Earth Day, every day: How Federated Co-operatives practices sustainable distribution

A Canadian retail co-op has embraced sustainability to reduce its costs and return the savings to its members and customers.

By Bob Trebilcock, Executive Editor

What does it mean to operate a sustainable warehouse and distribution network?

As we approach Earth Day, that's a question being asked by any number of organizations, especially as recycling, energy conservation, social responsibility and other aspects of sustainability percolate in board rooms around the world.

Federated Co-operatives Limited, an organization that provides wholesaling, manufacturing, marketing, administration and distribution services to 257 retail co-ops in Western Canada, has been asking and answering that question for more than 30 years.

"We began incorporating energy conservation into our building operations after the oil crisis in the 1970s," says Philip Thiemann, Federated's warehouse operations director in Saskatoon, Saskatchewan. "Back then, we thought $40-a-barrel oil was high, and we have been looking at ways to decrease our operational expenses ever since."

In its more than 300,000-square-foot food warehouse in Saskatoon, for example, Federated installed five 24-foot large-diameter, low-speed fans (Big Ass Fans, bigassfans.com) to regulate the air in the 80,000-square-foot loading dock section of the warehouse. That project delivered a 10% reduction in natural gas consumption and nearly $20,000 in savings during the first year at a time when natural gas rates were increasing by 20% (see box, p. 20).

The fans are just one example of how Federated is approaching sustainability, according to Thiemann and Trevor Carlson, Federated's environmental and technical services manager. "If we are

Federated Co-operatives has been focused on saving energy, recycling and optimizing transportation across its network of distribution centers for more than 30 years.

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going to be around for another 20 or 30 years, we have to be sustainable," says Carlson. "The savings we have already realized through our efforts has created revenue that we can invest in our business, return to our co-operative owners, and deliver as savings to our customers. Those all build loyalty for our brand." And, Thiemann adds, "Aside from the social imperative, there is a significant economic opportunity any time we can reduce, reuse or recycle in our operations."

A sustainable culture

Federated Co-operatives may not be a household name in the United States. However, with an estimated $6.5 billion in annual sales, it is the 49th largest corporation in Canada, the largest non-financial co-operative in the country, and the second largest company in Saskatchewan.

Founded in Saskatoon in 1928, the co-operative provides services to 257 retail co-operatives located throughout Western Canada. The members operate retail shops, fueling stations, building material supply centers and refineries. Federated employs some 2,900 people and operates five distribution centers in Calgary, Edmonton, Saskatoon and Winnipeg as well as a fleet of 143 merchandising trailers and 103 tankers.

While co-operatives typically form to increase the buying power of its members, operational savings are an important component of Federated's business model. Any savings the co-operative can realize from operating costs is refunded to its members each year as a patronage refund. The bigger the net income after operations—a figure Federated calls its net savings—the bigger the refund. Over the last 10 years, Federated has returned more than $2.5 billion to its retail members.

Sustainability has been an important

How Federated uses fans to further sustainability

With the cost of heating the Saskatoon warehouse going through the roof—literally—Federated Co-operatives was interested in testing whether thermal destratification in its warehouses would result in significant heat cost reductions and the reduction of the amount of natural gas needed to heat its facilities. Destratification is what happens when layers of warm air that form in one part of a facility mix with layers of cooler air in another part of a facility to produce a constant temperature.

According to Trevor Carlson, environmental and technical services manager, Federated believed a fair amount of heat was being trapped or lost through the ceiling. The difference between the temperature of the air at the floor level and the underside of the roof deck in some distribution centers can be up to 30 degrees, depending on the time of year. If that warm air could be brought down to circulate through the building, then Federated could reduce the rate at which its buildings were shedding heat through the roof.

To put the theory to the test, Federated installed five 24-foot large-diameter, low-speed fans (Big Ass Fans, bigassfans.com) in the 80,000-square-foot loading dock area back in 2007. The retail co-operative then began to measure its heat index in the pilot area, a measurement that relates the day's temperature to the energy demands of the heating system. The index is expressed as Btu/ft2/degree day. Before the installation of the fans, the heat index was 4.49 Btu/ft2/degree day. By the end of 2008, the heat index had been reduced by 10% to 3.61 Btu/ft2/F.

"We believe we saved $19,800 in the first year in natural gas consumption as a result of the fans," says Carlson.

Since then, Federated has expanded the use of fans to other facilities, says Philip Thiemann, warehouse operations director. In Winnipeg, for instance, the co-op installed a fan in a temperature controlled dock area where hot air was building up in the hot summer months around the dock doors.

"We had to turn the thermostats down, which put a constant demand on the refrigeration units," he says. "The air movement from the fans allows the air to mix and even out the temperatures." In the process, Thiemann adds, workers have found that the new fans keep the ambient temperature areas more comfortable on hot days for less money.

"The big fans use about 3 amps an hour compared to 180 amps for the fans we had been using in the summer," he says. "The electrical savings in the summer are greater than the gas savings in the winter and the workers are more comfortable."

component of those savings. Part of that is driven by geography: Federated's retailers are located in some of the coldest areas of Canada, making energy savings an imperative.

As a result, Federated was an early adopter of energy saving and recycling programs that are now gaining popularity in the United States. Carlson points out that Federated has been installing state-of-the-art heating and cooling systems in its warehouses since the 1980s. Similarly, the co-operative launched a program back in the 1980s that recycles nearly 300,000 pounds of paper annually. In the late 1990s, Federated was one of the first shippers in Western Canada to run triple trailers rather than doubles in one specific geographic area.

"We have a refinery in Regina and a food warehouse in Saskatoon," says Carlson. "We run two full trailers of fuel along with an empty grocery trailer. After we drop off the fuel trailers, we fill the empty grocery trailer." The program is a success because Federated limits the hours when it runs the trailers and shares the transportation savings with the government.

After 30 years of projects, a sustainable mindset has been instilled across the company, one that is driven by looking for a business case for every project. "If a project doesn't further our business, it's not sustainable," Carlson says. "But as we do more of these projects, the business case only gets better." After all, he adds, the long-term costs of electricity and fuel aren't going down. "If we find a business case for today, chances are that case will be a whole lot better five years from now."

Materials like plastic (shown) and corrugated are baled for recycling to minimize the amount of waste leaving the facility.

Sustainable materials handling

While sustainability has been part of the culture at Federated for years, the co-operative formalized the program about five years ago. In September 2008, Federated developed environmental performance metrics and determined the carbon footprint of some key larger buildings, including the Saskatoon food warehouse. In 2009, the project was expanded to include all of its warehouses and its fleet of vehicles. According to Carlson, the information is being used to objectively compare its environmental performance to other similar companies, set internal performance goals and manage its environmental impact.

Federated relies on a pool of rental pallets and captive pallets to reduce the amount of wood waste going to the landfill.

Some of the improvements that have come out of that effort include a project to retrofit its warehouses with T5 high output lighting systems equipped with sensors that turn the lighting on only when people are working in the area. Designed for a new grocery freezer in Calgary, the lighting system is expected to cut lighting-related electrical usage from 2.9 million kilowatt hours per year to 1.7 million kilowatt hours.

Similarly, Federated is converting refrigerator and freezer operations to ammonia-based refrigeration to enhance electrical systems. And its new trucks are equipped with electronically controlled engines that reduce the release of harmful emissions into the environment.

Yes, energy and transportation savings are important, but the question of what constitutes sustainable materials handling is harder to quantify. "We hired a consultant to audit our warehouses," Carlson says. "They identified potential projects for us, but generally felt that it would be difficult to find ways to improve our warehouse operations in a sustainable way beyond energy savings and emissions."

Still, both Carlson and Thiemann believe there is a role for sustainability in materials handling, especially if you adopt the broader definition of sustainability that includes the worker. Ceiling

Voice picking technology allows order selectors in the freezer to remain productive while wearing bulky protective gloves.

fans, for instance, not only lower utility costs, but they have also created a more productive work environment—or an environment that reduces the stresses on productive employees.

Thiemann also contends that the voice-directed picking solution that was installed in freezer areas fits the broader definition of sustainability. "Voice picking allows order selectors to wear bulky gloves while they're working in the freezer and still be productive," he says. "That's not the first reason you go to voice picking, but it's a benefit that is related to sustainability."

Thiemann has implemented sustainable solutions in other areas as well:

- Federated pays attention to the dock area, with vertical dock doors and seals in existing facilities along with specially designed dock doors in new construction.
- Federated was an early adopter of CHEP pallets in Canada for full pallet deliveries. Instead of using one-way pallets that may go to a landfill, CHEP retrieves, sorts and repairs the pallets used by Federated. The co-op builds mixed pallets for store replenishment on a captive pool of plastic pallets. "Since 97% of our deliveries are on our own fleet, we can bring back the plastic pallets, along with boxes, packing blankets, and some consumables to our warehouses," Thiemann says.
- Plastic shopping bags, stretch wrap, corrugated and one-way wooden pallets are recycled. "We are not a zero-landfill facility," Thiemann says, "but we minimize the amount of material going into the landfill as much as possible."
- Federated eliminated end-of-shift battery charges. "If your battery still has a few hours left at the end of the shift, we'll run it the next morning before its swapped out," says Thiemann. "That reduces the power surge in the facility at the end of shift when everyone plugged in to a battery charger, and it increases the life of the battery by maximizing the draw down on each charge." Thiemann says that Federated typically gets about seven years of life out of its batteries.

"Going forward, we'll continue to look at every aspect of our operations for potential savings," says Thiemann. "The root of our program is one of economics, but we also know there's a real focus on environmental issues now. It's important that we keep doing what we are doing and get the message out as well." □

Lean, green machine

Federated Co-operatives uses technologies that are environmentally and worker friendly in its Saskatoon warehouse.

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Receiving: The receiving process begins prior to the arrival of a trailer in the receiving and shipping area (1) when a vendor sends an advance ship notification (ASN) and books a delivery appointment. Once the trailer arrives, Federated manages a paperless receiving process. Palletized product is unloaded from the truck and scanned with handheld devices. With that information, the warehouse management system (WMS) creates a license plate bar code tag and pallets are staged in the receiving and shipping staging area (2) for putaway. Priority is given to product that is destined for the refrigerated (3) or freezer (4) storage areas.

Putaway: Although there is some floor storage in the Saskatoon facility, most product will be stored in pallet rack, regardless of whether the product is stored in refrigerated (3), freezer (4) or ambient temperature (5) areas. The lower levels of the racks are used for picking while the upper levels of the rack are used for reserve storage. The WMS first determines whether product

Federated Co-operatives Limited

Saskatoon, Saskatchewan

SIZE: 302,000 square feet plus a planned 165,000-square-foot addition

PRODUCTS HANDLED: Full range of food products, including dry groceries, tobacco products, produce, dairy cooler and frozen foods. Milk and meat are crossdocked.

STOCK KEEPING UNITS: 13,500+

THROUGHPUT: 1.4 million cases per month

EMPLOYEES: 160 in operations

SHIFTS/DAYS: 2 shifts/7 days plus some third-shift activities

should be stored in reserve storage on the upper levels or if there is an immediate need for that product in a pick module on the lower levels. In addition, the system manages storage locations based on expiration dates to ensure that product nearest its best-by dates are picked first. Using that criteria, the WMS directs the driver to an aisle or a segment within an aisle. The driver chooses the best available storage location and updates the WMS.

Crossdocking: Some products, especially meat and milk (6), are crossdocked directly to stores using a flow-through model. When product arrives that can be shipped directly to a store, it is put away into an available pick location in a dynamic storage and picking area in the flow-through area (7). Once all of the product has been putaway, the WMS drops orders for that merchandise and order selectors begin to fill those orders.

Picking: Whether product is stored in the flow-through area (7) or in the pick modules (3, 4, 5), the WMS sorts orders into assignments, prioritizes the sequence the orders will be picked based on a set of rules established by Federated, and begins to deliver them to the floor. Some order selectors use RF scanners but most pick using voice recognition technology. In most instances, order selectors pick full cases to pallets. However, tobacco, confectionary, and health and beauty products are picked by item to totes. In those instances, the WMS creates a license plate ID tag for a tote that is similar to a pallet tag. Order selectors are directed to pick items into a tote. Once the tote is full, it is closed and loaded onto a pallet. The order selector then begins picking to another tote.

Shipping: Once a pallet is picked, it is directed to the receiving and shipping staging area (2). From there, it will be loaded onto the next available trailer in the shipping area (1). In Saskatoon, Federated uses multiple temperature trailers. Frozen products are loaded first, followed by refrigerated products and finally dry groceries to close out the trailer. □

System suppliers

FANS: Big Ass Fans, bigassfans.com
CASE FLOW RACK: Rhinotrac, rhinotrac.com; Span-Track, unex.com/spantrack.htm
PALLET RACK: Frazier, frazier.com; Redirack Storage Systems, redirack.com
LIFT TRUCKS: Hyster, hyster.com; Raymond, raymondcorp.com
VOICE RECOGNITION: Vocollect, vocollect.com
WMS: AFS Technologies, afsi.com/warehouse-management-software.asp
DOCK DOORS: TKO Dock Doors, tkodoors.4frontes.com
DOCK EQUIPMENT: Serco Equipment, serco.4frontes.com/Products/DockLevelers.aspx
WOODEN PALLETS: CHEP, chep.com