2019 OWWA Award of Excellence for Water Efficiency

PUBLIC SECTOR & UTILITES AWARD

York Region

York Region Industrial, Commercial and Institutional (ICI) Water Audit & Capacity Buyback Program

Executive Summary

York Region has goals to reduce water consumption throughout the Region to allow growth without the need for expensive water infrastructure. Industrial, commercial, and institutional (ICI) facilities are typically the largest individual consumers of water in York Region. As such, York Region provides water conservation programs and incentives targeted specifically at this sector, one of which is the ICI Capacity Buyback Incentive Program. This program is especially effective in water conservation by offering these benefits:

- The program has received a high participation rate and has reached its target of 10 facilities annually, although implementation and uptake has been low.
- The audits provided at no-cost to ICI customers are comprehensive and include both a complete water balance and a comprehensive list of quantified water conservation opportunities.
- This program offers major financial benefits to York Region ICI water customers through the significant water cost savings combined with the high buyback incentive rates, which allows businesses to improve their competitiveness.
- The audits typically identify water saving opportunities with a payback period (averaging 3 years).
- The water audits also include an energy conservation and greenhouse gas reduction component for any water opportunities that also result in energy savings.
- For participants who experience wastewater discharge fees, water audits also include a pollution prevention component that assists the participant with reducing their effluent loadings to minimize concentration (mg/L) increase when water is saved.
- The program offers a much higher buyback incentive rate for opportunities that reuse water.
- A rainwater harvesting assessment is completed for each water audit with a higher buyback incentive that is payable for rainwater harvesting opportunities.

The program has saved businesses an average of 30% on their water use with an average payback period of 3 years.

1. Introduction

York Region's innovative and effective water conservation program has many benefits to both businesses' bottom line and to reducing water use in the Region. This program has several key features, which allow it to be effective in reducing water use:

- High audit participation rate;
- Audits are comprehensive;
- Beneficial to water customers;
- Targeted savings identified at each facility;
- Relatively quick payback periods for opportunities;
- Pollution prevention and energy conservation considerations are factored into audits;
- Offers two buyback rates, one of which is specific to reuse opportunities and nearly three times the base rate; and
- Includes rainwater harvesting component.

The program has saved businesses an average of 30% on their water use with an average payback period of 3 years.

2. Background

York Region has a rapidly expanding population; increased growth puts pressure on the water supply system. Recognizing the need for smart water management, York Region has integrated water conservation into its sustainable growth plans and policies. York Region's current water conservation strategy envisions a residential consumption rate of 150 liters per capita per day. To achieve this target, water conservation is necessary to accommodate increased growth in the Region. Conservation avoids costly infrastructure capacity upgrades and thus reduces the cost of delivering water to communities. As part of their water-saving efforts, York Region offers a buyback incentive program to businesses called the Industrial, Commercial, and Institutional (ICI) Capacity Buyback Incentive program. ICI facilities are typically the largest individual consumers of water in York Region. As such, York Region provides water conservation programs and incentives targeted specifically at this sector.

3. Detailed Description of the Program and its Results

This section highlights the aspects of York Region's program that stand out and lead to significant water conservation.

High Audit Participation Rate

The ICI Capacity Buyback Incentive program has been targeting 10 audits per year for large manufacturers since 2012. From 2012 through 2014, all 30 available spots were filled by ICI businesses interested in water conservation. This was in part due to the high level of relevant industry experience of the consultant (Enviro-Stewards) as well as various marketing and promotion strategies undertaken by York Region including annual breakfast workshops to invite ICI high water users to learn more about the program and its benefits.

It should be noted that while there has been high participation, implementation and uptake for water conservation measures has been low. Potential barriers to implementation include staff turnover, lack of financial resources for implementation measures, and high workload demand for facility staff, which can lead to their attention being focused on other, more time sensitive, projects.

Comprehensive Audits

The water audits conducted in York Region's program are comprehensive and paid for by the Region. They include monitoring of main water consuming processes and collection of existing water consumption data to complete a water balance of the facility. Opportunities for water conservation are also identified and evaluated economically. This leads to a comprehensive list of water conservation opportunities, which can assist the participant with making informed decisions about water conservation and provide a business case for implementation.

Program Benefits Water Customers

The program is designed to benefit the Region's water customers. As described above, the comprehensive water audit allows customers to realize water savings with a relatively short payback period and includes a potential incentive provided by the Region. There is no financial risk for the participant to conduct the water audit and the water audit provides both a water balance and a list of implementable opportunities with a relatively short payback period. This allows the business to be more competitive through improving reducing their water costs.

Water Savings and Payback Period

The water audits conducted at various ICI businesses throughout York Region identified an average of 30% savings with an average payback period 3 years for opportunities. Table 1 below provides an overall summary of 57 water-use consultations conducted by Enviro-Stewards from 2012 through 2018.

Table 1: Summary of water-use consultations conducted by Enviro-Stewards

Number of facilities audited:	57
Total potential water savings:	929,730 m³/year
Average % savings of total water consumption:	30%
Average payback of all opportunities:	3 years
Total verified savings to date:	86,582 m³/year

These savings represent a very high financial benefit to the customers since every dollar saved on utility costs is a dollar in pocket for the customers (i.e. earning a dollar of profit).

Energy Conservation Component

Each facility is assessed to determine whether there would be a benefit to including an energy conservation component for certain opportunities. The energy component may allow a participant to realize higher total savings if natural gas and/or electricity consumption are

reduced in addition to water savings alone. This may help increase implementation rates. For example, an opportunity for installing a new chiller system at one of the businesses resulted in both water and electricity savings and a combined payback period of 4.2 years. If the payback period was based on water savings alone, the payback period would have been over 10 years. Additionally, whenever hot water is conserved, the natural gas or electricity needed to heat that water is also conserved, which is included in these water studies. Analyzing associated utility savings of water-savings opportunities thus helps the participant see that total savings may be greater than water alone and that an opportunity is therefore worth implementing.

Pollution Prevention Component

York Region's bundling of an optional wastewater assessment with the water-use consultation has been an excellent innovation to water conservation programs. The wastewater portion of the assessment takes a pollution prevention (P2) approach, where at-source opportunities to reduce wastewater loading are identified. This approach is significantly less expensive than end-of-pipe wastewater treatment systems. Additionally, if a treatment system is ultimately necessary to pretreat effluent prior to discharging to the sanitary sewer, the size (and hence cost) of the system can be much smaller if P2 and water conservation have already been implemented.

The addition of the P2 component to the water-use consultation program provides many benefits to both the Region and the participating facility, such as reduced loading to wastewater treatment plants (and associated wastewater fees), and reinforcement of the "prevention first" mindset. Prevention first practices can significantly reduce loading fees by identifying the main source of the problem, which has a significant financial benefit for participants; potentially saving a facility more than just sanitary sewer loading charges.

Two Buyback Incentive Rates

York Region offers a one-time incentive of $0.75 per litre of water saved in a single average day through water saving retrofits and $2.00 per litre of water saved in a single average day through water reuse retrofits; up to 50% of capital cost to a maximum of $50,000.

Water reuse opportunities are typically more challenging to implement, because once a facility's water consumption has been reduced as much as possible, the only way to extract more efficiency is to reuse the water to offset the consumption of fresh water. Generally, opportunities for water use reductions (e.g. installing a flow restrictor, rotameter flow meter, setting a reduced overflow rate) are typically less technically complex and hence less expensive than water reuse opportunities (e.g. rainwater harvesting, new pumps and filters for treatment and reuse, etc.). Reuse opportunities also require more investigative studies (i.e. detailed flow monitoring, quality analysis of water to be reused, consultation with equipment suppliers, etc.); pilot studies; and generally are higher risk (e.g. potential fouling of system where water is being reused, more stringent customer and/or regulatory requirements for reuse, novelty of opportunity). Other typical examples of reuse include:

- Reuse final rinse water as the first rinse in a subsequent clean-in-place (CIP) cycle
- Use non-contact cooling water as cooling tower make up
- Use reverse osmosis (RO) reject as cooling tower make up or cooling water
- Reuse pump seal water through several pump systems ("daisy chain" seal water)

- Capture regeneration water in deionization systems and reuse in subsequent regeneration cycle
- Recirculate vacuum pump seal water
- Reuse spent non-contact cooling water for cleaning
- Counter-current rinse tanks
- Capture and reuse filter backwash water
- Reuse final rinse in a conveyor/belt cleaning process to first rinse
- Reuse cooling water through a cooling tower and/or chiller
- Capture and reuse rainwater for non-process fixtures, cooling tower make up, non-contact cooling, irrigation, etc.

Since many of the above water reuse opportunities require process modification and/or the installation of additional equipment, they typically have higher capital costs and longer paybacks. Therefore, a higher incentive of $2/L/day (vs $0.75/L/day) is offered to encourage implementation of these higher cost opportunities.

Rainwater Harvesting Component

As climate change yields increasingly severe and frequent storm events, stormwater management is more important than it ever has been. As part of each water audit, York Region includes a rainwater harvesting (RWH) component that quantifies the potential rainwater that could be collected for use within the facility using specialized RWH software. This allows each participant to recognize the potential for rainwater to offset water used in the facility. The payback periods for this type of opportunity are typically over 10 years (usually closer to 30 or 50 years) due to the high capital costs of installing a RWH system (storage tanks, pumps, pipes, controls, valves, filters, etc.). As mentioned above, York Region provides a higher incentive of $2/L/day (versus $0.75/L/day) for all RWH opportunities that are implemented. This financially encourages participants to implement RWH systems.

Appendix A

Case Studies

York Region's Industrial, Commercial and Institutional (ICI) Water Use and Wastewater Quality Consultation and Capacity Buyback Incentive Programs

CASE STUDY: ARLA FOODS

Arla Foods Inc. (Arla Foods), a Canadian subsidiary of Arla Foods in Denmark, is a major supplier of fresh, specialty cheeses.

At Arla Foods, environmental sustainability is a top priority. The company's participation in York Region's Water Use and Wastewater Quality Consultation and Capacity Buyback Incentive Program has already resulted in a 32 per cent reduction in their total water consumption since 2014.

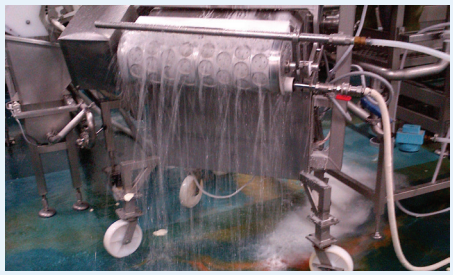
By implementing a suite of water saving measures — from replacing spray nozzles with more efficient models to reusing process water — Arla Foods has been able to reduce its annual water consumption by more than 37,000 cubic metres, which equates to a savings of $143,000. Arla Foods also received a water savings incentive of $19,487 from The Regional Municipality of York and has had additional savings of over $142,000 annually from a reduction in natural gas, cleaning chemical and labour costs.

WATER SAVING:
>37,000 m'/year

TOTAL OPERATIONAL SAVINGS: $285,000

Payback: Less than 6 months

*Payback period includes water incentives, energy and operational savings.



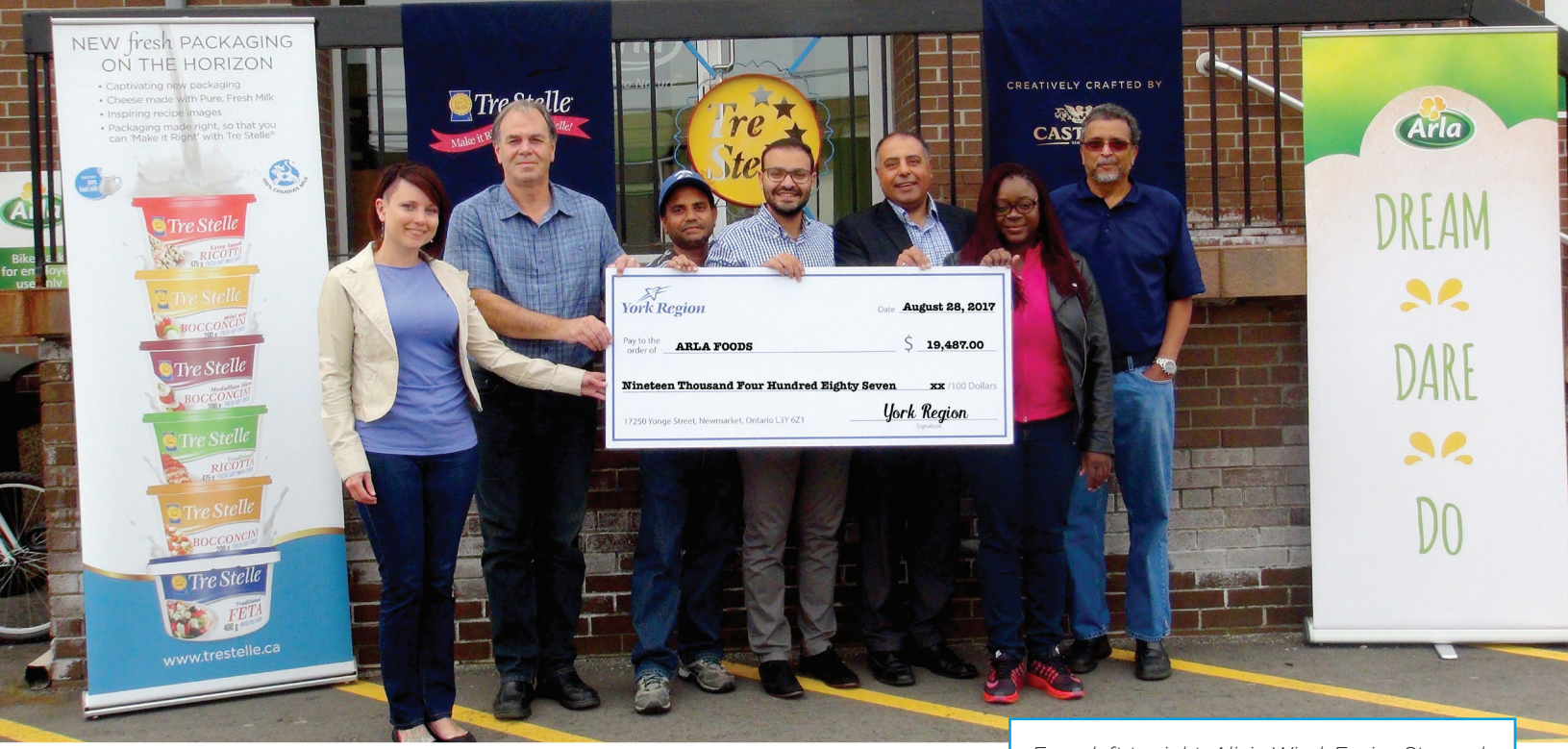
Top: Before — Demoulder running when no production.

Bottom: After — Addition of the demoulder water recovery system to reuse more water for bocconcini production.

For more information on how your business can benefit from water savings, contact waterfortomorrow@york.ca or visit york.ca/waterincentives

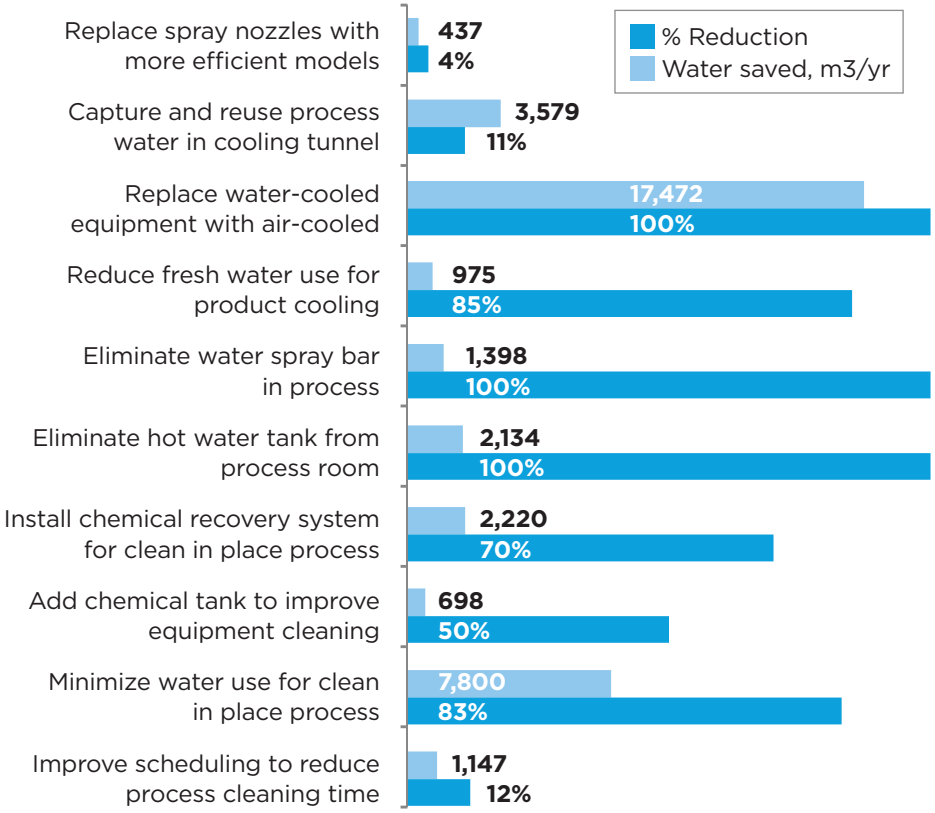
WATER FOR TOMORROW

York Region



From left to right: Alicia Wind, Enviro-Stewards, Kirk Pollitt, Arla Foods, Samir Patel, Arla Foods, Omar El Sherif, Arla Foods, Bill Chihata, York Region, Ashley McKenzie, Arla Foods, Greg Sanford, Arla Foods

Water reduction from implemented water saving opportunities



Environmental Strategy

A core component of Arla's success has been their relentless dedication to sustainable growth. The company is committed to reducing their energy and water consumption by three per cent per year within their operations.

Arla's Commitment

"We strive for the best environmental practices and work to continuously reduce our environmental impact, all the way from the farm to the consumer."

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York Region

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CASE STUDY

Moscone Marble

Company Overview

Providing installation and fabrication, Moscone Marble has serviced the construction industry for more than 60 years.

Moscone Marble houses state-of-the-art technology with five Computer Numerical Control (CNC) machines and automated conveyor belts including the *Champion 5* saw, which is exclusive to Moscone Marble in North America. This enables continuous cutting and the capacity to produce large volumes of stone countertops.

Water Measures Implemented

Moscone Marble's commitment to water efficiency in their facility has resulted in a 64 per cent reduction in their total water consumption.

In 2012, Moscone Marble reduced water consumption by more than 59,000 litres per day by collecting, treating and reusing spent water in five CNC machines, automatic and manual cutters and straight polishers. Moscone Marble received an incentive of $17,750 from York Region for the water-saving retrofits under the ICI Water Audit and Capacity Buy Back Program.

Process	Solution	Water Savings	Cost Savings	Payback
Process Water Demand (CNC Machines, cutters and polishers)	Treat and reuse process water	>15,000 m3/year	$37,000/year	1 year*

* Moscone Marble had previously invested in equipment used to construct the water reuse system. The total payback period including the previous investment is 3.5 years.

For more information on York Region's ICI Water Capacity Buyback Program please visit www.waterfortomorrow.ca

York Region