

Longo Brothers Fruit Markets

Food Retailer

The Challenge

By their very nature, grocery stores require significant amounts of energy, both for facility power and for heating and cooling needs. Consistent and reliable power is critical to grocery stores since a single utility power outage can result in considerable food spoilage, not to mention contribute to dissatisfied customers. So when Longo Brothers Fruit Markets, a grocery retailer with more than thirty five stores in the Greater Toronto Area, sought to evaluate and upgrade their energy plan, they took a holistic view that accounted for their refrigeration equipment as well as the stores' operations. The company's aim was to implement a highly efficient, reliable power solution that would allow them to reduce energy costs and further their sustainability goals.

As a family-run business, Longo Brothers believes deeply in operating the most high-tech, environmentally friendly grocery stores to provide the best products and service to its customers. One of the significant changes they were embarking on was a shift away from conventional refrigeration racks to cleaner CO2-based refrigeration systems. CO2 systems have a GWP of 1 compared to traditional HFC based refrigerants that have a much higher GWP (1500-4000). CO2 systems operate best in a cooler environment. When the ambient temperature is higher, they go into a trans-critical mode which negatively impacts their operational efficiency. Additionally, because of the high pressure

Power Profile

Customer

Longo Brothers Fruit Markets

Location

Burlington, Ontario, Canada

Commissioned

March 2022

Fuel

Pipeline Natural Gas

Technologies

- (2) C65 Microturbines
- World Energy 80-ton Absorption Chiller
- CO2 Refrigeration System
- Customized PLC-based Microgrid Controller

Capstone Green Energy Distributor

Vergent Power Solutions



We couldn't be happier with our Capstone microturbine-based CCHP project. We had goals of reducing our environmental footprint, adding resiliency to our store, and further improving the efficiency of our CO2 refrigeration system. Longo's could not have done this without partners who have a shared vision of a sustainable future."

— Dave Mastroieni, VP of Central Procurement & Facility Management at Longo Brothers Fruit Markets



**Smarter Energy
for a Cleaner Future**



The energy solution system installed at Longo Brothers Fruit Markets in Ontario, Canada is the first of its kind in North America to integrate two combined cooling heat and power C65 microturbines with CO2 refrigeration, providing seamless, ultra-reliable power.

that these systems operate under, they need uninterrupted power in order to avoid pressure build-up that would force the CO2 to be vented into the atmosphere.

A collaboration with Neelands Group Limited (Refrigeration and turnkey EPC company) and Capstone distributor Vergent Power Solutions provided an energy solution that would tackle all the company's priorities, while also lowering their environmental footprint. It would become the first system of its kind in North America to integrate a microturbine combined cooling heating and power (CCHP) system with CO2 refrigeration, providing seamless, ultra-reliable backup power.

The Solution

The project implemented a sophisticated CCHP system as the backbone of a power and thermal microgrid, configured with dual-mode controls for an automatic transition between grid-connected and standalone operation in the event of a power interruption. The system's two C65 microturbines produce electricity while the exhaust is channeled to integrated heat recovery modules to provide hot water. The exhaust is also used by an 80-ton absorption chiller to provide on-site chilled water which complements the CO2 system to ensure its operation in sub-critical mode all throughout the year.

Because different environmental temperatures create different needs, the systems adapt seasonally. During summer months, the CHP hot water output is used by a make-up air unit to provide dehumidification, while the absorption chiller provides chilled water to the CO2 racks to precool the system and improves refrigeration system efficiency. In the winter, however, the CHP hot water is used to provide heating for the building reducing natural gas consumption for heating, while the CO2 refrigeration racks get precooling from cold outside air.

The Results

Commissioned in spring of 2022, the systems will generate over 1 million kWh annually and offset an additional ~250,000 kWh by integrating the absorption chiller. Further, the hot water heat recovery will offset over 1 million kWh of gas-fired heating every year. The efficiency improvements are expected to generate over \$130,000 CAD of annual savings and, in concert with the CO2 conversion, reduce greenhouse gas emissions by 1,250 tonnes per year.

While the Ontario power grid has lower carbon intensity than many other jurisdictions in North America due to the prevalence of nuclear and hydro sources, GHG-intensive peaking plants contribute significant GHG pollution at the margins. A well-designed, highly-efficient CHP/CCHP plant, like the one at Longos, can deliver GHG reductions by displacing power otherwise supplied by polluting "peaker" plants.