

The Township of Brock

REALice Pilot Program



Appendix "3" to Climate Initiatives
Memorandum 2024-CLIM-001

Description

REALice Pilot Program and introduction of new Electric Ice Resurfacers at Foster Hewitt Memorial Community Centre

In September 2022, Council approved the REALice pilot program at Foster Hewitt Memorial Community Centre for the 2023/2024 ice season. The REALice pilot aims to achieve significant cost savings and lower GHG emissions. The REALice system utilizes mechanical technology with no moving parts to achieve the elimination of microbubbles from cold water. Historically, water had to be heated to make and maintain ice.

Brock Township's first electric ice resurfacing unit from Zamboni eliminates propane use, reduces CO emissions, and minimizes the need for air exchanges and dehumidification in the arena. Monitoring electric and natural gas consumption alongside the REALice system installation in the 2023/2024 ice season aims to identify potential savings.

This facility has also received new high efficiency gas boilers and a domestic hot water system using the boilers for hot water to reduce duplication of heating water. This provides more efficient heating for the lobby and dressing room areas. Embracing innovative technologies will help the Township offset expenses through fuel and maintenance savings.

Progress to date

The REALice system was installed in September 2023 and has been used for the creation of the ice surface and standard ice maintenance, showcasing progress towards the desired environmental and operational benefits at Foster Hewitt Memorial Community Centre.

Desired outcomes



The REALice pilot aims to achieve significant cost savings and lower GHG emissions. Potential savings of \$10,000 to \$15,000 annually have been suggested. This will be fully determined after the pilot year.



Additionally, between 25 and 30 tonnes of CO2 emissions would be saved annually, with reductions in Natural Gas usage. This reduction should effectively decrease the carbon footprint for this facility.



The introduction of the first electric ice resurfacing machine in the Township of Brock



Durham Region

Beaverton Supportive Housing Project



Introduction

The Beaverton Supportive Housing Project aims to address housing needs while prioritizing sustainability and energy efficiency. The envelope design includes enhancements such as increased roof and wall insulation, along with high-efficiency windows. The mechanical systems design features an all-electric setup with heat pumps and water heaters, eliminating the need for gas service.

Progress to date

The Beaverton Supportive Housing project is on track for completion in winter/spring 2024. The modular construction, enhanced envelope design, and renewable energy sources showcase the project's commitment to creating a supportive and environmentally conscious living space for its residents.

Summary of the project

- ✓ **Envelope design:**
 - Increased roof insulation
 - Increased wall insulation
 - High-efficiency windows

- ✓ **Mechanical Systems design:**
 - All Electric Heat Pumps and Water Heaters
 - No gas to the site
 - Solar PV installation – 350 rooftop panels

- ✓ **Construction method:**
 - Modular construction
 - Reduced time on site
 - Reduced construction waste

Desired outcomes

- The project aims to provide homes and support through a 47-unit modular housing plan with a strong emphasis on sustainability and energy efficiency. Key objectives include:
- Fulfilling 30% to 40% of building energy needs rooftop solar installation.
 - Achieving zero greenhouse gas (GHG) operational emissions, representing an 80% to 85% reduction compared to similar-sized buildings operating on gas.
 - Increasing operational and functional efficiency.
 - Future-proofing the building for true net zero capabilities.



The Beaverton Supportive Housing project offers support to marginalized individuals through a 47-unit modular housing plan.



The Town of Whitby

Zero Carbon Whitby Plan



Introduction

The Town of Whitby has adopted the Zero Carbon Whitby Plan. The plan aims to reduce corporate carbon emissions to net zero by the year 2045 while also setting a four-year reduction target consistent with this trajectory.

Outcomes



The Town explored net-zero technology as the replacement option and has installed an advanced air source heat pump, including an energy recovery ventilator (ERV) system to heat, cool and condition the space.

These heat pumps are engineered with advanced technologies suitable for Canada's cold climate conditions, providing extra low-temperature heating (XLTH), where the new heat pump can provide heating at even -26°C.

The new heating ventilation and air conditioning (HVAC) system in the building now also includes an energy recovery ventilator (ERV), which will help improve the indoor air quality and comfort levels in the building. In addition, it offers a host of additional advantages, including moisture control, odor control, and better HVAC efficiency.



This project will result in annual greenhouse gas emission savings of around 8.5 tonnes of CO₂e.



This is equivalent to greenhouse gas emissions from two gasoline-powered passenger vehicles driven for one year or carbon sequestered by 141 tree seedlings grown for 10 years.

Description

Moving towards carbon neutral: 117 King — Oil furnace replacement project

This is the first of many net-zero carbon-focused projects for the Town of Whitby. The Town has been strategically planning the upgrade of various building equipment across its portfolio and is slowly phasing out the building's dependence on gas (or fossil fuel) powered equipment in the coming decade.

The building at 117 King originally used an oil furnace (approximate capacity 80,000 BTU/h) with an indoor oil storage tank to heat the building. The existing equipment was past its typical lifespan, and the cost to heat the building using oil was rising yearly. This project focused on replacing the existing mechanical system in the building with an energy-efficient option.



New 'Fujitsu' condenser unit installed on exterior stand



Associated indoor heat pump unit mounted on interior stand



Energy recovery ventilator unit



Outside air intake ductwork



The Township of Uxbridge

Cold Water Resurfacing Project



Description

Cold Water Resurfacing installed at Uxbridge Arena and Community Centre

Ellexicon Group successfully implemented Realice Cold Water Ice resurfacing at the Uxbridge Arena and Community Centre, resulting in a notable 30% reduction in the ice plant's electricity consumption and the complete elimination of natural gas usage for heating the resurfacing water. This achievement has led to the improvements in ice quality and an overall reduction in water usage.

The implementation of the new system has enabled the ice plant to operate at warmer temperatures, producing thinner ice over the twin pad arena and saving the Township approximately \$24,000 during the 2022-2023 season.

The significant reduction in electricity and gas consumption translates to annual savings of approximately \$8,000. Moreover, with over 3,300 indoor ice rinks in Canada, the adoption of cold-water resurfacing technology presents a substantial opportunity to contribute to Canada's climate change initiatives.

Progress to date

In 2022, the Township reached a significant milestone with the installation of the Realice Cold Water Ice resurfacing system, showcasing its commitment to energy efficiency and sustainability.

This advanced technology has already led to substantial projected annual savings of 7,865 cubic meters and 91,209 kilowatt-hours in natural gas consumption.

Additionally, the system is expected to avoid over \$12,000 in carbon taxes by 2030, while the town has already benefited from \$3,000 in utility incentives from Enbridge Gas.

These achievements highlight the positive impact of Realice, positioning the Township as a leader in environmentally responsible practices and paving the way for continued progress.

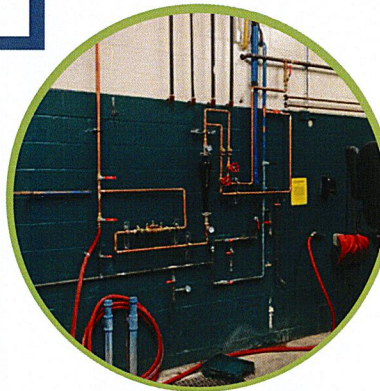
Desired outcomes



The Township of Uxbridge has realized a significant reduction of 29 tonnes in its annual CO2 emissions through the adoption of a mechanical de-aerator to flood its ice rinks with tap-temperature water, known as Realice Cold Water Ice resurfacing.



This innovative system has successfully eliminated the need for natural gas to heat the resurfacing water, as cold mechanically de-aerated tap water is now utilized for flooding the ice. Realice has led to substantial cost savings, amounting to approximately \$24,000 in operational expenses during the 2022-2023 season.



The Township of Uxbridge has reduced its annual CO2 emissions by 29 tonnes just by installing a mechanical de-aerator to flood its ice rinks with tap temperature water.



The City of Pickering

Civic Complex Boiler Retrofit Project



Description

In 2023, the City successfully completed a comprehensive boiler retrofit project within its Civic Complex, encompassing City Hall and the Central Library. The initiative involved replacing end-of-life natural draft units with high-efficiency modulating condensing boilers.

As part of the ongoing improvements to the system in the current year, new design envelope heating circulators are being introduced. These enhancements are expected to optimize heat generation, delivery, and system controls, resulting in further gas savings.

Progress to date

The Civic Complex Boiler Retrofit Project, initiated in 2023, has been successfully executed. The natural draft units have been replaced with high-efficiency modulating condensing boilers, achieving a minimum 20% increase in efficiency.

This retrofit has resulted in a significant annual reduction of 52 tonnes in greenhouse gas emissions.

In the ongoing efforts to further enhance the system, new design envelope heating circulators are being introduced in the current year.

These additions are expected to optimize the overall performance of the heating system, further contributing to gas savings.

Desired outcomes

- ✓ **Enhanced Boiler Efficiency:**
 - Replace outdated natural draft units with high-efficiency modulating condensing boilers.
 - Achieve a minimum 20% improvement in boiler efficiency compared to the previous units.

- ✓ **Greenhouse Gas Emissions Reduction:**
 - Result in an annual reduction of 52 tonnes of greenhouse gas (GHG) emissions.

- ✓ **Optimized System Performance:**
 - Implement new design envelope heating circulators for improved system performance.
 - Optimize heat generation, delivery, and system controls to maximize overall gas savings.



The City of Oshawa

Oshawa's Net Zero Emissions Retrofit Strategy



Description

The Net Zero Emissions Retrofit Strategy quantifies the top greenhouse gas (GHG)-contributing facilities in the City of Oshawa's corporate portfolio and plans to develop a fuel-switching roadmap for each of these facilities to achieve Net Zero Emissions.

On-site renewable generation will support carbon footprint targets while reducing exposure to utility markets. As measurement and verification are key to outlining facility operation, the City will install and implement new meters and analytics to assist in this process.

Progress to date

The Net Zero Retrofit Assessments will begin in 2024. The energy team was expanded in 2023 to include an Energy Manager and Energy Management Coordinator to build capacity for achieving Net Zero targets.

Desired outcomes



By targeting the top gas-consuming facilities through Net Zero Retrofits, the City aims to achieve an 80% reduction in 2007 GHG emission rates by 2045.

By engaging in long-term planning for these targets, the City will ascertain a complete scope of work, increase efficiency of project delivery, and create alignment with scheduled capital investments where possible.

On-site renewable generation will support greenhouse gas reduction targets while reducing exposure to future utility markets.



Oshawa City Hall



The Town of Ajax

The Ajax Community Centre's New Pool Cover



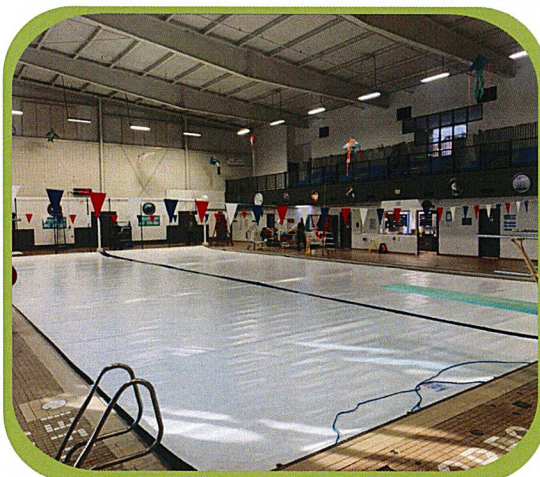
Introduction

The Town of Ajax continues to be a leader in environmental sustainability. The Town declared a climate emergency to acknowledge the impacts of climate change and reaffirm our commitment to mitigate and adapt to those impacts wherever possible.

The Town has implemented several energy-saving projects, such as the construction of LEED-certified buildings, installation of solar photovoltaic, solar thermal, and geothermal systems, as well as various facility energy retrofit upgrades. The Town has installed Electric Vehicle (EV) charging stations, completed the streetlighting LED conversion, and acquired a fleet of green vehicles to reduce energy consumption and GHG emissions.

In addition, the Ajax Green Standard serves as a tiered municipal green standard that establishes sustainability-related performance measures and design guidelines for new development and redevelopment in the Town of Ajax. The Town is currently working on a Sustainable Green Fleet Strategy and a Corporate Net Zero Emissions Plan to achieve net zero by 2050.

Ajax Community Centre has a new Pool Cover — **the first of its kind in Canada!**



The Ajax Community Centre's new pool cover

Description

The Ajax Community Centre (ACC) serves the residents of the Town of Ajax as a community hub, housing a four-pad arena, lap and recreational pools, fitness facilities, meeting rooms, and outdoor facilities, such as a splash pad and soccer fields. In early 2023, a new, energy-efficient, and motorized swimming pool cover (as seen in the image below) was installed in partnership with Elexicon Group Inc. This innovative technology will save energy and associated costs, including:

Progress to date



Since its installation in January 2023, the reduction in GHG emissions is approximately 45 tonnes of CO₂e.

Desired outcomes

- Reduce annual greenhouse gas emissions (GHG).
- Prevent heat loss due to evaporation.
- Lower heating expenses during pool closure times, resulting in annual savings of approximately \$20,000.
- Significantly extend the life of dehumidification equipment.

