

Corporate Energy Report 2023

March 2024



Table of Contents

1.0 Introduction	2
2.0 Corporate Energy 2019 - 2023	3
2.1 Energy Conservation and Demand Management Plan	3
2.2 Corporate Energy Consumption 2019 – 2023	3
2.3 Corporate GHG Emissions Reductions 2019 – 2023	5
2.4 Renewable Energy Generation 2019 – 2023	6
2.5 Achievements in 2023	6
2.5.1 New pool cover installed at Ajax Community Centre (ACC)	6
2.5.2 New pool filtration system at McLean Community Centre (MCC)	8
2.5.3 Successful transition of Broader Public Sector Reporting	9
3.0 Corporate Energy Goals in 2024	9
3.1 Energy and Conservation Demand Management Plan Update	9
3.2 Corporate Energy Team	10
3.3 Corporate Energy Management Workshop	10
4.0 Conclusion	10

1.0 Introduction

The purpose of this report is to track the progress in savings of electricity and natural gas consumption from the top energy consuming Town of Ajax facilities between 2019 and 2023.

The Town has over 48 municipal owned buildings including administrative buildings, community centers, libraries, recreation buildings, and fire stations. The Town provides various municipal services to the Ajax community including libraries, recreational services, community centres, playgrounds, snow removal, public parks, and fire services. Providing continuous delivery of these services requires the use of energy in daily municipal operations, including maintaining buildings, fleets, streetlights, and outdoor lighting. Additionally, several utilities are required for the upkeep and maintenance of municipal operations, including electricity for powering, cooling, and heating municipal buildings along with natural gas for heating purposes, diesel and gasoline to operate fleet vehicles, and electricity to maintain streetlights.

The energy used for municipal operations and maintenance contributes to greenhouse gas (GHG) emissions. Accordingly, corporate energy management has been integrated into the Town's daily operations to conserve energy and reduce GHG emissions. The Town has continued to be a sustainability leader with the implementation of several energy reduction projects such as the construction of Leadership in Energy and Environmental Design (LEED) facilities, 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 2019, Ajax Council deemed climate change an emergency and in 2021 passed a resolution to set new corporate GHG emission reduction targets that comprises of short-, mid-, and long-term targets (below 2019 levels) including:

- 20% GHG emission reduction by 2025
- 40% GHG emission reductions by 2030
- 100% GHG emission reductions by 2050

In 2024, the Town will complete the Green Fleet Strategy, Energy & Conservation Demand Management (ECDM) Plan update, and a detailed inventory of GHG emissions. These strategies will reduce energy usage from municipal operations and counter the continually rising cost of electricity, natural gas, water, and fuel which has an increasingly significant impact on the Town's annual operating budget.

The Town's first annual Corporate Energy Report aligns with targets and highlights the Town's energy efficiency initiatives, progress towards GHG emissions reductions, and ongoing energy management between 2019 and 2023.

2.0 Corporate Energy 2019 - 2023

The Town consumes significant energy to maintain its facilities to meet community demands. The sources of the energy used within the Town's corporate portfolio of buildings is powered by grid-supplied electricity (primarily nuclear generated) from Elexicon Energy and natural gas from Enbridge. The emissions from these sources of energy account to 46% of the total emissions from municipal operations based on the Town's 2018 GHG emissions inventory. These emissions have been managed through the Town's ECDM Plans which are updated every five years.

2.1 Energy Conservation and Demand Management Plan

The Town's ECDM Plan was created in 2016 to meet the requirements under Ontario Regulation 397/11 (*Green Energy Act, 2009*). In 2019, this regulation was updated with Ontario Regulation 507/18: Broader Public Sector: Reporting and Conservation and Demand Management Plans (under the *Electricity Act*) which requires all public entities in Ontario to develop, publish, and implement energy conservation and demand management plans.

Through the Ontario Regulation 507/18 regulation, the Town's ECDM Plan was updated in 2019. This plan was developed based on the 2019 energy audits of 14 municipal buildings to identify energy conservation measures and address the significant energy consumption of municipally owned and operated buildings. This includes water usage, heating and cooling, and outdoor lighting such as streetlights, traffic lights, parks, and outdoor sports field lights. These recommendations were incorporated into the long-range capital forecast to implement energy reduction projects and ensure continuous energy management from 2019 to 2023.

2.2 Corporate Energy Consumption 2019 – 2023

In 2023, using RETScreen Expert software, energy models, including electricity and natural gas bill analysis for the top 15 energy consuming Town buildings, have been developed to create the corporate energy consumption for 2023 in comparison to 2019 (Table 1). RETScreen Expert is a Clean Energy Management Software platform from Natural Resources Canada (NRCAN) which identifies and evaluates initiatives related to energy efficiency, renewable energy, and the actual energy performance of buildings. The remaining buildings from the Town portfolio have not been considered for this report due to intermittent building usage, gaps in utility billing information, and lower energy consumption due to smaller facility size.

Table 1: Comparison of 2019 and 2023 energy consumption in the top 15 energy consuming Town of Ajax facilities.

Buildings	2019		2023	
	Electricity Consumption (kWh)	Natural Gas Consumption (kWh)	Electricity Consumption (kWh)	Natural Gas Consumption (kWh)
Ajax Community Centre	4,323,532.95	5,751,796.69	4,090,568.85	4,345,714.93
Audley Recreation Centre	2,037,522.60	3,316,863.83	2,261,993.04	2,407,211.82
McLean Community Centre	1,402,416.24	2,423,179.20	1,107,186.72	1,722,289.36
Townhall	887,210.80	1,300,175.20	791,047.00	963,907.61
Operations Centre	682,917.60	1,029,423.90	649,431.84	829,705.60
Fire HQ	401,463.20	337,177.13	465,821.68	374,055.13
Main Library	322,629.00	315,498.63	277,373.07	262,328.68
Fire Station 2	206,607.00	235,009.05	180,965.46	229,624.34
St Andrews	179,310.00	398,565.68	134,617.39	322,697.69
St Francis	122,471.35	256,238.36	105,637.62	23,865.00
Fire Station 1	109,820.00	233,223.00	123,703.86	22,031.00
Rotary Park Pavilion	93,149.00	180,989.26	85,436.03	132,344.17
Ajax Memorial Pool	58,743.00	162,840.07	56,702.68	60,603.91
Carruthers Marsh Pavilion	80,039.00	-	54,546.67	-
Greenwood Pavilion	53,073.00	-	37,914.17	-

The years 2020 and 2021 have not been listed in Table 1 due to decreased energy usage resulting from facility closures associated with the COVID-19 pandemic. Of note, the year 2022 was observed to have increased energy usage. This is likely due to pandemic restrictions being lifted resulting in immediate facility openings that required systems to be re-initiated and in full operation with increased air filtration requirements. The decrease in energy consumption from 2020 and 2021 along with increase in 2022 can be observed in Figure 1 which represents the energy (fuel) consumption for the top 15 Town buildings generated from RETScreen Expert software. Therefore, the baseline (reference) year has been determined as 2019 since it represents a typical year for the Town's municipal operations before the pandemic with the next typical year being 2023.

Energy efficiency projects including upgrades of LED lighting, heating, ventilation and air conditioning (HVAC) system as well as pool system automation from the 2020-2023 long-range capital forecast were implemented in several Town owned buildings such as Ajax Community Centre (ACC), McLean Community Centre (MCC), Main Library, Townhall, Fire Stations, St Andrews Centre, and Rotary Pavilion and have resulted in overall energy savings of **16.2%** (Figure 1).



Figure 1: The fuel consumption and savings for the top 15 Town of Ajax facilities, generated from RETScreen Expert software.

2.3 Corporate GHG Emissions Reductions 2019 – 2023

The utility bill analysis using RETScreen Software for the top 15 Town facilities along with the implementation of the energy efficiency retrofit projects from the 2020-2023 long-range capital forecast have resulted in total GHG emissions reductions of **467 tonnes CO₂e** (carbon dioxide equivalent) in 2023 as compared to 2019. This translates to a reduction of **14.8%** below 2019 levels ensuring that the Town is on the right path towards achieving the short-term goal of 20% GHG reduction below 2019 levels by 2025. RETScreen Expert software was used to analyze the emissions associated with the consumption of electricity and natural gas by the top 15 energy using facilities (Figure 2).

The Town conducted an analysis of its 2018 GHG emissions of corporate operations. In this analysis, the Town's electricity and natural gas consumption for facilities were found to be the largest contributors of GHG emissions, followed by diesel fuel consumption, outdoor lighting, and gasoline consumption. A detailed GHG inventory from all these sources will be conducted in 2024 as a part of the Town's 2024 Energy Conservation and Demand Management Plan update.

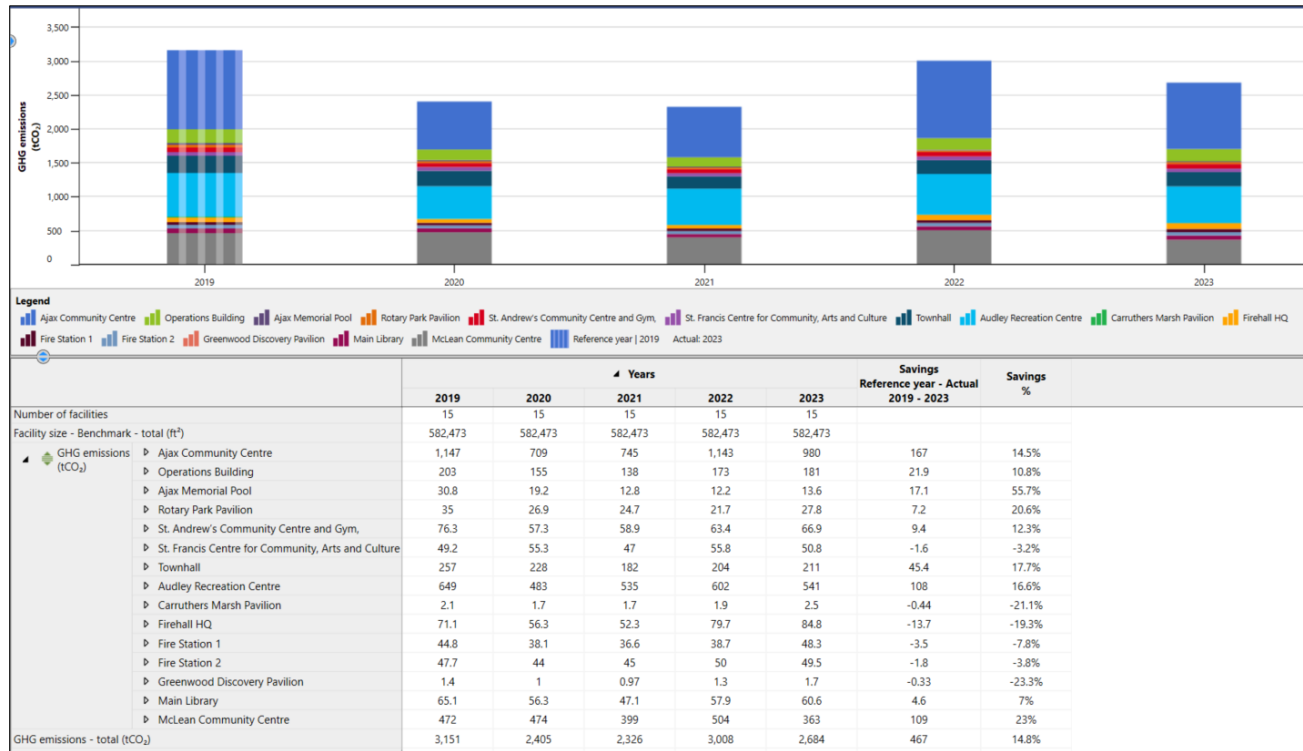


Figure 2: GHG emissions and savings from the top 15 Town owned facilities, generated using RETScreen Expert software.

2.4 Renewable Energy Generation 2019 – 2023

The Photovoltaic systems installed at the Operations Centre (100kW) and Greenwood Pavilion (2kW) uses solar panels to collect energy from the sun which is subsequently converted to alternating current as useful electricity and sold to the grid (Figure 3). These systems offset approximately **6.6 tonnes CO₂e** of GHG emissions and generate a revenue of nearly **\$90,000**, annually. Since 2015, these systems have avoided **37 tonnes CO₂e** of GHG emissions while generating a revenue of over **\$834,000** for the Town.

2.5 Achievements in 2023

The major achievements of 2023 have been described below.

2.5.1 New pool cover installed at Ajax Community Centre (ACC)

In early 2023, an energy efficient and motorized swimming pool cover (Figure 4) was installed at ACC in partnership with Elexicon Group Inc. This innovative technology was implemented to save energy, reduce costs, and reduce annual GHG emissions by preventing heat and water loss (due to evaporation) during pool closure times. This significantly extends the life of dehumidification equipment and results in annual savings of approximately **\$20,000**. Since its installation in January 2023, the annual reduction in GHG emissions is approximately **45 tonnes CO₂e**.



Figure 3: The Photovoltaic system (100kW) installed on the roof of Operations Centre.

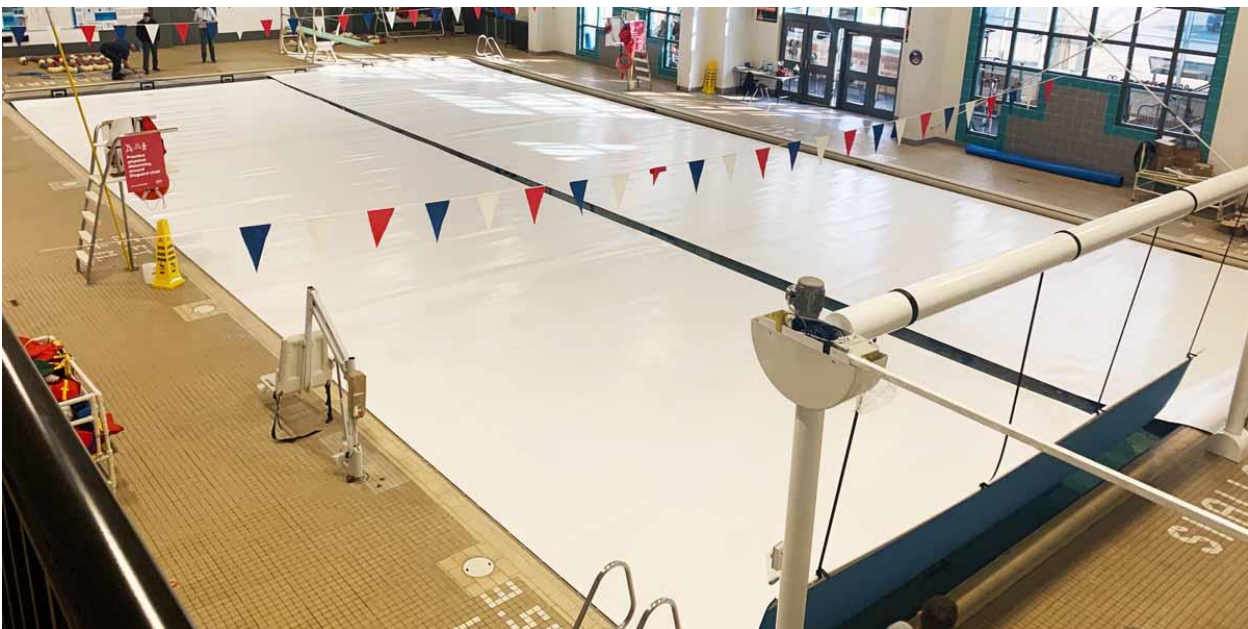


Figure 4: Pool cover installed at Ajax Community Centre.

2.5.2 New pool filtration system at McLean Community Centre (MCC)

In 2023, the aging pool filtration system for MCC's main pool, tot pool, and hot tub was replaced with a closed tank system, new piping, fittings, pumps with variable frequency drives (VFDs), and an automated make-up water controller (Figure 5). This upgrade was funded by the 2022 Canada Community-Building Fund and resulted in the reduction of water usage, energy cost savings, and annual GHG reductions of approximately **13.5 tonnes CO₂e**.



Figure 5: The new pool filtration system with VFDs and automated controller installed in the mechanical room of MCC.

2.5.3 Successful transition of Broader Public Sector Reporting

In 2023, Ontario's broader public sector (BPS) energy reporting program was updated with a new regulation, Ontario Regulation 25/23 (O. Reg 25/23): Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans, under the *Electricity Act*. This regulation requires BPS organizations to report their buildings' annual energy consumption to the Ministry of Energy every year through the Energy Star Portfolio Manager® (Portfolio Manager) application.

Previously, excel sheets (via Sharepoint platform) were used and data migrated to Portfolio Manager from previous years was reviewed and verified. Through the review process, a data entry error was identified for ACC's electricity consumption. This reported ACC's consumption as ten times the actual consumption and increased the energy use intensity of the building (i.e. instead of 1.3 MWh of electricity it was recorded as 13 MWh). The bills were reviewed for 2020 and the error was rectified.

A positive outcome of this exercise was the exploration of an automated utility management software system which will capture utility bills directly from the vendors and provide an integrated energy management system. This energy management software would enable staff to view bills as soon as they are available from the vendors instead of using paper bill delivery which are typically delayed by over two months. This system will help facility managers notice anomalies in the bills and achieve operational savings instantly and will be included as a part of the 2025 budget process.

3.0 Corporate Energy Goals in 2024

The 2024 corporate energy goals and priorities have been described below.

3.1 Energy and Conservation Demand Management Plan Update

Ontario Regulation 25/23, under the *Electricity Act*, mandates public agencies to develop and update an ECDM Plan every five years. This regulation aims to improve the understanding and reporting of energy consumption within the broader public sector and to assist these organizations with benchmarking, encouraging energy conservation and demand management activities within their organizations, and providing this information to the public. The ECDM Plan will be updated in 2024 in accordance with the recent regulation.

Ajax Council has set short-, mid-, and long-term corporate GHG emission reduction targets (below 2019 levels) of 20% by 2025, 40% by 2030 and 100% by 2050. In support of these targets, the Town will develop a Corporate Net-Zero Emissions Plan (CNZEP) which will be a comprehensive and actionable strategy that defines the pathway to achieve net zero by 2050 with a focus on:

- Reduction of energy consumption from municipal operations.
- Eliminating the usage of fossil fuels and offsetting residual emissions.
- Increasing local renewable energy generation.
- Building capacity among Town staff through education and collaboration.

Once developed, the CNZEP will serve as the Town's updated ECDM Plan which will include short- and long-term goals and actions in accordance with Ontario Regulation 25/23 requirements. Through the CNZEP, the Town will be able to develop a comprehensive budgeting, forecasting, and planning strategy as well as set short-, medium-, and long-term objectives with the goal of reaching net zero by 2050.

3.2 Corporate Energy Team

The Town's new Corporate Energy Team will involve facility operations managers and key staff from various other departments such as Finance, Strategic Initiatives, Purchasing, and IT to help save energy and reduce GHG emissions from facility operations. The team will meet quarterly to ensure that the goals, objectives, and targets of the CNZEP are met. During these quarterly meetings, energy consumption reports and the Town's energy saving initiatives will be showcased to ensure continuous energy management within the Town's facilities.

3.3 Corporate Energy Management Workshop

A key initiative of the Town's corporate environmental programs is to promote training and awareness of effective energy management among its staff. The Corporate Energy Management Workshop will be held in May at Audley Recreation Centre to discuss the fundamentals of energy, how to determine energy savings in building equipment, review financial analysis of energy bills, and offer interactive activities. The delivery of this workshop will be carried out by industry experts and staff from Association of Municipalities of Ontario. This workshop will provide an overview of energy management techniques to help senior management, facility managers, and operators make informed decisions concerning energy efficiency projects.

4.0 Conclusion

The Town has been a sustainability leader in implementing various energy efficiency initiatives which is evident through the GHG emissions reductions of **14.8%** from the top 15 energy consuming buildings between 2019 and 2023. Additionally, the Green Fleet Strategy and the Energy and the Conservation Management Plan update to be completed this year will help identify additional measures to meet the short-term target of 20% reductions by 2025. The Town of Ajax can also achieve priorities identified in *Action26* by implementing a comprehensive Corporate Net Zero Emissions Plan that will improve building performance and significantly decrease GHG emissions from municipal operations, as well as enhance air quality, increase local production of renewable energy, and improve thermal comfort for building users. This will increase the life expectancy of Town facilities, enabling them to continue providing recreational services to Ajax's rapidly growing community.