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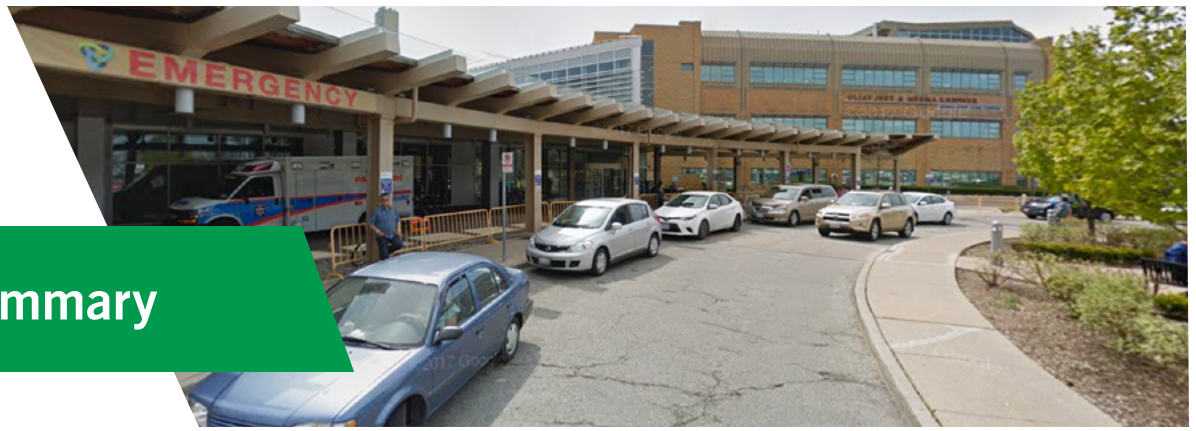
Municipal Water Efficiency Eco-Cluster:

CREDIT VALLEY HOSPITAL

Case Study

A program of:





View of Credit Valley Hospital's Emergency Entrance (Google 2018)

Project Summary

In 2017 the Region of Peel retained Enviro-Stewards to complete a water assessment at Trillium Health Partners' Credit Valley Hospital (the Hospital) under the Region's Indoor Water Assessment program. Initially the Hospital was engaged through Peel's representation on the TRCA's Greening Health Care initiative.

The facility implemented two water efficiency measures: sterilizers units that used water eductors were replaced with new ones equipped with vacuum pumps, and a heat exchanger was installed to preheat boiler feed-water using the boiler blowdown water, which eliminated the need for blowdown cooling water. These two measures collectively saved 18,615 m³/year of water.

A co-benefit of the water efficiency measures was the avoidance of 28.2 tonnes/yr of Greenhouse Gas emissions (GHG), broken down as follows:

- 1.33 tonnes/yr less GHG emissions associated with electricity the Region of Peel previously used to pump and treat the water that is now conserved
- 26.9 tonnes/yr less GHG emissions associated with natural gas that the Hospital previously used to heat the portion of the conserved water that was heated onsite to make hot water

Assuming that the water efficiency measures remain in place for at least 10 years, the water conservation study will result in the avoidance of 186,150 m³ of water and 282 tonnes of GHG emissions.

About Trillium Health Partners & Credit Valley Hospital

Trillium Health Partners encompasses three main sites: Credit Valley Hospital, Mississauga Hospital, and Queensway Health Centre. The three sites offer a full range of acute-care services and specialized community-based programs. Trillium Health Partners' goal is to focus on providing the best care for patients today, while helping to build a better future for tomorrow.

Credit Valley Hospital (the Hospital) serves the approximately 1 million people living in Mississauga and the Region of Peel. Its programs and services include clinical genetics, maternal-child care, oncology, general medicine, surgery, emergency, mental health, rehabilitation, obstetrics and gynaecology, paediatrics, and cardiac services.

The Hospital consists of over 1 million square feet and provides 459 beds for acute care inpatients and has consistently met Accreditation Canada's national safety and patient care standards.



Front view of two new steam sterilizers.



Blowdown tank, municipal water line, and temperature regulating valve that previously cooled boiler blowdown water before it went to the drain.

Process & Resource Consumption

Hospitals operate a wide-range of specialized medical equipment and building heating and cooling systems.

Resource consumption includes:

Natural gas

- Steam boiler heating
- Domestic hot water
- Specialized medical processes and equipment such as vacuum steam sterilizers

Electricity

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

Water

- Steam
- Reverse Osmosis (RO) systems
- Domestic
- Cleaning
- Boiler makeup
- Sterilization
- Laboratory procedures and equipment

The Case for Water Efficiency

Healthcare facilities such as hospitals incur significant expenses associated with utility consumption. Hospitals are typically large buildings requiring heating and cooling 24 hours a day and 365 days a year and operate sophisticated medical equipment and processes that consume electricity, water, and natural gas. To keep hospital costs low, reducing baseline utility consumption is an excellent way to reduce operating expenses.

Realizing the need to reduce utility consumption costs, the Hospital implemented water efficiency projects associated with its steam sterilizers and boiler blowdown cooling system.

The Region of Peel's Indoor Water Assessment Program

The Hospital participated in the Region's Indoor Water Assessment. The program provided a free indoor assessment of the facility to identify water saving opportunities. Once identified, water saving opportunities were metered to quantify municipal water use and help detail the potential opportunity and resulting cost benefit. This data supported the facility in creating a business case to move forward in cases where a large capital expenditure is recommended. The flow metering was conducted using ultra sonic, clamp-on flow meters and quantified the savings associated with the measures that are presented in this case study.

Summary of Savings

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



Environmental Savings

	OPPORTUNITY		
	Install boiler heat exchanger ³	Replace steam sterilizers	TOTAL
Water savings (m ³ /yr)	3,577	15,038	18,615
Electricity savings (kWh/yr)	5,097	21,429	26,526
Electricity GhG savings ¹ (tonnes CO ₂ eq/yr)	0.25	1.07	1.33
Natural Gas savings (m ³ /yr)	14,320	-	14,320
Natural Gas GhG savings ² (tonnes CO ₂ eq/yr)	26.9	-	26.9
Total GhG savings (tonnes CO₂eq/yr)	27.2	1.1	28.2

GhG savings estimates based on the following:

¹Associated with water use in Ontario: $0.05 \text{ kgCO}_2\text{e/kWh} * 1.425 \text{ kWh/m}^3 = 0.07125 \text{ kgCO}_2\text{e/m}^3$

References: $0.05 \text{ kgCO}_2\text{e/kWh}$ – Environment and Climate Change Canada: Canada National Inventory Report, 1990-2014, Part 3, 2016
 1.425 kWh/m^3 – provided by Region of Peel for total energy use associated with treatment, transmission, and collection of water and wastewater

²Associated with natural gas combustion in Ontario: Ontario natural gas combustion = $1.879 \text{ kg CO}_2\text{e/m}^3$

³Savings numbers per Enbridge Blowdown Heat Recovery calculations provided to Credit Valley Hospital.



Economic Savings

	OPPORTUNITY		
	Install boiler heat exchanger ³	Replace steam sterilizers	TOTAL
Incentive amount (\$)	\$2,450	\$10,300	\$12,750
Economic savings ¹ (\$/yr)	\$12,415	\$34,738	\$47,153
Payback (years)	1.8	7.3	-

NOTES:

GhG savings estimates based on the following:

¹Economic savings for boiler heat exchanger includes estimated natural gas savings of 14,320 m³/year and a natural gas cost of \$0.25/m³.

Payback without natural gas savings (water savings only of \$8,835/year) is 2.5 years. Economic savings for steam sterilizers does not include electrical or natural gas savings (information not available) or benefits associated with process improvements. Payback with these additional savings would be lower.

Summary



(image on the left) View of new heat exchanger (blue object in foreground) and previous blowdown cooling system in background.

(image on the right) Municipal water line to one of the new steam sterilizers.

1. Credit Valley Hospital participated in the Region of Peel's Indoor Water Assessment Program and were provided a one-time incentive of \$12,750, this will result in annual municipal water savings of \$43,573 for their two water efficiency projects.
2. Additionally, the hospital realized monetary savings associated with the electrical and/or thermal savings of the projects.
3. The hospital was pleased with the outcome of the assessment program and support received by Region of Peel staff. A testament to that was the willingness to share the results of their water savings work through case studies and allow promotion through social media.

Contact Us

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This initiative was made possible in part through the financial support of the Independent Electricity System Operator's (IESO) Education and Capacity Building Program. Toronto and Region Conservation Authority is solely responsible for implementation of, and the content of any materials produced by, this initiative, and the IESO has no responsibility or liability whatsoever in the event that any person suffers any losses or damages of any kind as a result of the initiative.

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