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A PEARSON ECO-BUSINESS ZONE

Municipal Water Efficiency Eco-Cluster:

SUPREME EGG

Case Study

A program of:



Project Summary



View of Supreme Egg (Google 2018)

Supreme Egg retained Enviro-Stewards in 2014 to complete a water conservation study suitable for participation in Toronto Water's Industrial Water Rate (IWR) Block 2 program, which offers a reduced water rate to industrial businesses that qualify for the program. The facility implemented 10 measures from the conservation plan, which are collectively saving 7,754 m³/yr of water. The facility also pays 30% less for the remainder of the water that they purchase (due to the Block 2 rate).

A co-benefit of the water conservation measures is the avoidance of 28.3 tonnes/year of GHG broken down as follows:

- 0.5 tonnes/yr less GHG associated with electricity Toronto previously used to pump and treat the water that is now conserved
- 27.8 tonnes/yr less GHG associated with natural gas that Supreme Egg previously used to heat the portion of the conserved water that was heated onsite to make hot water

Assuming that the water conservation measures remain in place for at least 10 years, the water conservation study will result in the avoidance of 77,540 m³ of water and 283.0 tonnes of GHG emissions.

About Supreme Egg

Supreme Egg Products (Supreme Egg) is a business unit of Nutrigroupe, which is a farmer-owned Canadian egg grader and processor. Nutrigroupe's other business units include: Nutri-Oeuf, Ontario Pride Eggs, Maritime Pride Eggs, and Countryside Farms.

Supreme Egg's 2,140 m² facility is located at 17 Newbridge Road in Toronto, Ontario. The facility has 25 years of experience processing and distributing fresh and frozen liquid egg products. Supreme Egg's primary product line includes pasteurized liquid egg white, pasteurized liquid egg yolk, and pasteurized liquid whole egg.



Examples of Supreme Egg's products (clockwise from top left): 20 kg pails of pasteurized liquid egg white, 20 kg boxes of pasteurized whole eggs, and 20 kg pails of pasteurized egg yolk



Eggs being processed.

Process & Resource Consumption

Supreme Egg's major processes include automated egg sorting, egg sanitization, egg breaking, pasteurization, and packaging. Significant ancillary processes include CIP (clean-in-place) systems to sanitize the egg sorter and pasteurizer and an egg crate washer, and a steam boiler for process heating (e.g. pasteurization). Manual cleaning is also performed to wash floors, plastic totes, tools, etc., using spray nozzles and high-pressure spray systems.



Installing flow restrictors in spray nozzles can conserve water and natural gas (used to heat the water).

Resource consumption includes:

Natural gas

- Steam boiler heating
- Hot water for CIP
- Domestic hot water
- Hot water for manual cleaning activities

Electricity

- Lighting
- Process machinery
- Ancillary equipment (air compressors, pumps, controls, electronics, etc.)
- HVAC systems (heating, ventilation, and air conditioning)

Water

- Steam
- Pasteurization
- CIP
- Domestic
- Manual cleaning activities
- Egg washing
- Boiler makeup

Identified opportunities

Associated savings in table(s):

- Water savings
- Energy savings
- GHG savings
- Economic savings (\$/yr, payback, etc.)



The Case for Water Conservation

Due to the high rate of utility consumption by industrial facilities such as Supreme Egg and the rising costs of utilities, Supreme Egg is constantly seeking innovative ways to save money and remain competitive. One approach is to increase sales by selling more product and identifying new markets. However, given the typically tight margins of food products, significant sales are required to generate additional profit. A more effective approach for generating additional profit would be for them to make more money on what they are already selling by reducing baseline costs associated with their egg processing operations. General methods for doing so can include cutting labour, reducing waste generation, and using less energy and water. The preferred methods are reducing waste and consuming fewer utilities as they can significantly improve bottom lines and avoid layoffs. Reducing utility use, such as water consumption, is particularly effective. For example, if a manufacture's product sells at 5% margin and they reduced water consumption by \$10,000 per year, the equivalent increase in sales that would be required to generate the additional \$10,000 per year would be \$200,000 per year.

Realizing the effectiveness of reducing utility use, in 2014 Supreme Egg retained Enviro-Stewards to conduct a utility-reduction assessment of the facility with the primary focus on water conservation. Water was selected as the focus utility because it

is used extensively by the facility for processing, cleaning, and domestic use. Water is also becoming increasingly more expensive in the City of Toronto. As a recent example, water rates in Toronto were increased by 5% in 2017 and were again increased by 5% in 2018. Hence, any reduction in water use that Supreme Egg realizes will help offset some of the financial impacts of the water rate increases.

The City of Toronto's Industrial Water Rate

Since Supreme Egg is located in Toronto, it was potentially eligible for Toronto Water's Industrial Water Rate (IWR) program for industrial facilities. The IWR program provides a reduced water rate to industrial facilities that are accepted into the program. For example, the standard (Block 1) water rate in 2018 was \$3.8036/m³, whereas the IWR program's (Block 2) rate was \$2.6623/m³. For high-volume water consumers such as Supreme Egg, this 30% savings is significant for their bottom line. Additionally, if the water is heated, the cost of use is increased considerably due to the natural gas required to heat the water to the required temperature. The combustion of the natural gas also increases the facility's greenhouse gas (GHG) emissions.

Enviro-Stewards helped Supreme Egg prepare and submit its Water Conservation Plan for Toronto's IWR program, which was approved by the City.

Summary of Savings

The table below provides a summary of the estimated savings associated with the opportunities identified at Supreme Egg.



Environmental Savings

Water savings (m³/yr)
7,754
Electricity savings (kWh/yr)
9,305
Electricity GHG savings¹ (tonnes CO₂eq/yr)
0.47
Natural Gas savings² (m³/yr)
14,807
Natural Gas GhG savings (tonnes CO₂eq/yr)
27.8
Total GhG savings (tonnes CO₂eq/yr)
28.3



Squeegee that can be used instead of hoses to wash floors.

NOTES:

GHG savings estimates based on the following:

¹Associated with water use in Ontario:

$$0.05 \text{ kgCO}_2\text{e/kWh} * 1.2 \text{ kWh/m}^3 = 0.06 \text{ kgCO}_2\text{e/m}^3$$

0.05 kgCO₂e/kWh – Environment and Climate Change Canada: Canada National Inventory Report, 1990-2014, Part 3, 2016

1.2 kWh/m³ – adapted from Water Research Foundation & Electric Power Research Institute: Electricity Use and Management in the Municipal Water Supply and Wastewater Industries, 2013

Associated with natural gas combustion in Ontario:

²Assumes City water temperature of 12°C, heated water temperature of 30°C, and a boiler efficiency of 80%.



Economic Savings

Economic savings¹ (\$/yr)	Payback (years)
\$136,722	0.1

NOTES:

¹Economic savings and payback are per Supreme Egg's Water Conservation Plan and are based on water savings only (savings would be greater and payback even faster with natural gas savings included).

Summary



(image on the right) Turning off hot water during cleaning processes will save water as well as the natural gas to heat the water.

1. Supreme Egg was able to participate in Toronto Water's IWR program, which provides them with a water rate that is 30% lower than the City's Block 1 rate
2. The IWR program substantially decreases Supreme Egg's annual spend on water
3. Additionally, Supreme Egg realizes additional monetary savings associated with the water conservation measures identified in their water conservation plan
4. The total identified water savings of 7,754 m³/year also have significant GHG savings of 28 tonnes of CO₂e/year associated with reduced hot water consumption and pumping

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