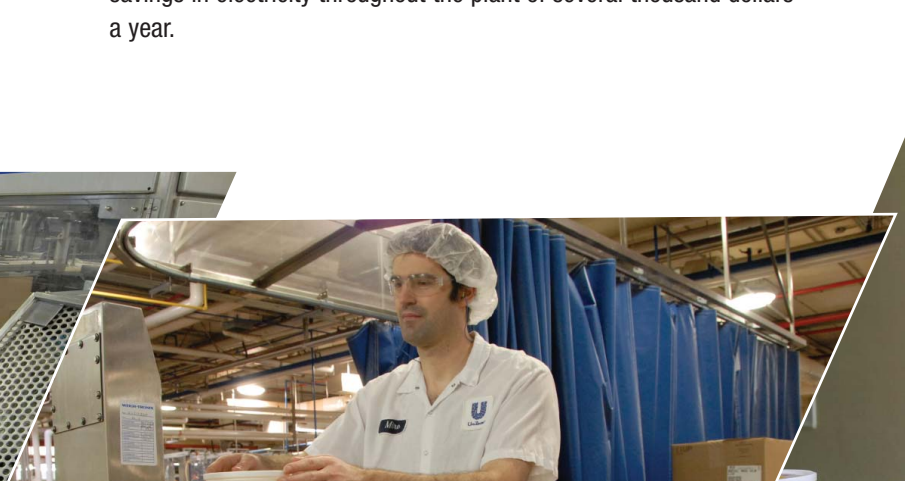
Heat recovery

The plant's first project in 1999 was to fit its boiler with a condensing economizer, which recovers heat that would otherwise be lost up the boiler stack. This energy is now used to pre-heat water that feeds the boiler. The project cost about $500,000 to complete and saves the company roughly $378,000 a year.

In a more recent project, Unilever Canada decided to duct residual hot air from compressors in one plant location to a loading dock in a separate location – essentially heating the loading dock for free. The ducting project replaces the loading dock's gas and steam heaters, saving Unilever $33,000 a year. The project cost $84,000 to implement, which translates to a simple payback period of about two and a half years. For the latter project, Unilever partnered with Enbridge Gas Distribution Inc., which offered the company a $5,000 incentive for its reduced use of natural gas.

Lighting upgrade

In 2002, Unilever Canada undertook a lighting upgrade that led to savings in electricity throughout the plant of several thousand dollars a year.



The project had two distinct components: retrofitting existing T-12 fluorescent lighting throughout the plant with more efficient T-8 fluorescent lighting, and installing motion sensors in certain areas of the plant to eliminate excessive around-the-clock lighting.

In total, 44 lighting fixtures in the Rexdale plant were retrofitted to accommodate T-8 lighting. T-8 lighting is not only less expensive to operate – resulting in annual savings of $1,400 for Unilever – but also considered higher-quality lighting. Specifically, it renders colours 28 percent more accurately than T-12 lighting. The total project cost for the lighting retrofit was $3,700, which resulted in a 2.6-year payback period.

To increase lighting efficiency even more, motion sensors were installed in such areas as private offices, storage spaces and meeting rooms. The reduced electricity consumption from the motion sensors has resulted in annual savings of $3,900. With a total project cost of $4,000, Unilever's payback period was a little more than a year.

Finally, older, less-efficient lighting in the packaging area is being replaced with 120 T-5 fixtures. Also, a lighting audit of the entire plant was carried out in 2007 and a lighting specification for watts per square foot and lumens per square foot is being completed. The lighting specification document will be used by all Unilever plants for future lighting retrofits.

Reverse osmosis (RO)

One of the most extensive energy efficiency upgrades of the Watt Watchers program at Unilever Canada was conceived in 2003, when engineers realized they could dramatically reduce the consumption of natural gas by switching to RO water to feed the plant's enormous boiler.

The boiler heats the plant and is a key piece of processing equipment. It produces approximately 22 679 kilograms (50 000 pounds) of steam per hour at 79 kilograms (175 pounds) of pressure.

Until 2005, plant workers fed the boiler mineral-heavy municipal water. Mineral-heavy water leads to a buildup of scale in a boiler and causes it to foam and prime. Plant staff dealt with these problems by employing an engineering practice known as "continuous blow-down," where a certain percentage of the boiler's water is continuously drained away in order to flush out most minerals. For Unilever Canada, continuous blow-down was an extremely expensive practice, because 8 percent of the municipal water added to the boiler was eventually drained away and wasted.

In 2005, engineers began to feed the boiler RO water instead of municipal water. RO water, produced at the plant following the installation of an RO machine, contains far fewer minerals. By using RO water, engineers were able to reduce the boiler's continuous blow-down to only 1 percent of the total water volume, thus wasting less heated water.

The savings didn't stop there. Before the RO project was rolled out, continuous blow-down never completely solved the problem of mineral buildup in the plant's boiler. Therefore, engineers relied heavily on water softeners to further de-mineralize the water. To run efficiently, the plant's water softeners consumed more than $22,000 a year in salt and de-alkalizers. Since the installation of the RO machine, that number has been reduced to roughly $2,000 a year.

The RO installation cost $500,000, including $245,000 for the RO machine itself. The RO machine will require a membrane refitting at a cost of $5,000 to $6,000 every two to three years. However, the project is saving Unilever Canada $380,000 a year in natural gas, water and chemical costs. It also offers Unilever Canada a payback period of less than two years. The payback period was further reduced as a result of a $14,000 contribution from Enbridge Gas Distribution Inc. for natural gas reduction and a $49,000 contribution from the City of Toronto water department for water reduction.

Results

Since 1999, Unilever Canada has realized $4.2 million in savings as a result of Watt Watchers upgrades. This includes a 69 percent reduction in the plant's consumption of natural gas, a 14 percent reduction in electricity use and a 48 percent reduction in water use and waste production. Greenhouse gas emissions were reduced by a remarkable 20 million kilograms a year.

The Watt Watchers program has reached critical mass, in that all employees have become aware of the energy and cost savings associated with small and large projects. The company now has a database of hundreds of employee-inspired energy-conservation ideas – almost all of which, are practical. The ideas range from simple light bulb changes to huge capital-cost projects.

The Watt Watchers program has also led to benefits beyond cost and environmental impacts at the Unilever plant. Cleaner, more efficient equipment is speeding up processes – such as in the boiler room RO project – and health benefits are also accruing.

As a result of the RO project, for example, the staff are enjoying substantial ergonomic benefits. Whereas in the past they hauled dozens of heavy salt bags to the boiler's water softener every day, they now haul only one or two bags of salt a week. Moreover, the company avoids flushing excess salt into Lake Ontario.

Future direction

Watt Watchers has become so well established at Unilever Canada that its continued success is virtually guaranteed, provided its champions maintain the momentum they have created since 1999.

Management plans to continue holding regular meetings with energy-efficiency-minded employees to solicit more ideas. Due to rising energy costs, and because improved equipment significantly shortens payback periods for some projects, management intends to revisit ideas that were not economically feasible several years ago.

Critical success factors

Soliciting support from employees is an essential element in the success of Unilever's Watt Watchers program. The team approach has created a culture of respect for the conservation of energy and has led to a host of creative ideas from employees that are saving money and reducing greenhouse gases.

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