ENERGY CONSERVATION AND DEMAND MANAGEMENT PLAN (ECDMP) 2024-2028

Prepared For: Municipality of Lakeshore

Date: September 26th, 2025

ALADACO CONSULTING INC.
6-425 Hespeler Road, Suite 378
Cambridge, ON N1R 8J6

aladaco.com

Table of Contents

List of Figures

List of Tables

Executive Summary

The Municipality of Lakeshore's 2024 Energy Conservation and Demand Management Plan sets a clear, actionable roadmap for reducing municipal energy use from 2024 to 2028 in alignment with the five year window of Ontario Regulation 25/23. Developed by Aladaco Consulting, the plan reflects Lakeshore's strategic commitment to sustainable infrastructure and responsible energy stewardship, expanding its focus beyond regulatory minimums to include all major municipal facilities, parks, water/wastewater sites, and fleet assets.

Progress to Date (2019–2023)

Over the past five years, Lakeshore has seen modest but meaningful energy reductions, particularly through facility lighting retrofits, HVAC upgrades, and enhanced water efficiency measures. However, changes to Ontario's electricity grid emissions have contributed to an overall increase in Lakeshore's GHG emissions during this period, highlighting the importance of sustained energy efficiency efforts. A 600 kWDC solar PV system at the Atlas Tube Recreation Centre remains the flagship renewable energy initiative.

2023 Baseline & Performance Snapshot

In 2023, Lakeshore consumed 69,503 GJ of energy and emitted 2,093 tCO_2e, with the Atlas Tube Recreation Centre, Denis St. Pierre Wastewater Treatment plant and John George Water Treatment Plant representing the largest contributors. Natural gas accounted for 39% of energy but nearly 67% of emissions. A benchmarking exercise identified nine facilities with above-average energy intensity, providing clear targets for improvement.

2024–2028 Targets and Strategies

Lakeshore is targeting an energy consumption reduction of 5% by 2028. To support this, Level 1 energy audits identified a range of cost-effective Energy Conservation Measures across buildings, water & wastewater sites and parks. High-priority measures include lighting and HVAC controls and additional recommendations are made for standardization of building automation systems as well as improved utility data management software. Several sites have also been flagged for deeper Level 2 audits.

Fleet and Electrification

Fleet energy consumption and emissions have remained steady since 2018, even as municipal services have expanded, which is an encouraging sign of improved operational efficiency. A phased transition to electric vehicles is recommended, beginning with light-duty fleet replacement and targeted deployment of EV chargers at key hubs such as the Operations Centre.

Renewables and Low-Carbon Integration

The plan evaluates solar photovoltaic, wind, and biogas cogeneration technologies. Solar PV presents the strongest near-term opportunity, supported by favorable local solar potential and incentive programs. Biogas at the Denis St. Pierre WWTP offers long-term potential pending a recommended feasibility assessment.

Implementation & Funding

A five-step framework guides implementation, supported by policy updates (e.g., lifecycle costing for energy investments), internal coordination, and external funding opportunities. Anticipated barriers such as capital constraints and limited staff resources are addressed with practical solutions, including bundling projects, adopting energy tracking software, and exploring a revolving energy fund.

Lakeshore's 2024 Energy Conservation and Demand Management Plan reflects a balanced, strategic approach to energy management - driven by data, grounded in best practices, and tailored to local priorities.

1. Introduction

1.1 Purpose and Scope

The Municipality of Lakeshore ("Lakeshore") has engaged Aladaco Consulting ("Aladaco") to develop its Energy Conservation and Demand Management Plan (ECDMP) as part of its commitment to sustainable growth and responsible infrastructure management. This plan aligns with Lakeshore's 2022-2026 Strategic Objectives, particularly "Building and Stewarding Municipal Infrastructure," by promoting energy efficiency, reducing greenhouse gas (GHG) emissions, and optimizing municipal assets. Level 1 (high-level) energy audits were completed at all facilities, water and wastewater (W&WW) sites and municipal parks as part of Aladaco's scope of work. The results of these audits, including identified Energy Conservation Measures (ECMs) are summarized and inform opportunities described in this ECDMP.

In response to Ontario Regulation 25/23: *Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans*, this ECDMP fulfills the requirement for broader public sector organizations to report on energy use and outline conservation strategies. The regulation requires that plans are completed every five years, published on the public agency's website and include:

- A summary of annual GHG emissions by prescribed operations (see Table 1)
- Results of previous activities and measures to conserve or reduce energy use
- Cost and saving estimates for current and proposed measures
- Details of renewable energy systems operated and their annual energy production
- Description of ground source, solar thermal, and other renewable or heat pump technologies in use or planned
- The expected length of time that the current and proposed measures will be in place
- Confirmation that the plan has been approved by senior management

Table 1 below provides a list of building and facility types that must be included in an ECDMP per the regulation.

Table 1 - O.Reg 25/23 Prescribed Building and Facility Types for Municipalities[1]

Prescribed Buildings and Facilities
1. Administrative offices and related facilities
2. Public libraries
3. Cultural facilities, indoor recreational facilities and community centres
4. Ambulance stations and associated offices and facilities
5. Fire stations and associated offices and facilities
6. Police stations and associated offices and facilities
7. Storage facilities where equipment or vehicles are maintained, repaired or stored
8. Buildings or facilities related to the treatment of water or sewage
9. Parking garages

Lakeshore has chosen to take a holistic approach to energy management by reviewing all municipal assets rather than limiting the scope to only those required per Table 1. In addition to the Prescribed Buildings and Facilities, Lakeshore has included parks, W&WW pumping stations, fleet vehicles, remote (sanitary/stormwater/municipal drain) pumping stations, streetlighting, and traffic lighting in the development of this ECDMP. This broader perspective supports more effective decision-making and a comprehensive understanding of the municipality's energy and emissions profile.

Preliminary analyses showed that the overall energy contribution of remote pumping stations, streetlighting, and traffic lighting was relatively low. These assets also had correspondingly low GHG emissions, as their energy use was limited to electricity consumption with no natural gas component. However, there were notable challenges in acquiring complete utility data for all years of the ECDMP term across these asset types. As a result, they were excluded from the detailed scope of this report. A recommendation has been made in this ECDMP to improve utility data management through software integration to support more consistent and comprehensive reporting on these assets in future planning cycles.

The data years within this ECDMP cover the period of 2019–2023 for facilities, W&WW sites, and parks, and include electricity and natural gas consumption. Fleet data includes fuel consumption (gasoline, diesel) and is reported separately for 2024, as earlier data was not available.

[1] O. Reg. 25/23 BROADER PUBLIC SECTOR: ENERGY REPORTING AND CONSERVATION AND DEMAND MANAGEMENT PLANS | ontario.ca

Energy use is measured in gigajoules (GJ) and associated GHG emissions are reported in tonnes of carbon dioxide equivalent (tCO_2e).

A full inventory of assets included can be found in Appendix A (Facilities/Parks/W&WW Sites) and Appendix B (Fleet).

Community Energy Management Plan (CEMP)

While this ECDMP focuses on Lakeshore's Corporate facilities, water and wastewater sites, parks, and fleet, Lakeshore is also developing its first Community Energy Management Plan (CEMP). The CEMP will complement this document by assessing energy consumption and GHG emissions across the broader Community, and by recommending actions related to energy savings, incentive programs, and public education. Together, the ECDMP and CEMP will provide a comprehensive view of energy and climate action in Lakeshore, with one addressing Corporate operations and the other addressing the wider Community.

1.2 Document Contents

This document is divided into 4 main sections:

- **Section 2: The Past (2019-2023 Historical Energy and GHG Performance)**

  This section analyzes energy consumption and GHG emissions trends for facilities, W&WW sites and parks over the past five years, identifying key patterns and factors influencing municipal energy use. It highlights completed energy efficiency projects and their impact, as well as achievements in reducing emissions. Additionally, it reviews the performance of existing renewable energy systems within Lakeshore's operations.

- **Section 3: The Present (2023 Baseline Energy and GHG Performance Focus)**

  This section establishes Lakeshore's 2023 baseline for energy consumption and GHG emissions, serving as a reference point for future performance evaluation. It also establishes new reduction targets for the 2024-2028 period, ensuring alignment with municipal sustainability goals.

- **Section 4: The Future (2024-2028 Energy and GHG Reduction Strategies)**

  This section outlines the prioritized ECMs and programs recommended for the next five years. It also evaluates the feasibility for integrating renewable energy sources to reduce energy consumption and GHG emissions. It provides a high-level implementation plan and identifies key implementation challenges, including financial and operational constraints, as well as considers the impact of projected changes in Ontario's electricity emissions.

- **Section 5: Fleet Energy Consumption and GHG Emissions**

  This section details Lakeshore's fleet energy use and emissions, recent improvements in fuel tracking, and a comparison of 2024 data to 2018. It highlights fleet electrification as the key emissions reduction strategy, outlining a

phased approach for transitioning vehicles and expanding EV charging infrastructure.

1.3 Leadership, Engagement, and Governance

The development of Lakeshore's ECDMP has been a collaborative effort grounded in shared responsibility and strong leadership. Energy management at Lakeshore is led by the Division Leader – Energy Management and Utilities, who is responsible for cross-departmental coordination, tracking performance, and driving continuous improvement in energy and emissions outcomes. Lakeshore has committed to engaging all necessary departments in support of these outcomes.

The ECDMP has been formally reviewed and approved by Lakeshore's senior management, reaffirming the organization's commitment to reducing greenhouse gas emissions, improving operational efficiency, and advancing long-term sustainability goals. Through this plan, Lakeshore continues to enhance transparency, accountability, and energy stewardship across all levels of its operations.

2. The Past: 2019-2023 Historical Energy and GHG Performance

2.1 Energy and GHG Emissions Trends

This section presents an overview of energy consumption and GHG emissions across Lakeshore's municipal facilities, W&WW sites, and parks over the 2019–2023 period. It includes a high-level trend analysis, key performance drivers, and contextual factors affecting year-over-year variations. The purpose of this analysis is to understand how energy use and emissions have evolved over time, identify areas of progress or concern, and assist in establishing a foundation for setting future reduction targets and planning energy-saving initiatives.

Note that complete utility data for 2019 was not available. Specifically 2019 natural gas data was unavailable across all sites[2] and electricity data for the Stoney Point Water Treatment Plant (WTP) was also unavailable. To support consistent year-to-year comparisons, 2019 natural gas values were estimated using 2023 site-specific consumption, adjusted to reflect the heating degree days of 2019. This approach acknowledges that natural gas usage is largely attributed to space heating and is highly weather-dependent. For the Stoney Point WTP, 2019 electricity use was estimated by averaging the site's consumption from 2022 and 2023. This facility makes up only about 3% of total municipal electricity use, so its impact on overall trends is relatively minor. While these estimates improve data continuity, readers should be aware that 2019 figures carry some uncertainty and may not fully reflect actual consumption.

Energy and GHG performance trends are illustrated in Figure 1 and Figure 2, respectively. See Appendix A for a full inventory of assets included in each category.

[2] Enbridge Gas indicated that 2019 data was unavailable in their system due to the amalgamation between legacy Union Gas and Enbridge Gas during this period. This data may have been contained in another repository. Aladaco and Lakeshore agreed that the value in pursuing this missing data was not justified.

Figure 1 - 2019-2023 Facility/W&WW Site/Park Energy Consumption by Category

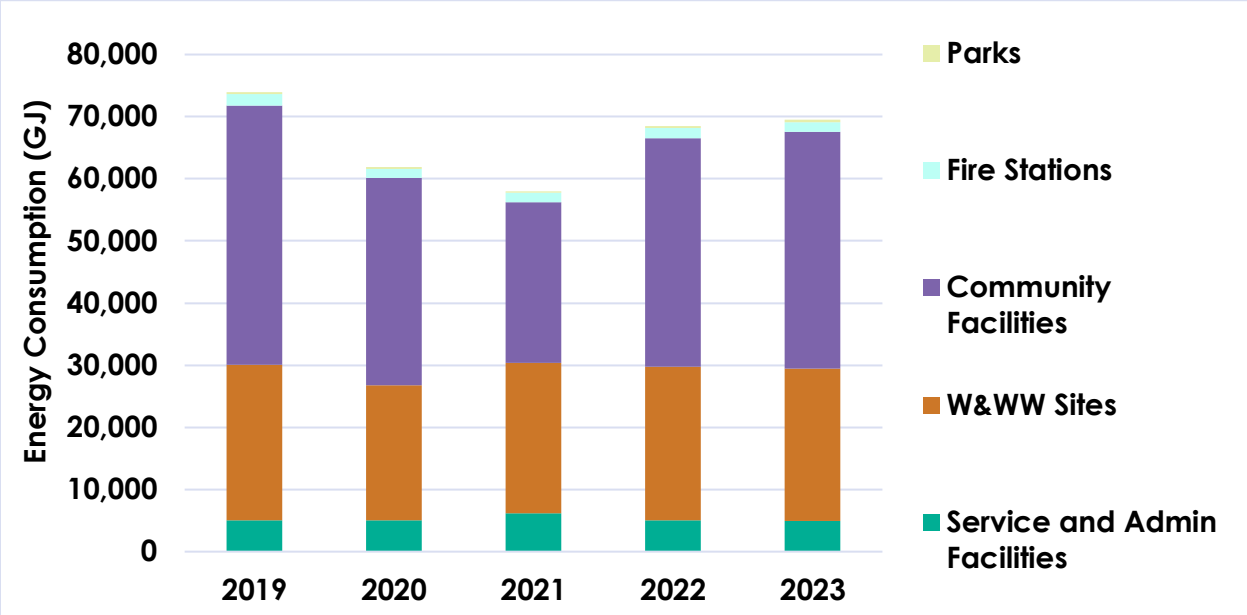
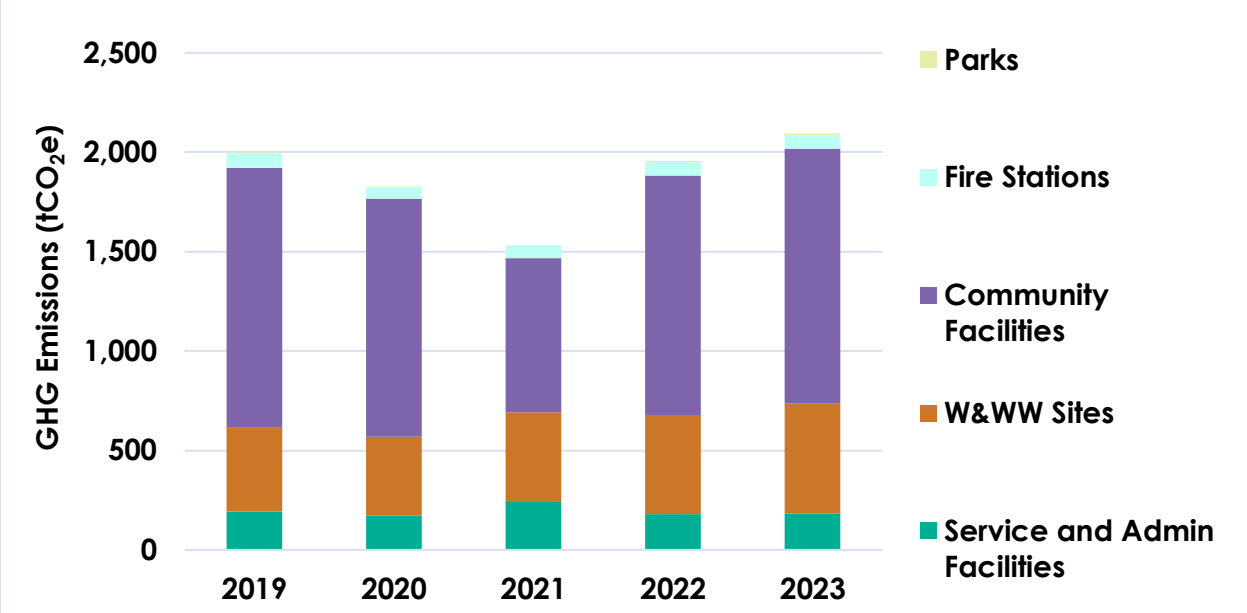


Figure 2 - 2019-2023 Facility/W&WW Site/Park GHG Emissions by Category



As illustrated in Figure 1, overall energy consumption across Lakeshore's facilities, W&WW sites, and parks declined slightly between 2019 and 2023. This decrease was led by reductions in the community facilities and fire stations categories. Cooling Degree Days (CDD), which indicate cooling demand, and Heating Degree Days (HDD), which indicate heating demand, were higher in 2019 than in 2023 (approximately 12% and 19% respectively). This higher demand for heating and cooling is a primary driver of increased energy consumption. These weather factors, paired with energy efficiency

efforts outlined in Section 2.2, are expected to have contributed to the observed difference in consumption between the 2019 and 2023 values.

It is also important to reiterate that 2019 data includes some estimated values, particularly for natural gas consumption, which introduces a degree of uncertainty in the year-to-year comparison.

Energy consumption was lowest in 2020 and 2021, reflecting the impacts of COVID-19. These years saw widespread facility closures and reduced operations, trends that were common across municipalities during the pandemic.

GHG emissions, shown in Figure 2, followed a similar dip in 2020 and 2021, largely for the same COVID-related reasons. However, unlike energy use, total GHG emissions in 2023 were higher than in 2019 despite slightly lower overall energy consumption. This is primarily due to an increase in Ontario's electricity emissions factor, which rose from 29 gCO_2e/kWh in 2019 to 59 gCO_2e/kWh in 2023. This shift means that using the same amount of electricity in 2023 results in roughly twice the associated emissions, presenting new challenges for meeting decarbonization goals. Further discussion on this topic can be found in *Section 4.4.2 – Ontario Electricity Emissions Projections*.

2.2 Completed Energy and GHG Emission Reduction Initiatives

Lakeshore has taken several important steps to improve energy efficiency and reduce GHG emissions across its facilities, aligning well with its strategic goals of modernizing municipal operations and building resilient infrastructure.

One of the most impactful ongoing initiatives is the LED Lighting Retrofit Program, which has replaced a significant number of legacy lighting systems (including incandescent, fluorescent, and high-intensity discharge fixtures) with high-efficiency LED alternatives across facilities, W&WW sites and parks. Complementing this, occupancy sensor controls have been added in select facilities to reduce unnecessary lighting use.

Major capital upgrades have also contributed to Lakeshore's progress. Renovations at the Operations Centre and ongoing improvements at the Town Hall include enhancements to major facility systems such as HVAC, lighting, and building controls; key areas highlighted in the 2019 ECDMP. These improvements are expected to have average effective useful lives of 15+ years and provide long-term energy and cost savings while modernizing core infrastructure.

Additional measures targeting water and natural gas consumption include low-flow fixtures and sensor-based water controls, which help to reduce both hot water use and related energy demand.

Quantitative cost and savings data for these initiatives are not available. This is largely due to how the measures were implemented, often as part of broader capital projects, across multiple departments, or executed incrementally as part of routine asset renewal. This makes it difficult to isolate specific financial or energy-related details. The

impact of the COVID-19 pandemic on facility operations and energy use during the implementation period further complicates analysis of savings.

However, based on aggregate energy consumption trends, the combined effect of these projects is estimated to have resulted in annual energy savings of approximately 5 to 10 percent.

Together, these initiatives help Lakeshore meet its energy and environmental goals while also promoting more informed, measurable, and accountable decisions around infrastructure upgrades and service delivery.

2.3 Renewable Energy Performance

Lakeshore operates a 600kW$_{DC}$ rooftop Solar Photovoltaic (PV) system at the Atlas Tube Recreation Centre. This system is subject to a Feed-In-Tariff (FIT) contract with the Independent Electricity System Operator (IESO). In this arrangement, energy generated is effectively sold to the electricity grid as opposed to consumed on site. Table 2 below provides a summary of the electricity generated by the system from 2019-2023. All values provided are in kilowatt hours (kWh).

Table 2 - Atlas Tube Recreation Centre Solar PV Generation (2019-2023)

Month	2019	2020	2021	2022	2023
January	29,819	29,595	29,373	29,153	28,934
February	39,029	38,737	38,446	38,158	37,872
March	58,257	57,820	57,387	56,956	56,529
April	66,253	65,756	65,263	64,773	64,287
May	81,648	81,036	80,428	79,825	79,226
June	77,861	77,277	76,697	76,122	75,551
July	78,719	78,129	77,543	76,961	76,384
August	69,359	68,839	68,322	67,810	67,301
September	52,505	52,111	51,720	51,332	50,947
October	42,421	42,103	41,787	41,474	41,163
November	28,826	28,609	28,395	28,182	27,970
December	22,718	22,547	22,378	22,210	22,044

Month	2019	2020	2021	2022	2023
Totals	**647,413**	**642,558**	**637,739**	**632,956**	**628,208**

This solar PV system is generating roughly 1,050kWh annually per kW_{DC} installed which is considered typical performance.

3. The Present: 2023 Baseline Energy and GHG Performance Focus

3.1 Energy and GHG Baseline (2023)

In 2023, Lakeshore's facilities, parks, and water and wastewater (W&WW) infrastructure collectively consumed a total of 69,503 GJ of energy, resulting in 2,093 tCO_2e in GHG emissions. This baseline provides a comprehensive snapshot of energy use and emissions across key municipal asset groups and serves as a foundation for identifying opportunities for efficiency improvements and emissions reductions.

Table 3 provides a breakdown of 2023 energy consumption and resultant emissions by asset category (see Appendix A for breakdown and facility list). Community Facilities, largely driven by the Atlas Tube Recreation Center, are the largest contributor to Lakeshore's energy and emissions profile within the scope studied.

Table 3 - 2023 Energy Consumption (GJ) and GHG Emissions (tCO2e) by Category

Asset Category	2023 Energy Consumption (GJ)	% of Total	2023 GHG Emissions (tCO2e)	% of Total
Service and Admin Facilities	4,956	7.1%	184	8.8%
W&WW Sites	24,505	35.3%	551	26.3%
Community Facilities	38,065	54.8%	1,283	61.3%
Fire Stations	1,564	2.3%	65	3.1%
Parks	413	0.6%	9	0.4%
Totals	**69,503**	**100%**	**2,093**	**100%**

In 2023, electricity accounted for 61% of energy consumption and 33% of GHG emissions. While natural gas consumption accounted for approximately 39% of energy consumption, its resultant emissions represent 67% of the total. The disproportionate contribution of natural gas to total GHG emissions highlights the need to reduce consumption of natural gas as a priority in the decarbonization plan.

Table 4 provides a further breakdown of energy consumption and GHG emissions by relevant asset type (facility, park or W&WW site). For visual convenience, these have been sorted from highest to lowest contributor to Lakeshore's energy consumption.

Table 4 - 2023 Energy Consumption (GJ) and GHG Emissions (tCO2e) by Asset

#	Asset Category	Asset Name	2023 Energy Consumption (GJ)	% of Total	2023 GHG Emissions (tCO2e)	% of Total
1	Community Facilities	Atlas Tube Recreation Centre	36,453	52.4%	1,230.31	58.8%
2	W&WW Sites	Denis St. Pierre WWTP[3]	13,912	20.0%	270.73	12.9%
3	W&WW Sites	John George WTP	7,026	10.1%	203.43	9.7%
4	W&WW Sites	Stoney Point WTP	1,811	2.6%	48.49	2.3%
5	Service and Admin Facilities	Operations Centre	1,414	2.0%	50.18	2.4%
6	Service and Admin Facilities	Town Hall	1,236	1.8%	37.62	1.8%
7	Service and Admin Facilities	OPP Building	951	1.4%	35.83	1.7%
8	Service and Admin Facilities	Public Works East Garage	823	1.2%	38.03	1.8%
9	W&WW Sites	South Woodslee WWTP	652	0.9%	10.69	0.5%
10	W&WW Sites	Comber Pumping Station	585	0.8%	9.60	0.5%
11	Community Facilities	Marina Building	585	0.8%	9.59	0.5%
12	Service and Admin Facilities	Public Works West Garage	532	0.8%	22.73	1.1%
13	Community Facilities	Comber Community Centre	479	0.7%	21.00	1.0%
14	Fire Stations	Fire Station #5 (Comber)	425	0.6%	17.12	0.8%
15	Fire Stations	Fire Station #4 (Ruscom Station)	397	0.6%	18.34	0.9%

[3] Denis St. Pierre (DSP) underwent a major expansion, with groundbreaking in November 2021, to increase its treatment capacity by roughly 70%. The works were substantially completed in summer/late 2023, including upgrades to pumping, aeration, clarification, screening, grit removal and UV disinfection systems. This expansion likely contributes to higher energy consumption at DSP in 2023 due to both increased throughput and more treatment processes.

#	Asset Category	Asset Name	2023 Energy Consumption (GJ)	% of Total	2023 GHG Emissions (tCO2e)	% of Total
16	Community Facilities	Libro Community Centre	358	0.5%	13.28	0.6%
17	W&WW Sites	North Woodslee WWTP	320	0.5%	5.24	0.3%
18	Fire Stations	Fire Station #1 (Puce)	283	0.4%	12.21	0.6%
20	Fire Stations	Fire Station #2 (LR203)	246	0.4%	10.44	0.5%
21	Fire Stations	Fire Station #3 (Belle River)	213	0.3%	7.26	0.3%
22	W&WW Sites	Haycroft Pumping Station	199	0.3%	3.26	0.2%
23	Community Facilities	Comber Library	189	0.3%	8.90	0.4%
24	Park	River Ridge Park	131	0.2%	4.44	0.2%
25	Park	Stoney Point Park	91	0.1%	1.49	0.1%
26	Park	West Beach	80	0.1%	1.30	0.1%
27	Park	Comber Community Centre Park	22	0.0%	0.37	0.0%
28	Park	Geralyn Tellier-Perdu Memorial Park	20	0.0%	0.33	0.0%
29	Park	Lakeview Park	14	0.0%	0.23	0.0%
30	Park	Optimist Park	14	0.0%	0.23	0.0%
31	Park	Maidstone Park	12	0.0%	0.19	0.0%
32	Park	Centennial Park	10	0.0%	0.16	0.0%
33	Park	Ladouceur Park/Lions Club Park	9	0.0%	0.15	0.0%
34	Park	Leffler Peace Park	9	0.0%	0.15	0.0%
35	Park	Lions Park[4]	0	0.0%	0.00	0.0%
36	Park	Shanahan Park[4]	0	0.0%	0.00	0.0%
37	Community Facilities	Stoney Point Library[4]	0	0.0%	0.00	0.0%
		Totals	**69,503**	**100.0%**	**2,093**	**100.0%**

These energy and emissions breakdowns provide a clear picture of where Lakeshore's biggest impacts lie, particularly at the Atlas Tube Recreation Centre and major water and wastewater sites. By highlighting top contributors and the high emissions from natural gas use, this analysis supports focused planning and prioritization of low-carbon

[4] Lions Park, Shanahan Park and Stoney Point Library all contribute to Lakeshore's overall energy and GHG profile however do not have their own utility metering. Their respective contributions are not known but are captured within the values of other sites within this table. For example, Shanahan Park is serviced by the nearby Fire Station #2.

actions. It sets a strong foundation for developing practical targets to be achieved during the 2024–2028 period.

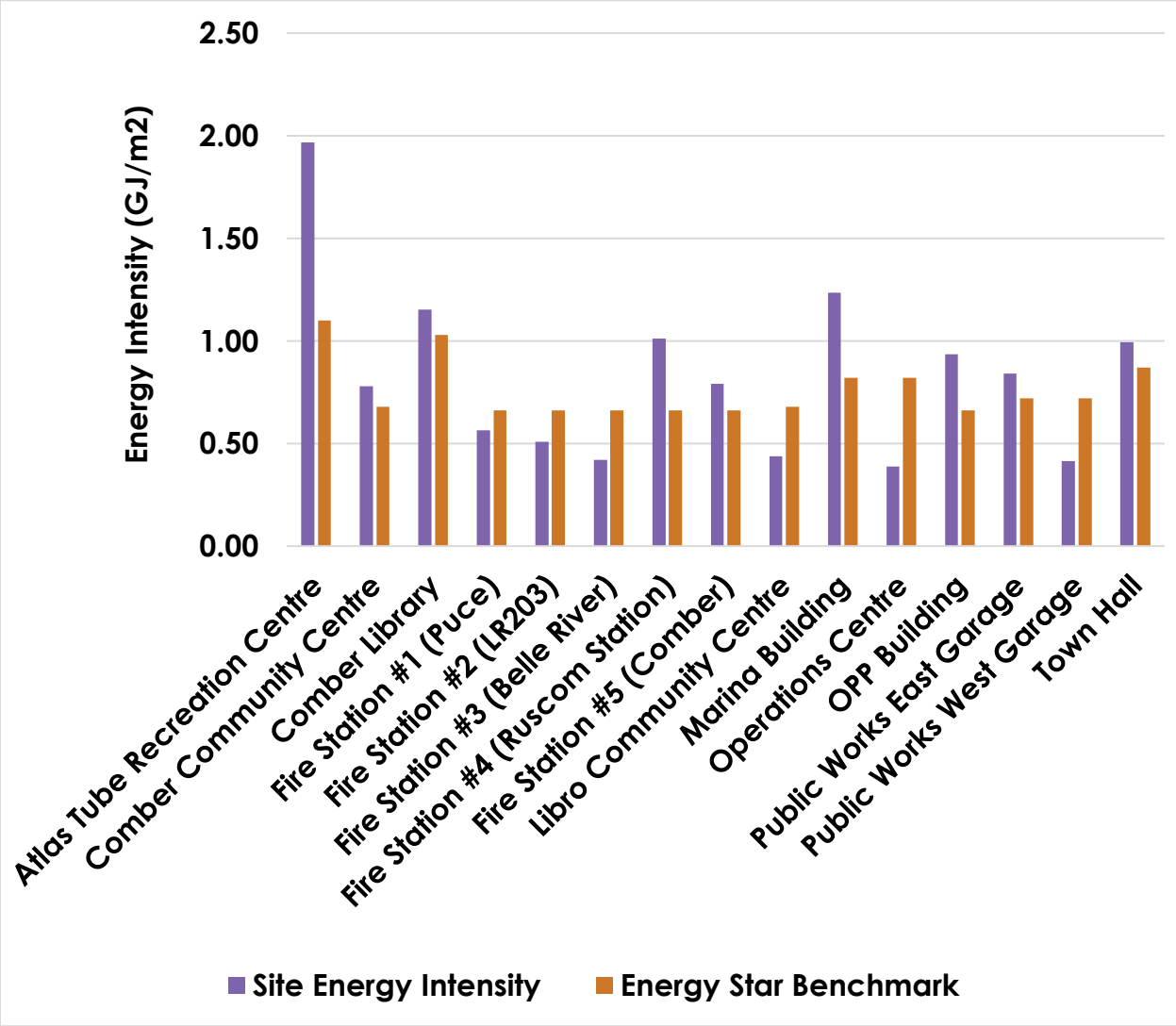
3.1.1 Facility Benchmarking

Benchmarking energy performance of Corporate facilities against industry standards offers valuable insights into operational efficiency. By comparing energy use intensity to similar buildings across Canada, Lakeshore can assess its performance, identify areas for improvement, and ensure alignment with broader industry practices. However, while benchmarking is a helpful first step, it doesn't give a complete picture of a facility's energy performance. It may not reflect unique building uses, weather differences, or specialized operations that don't match standard benchmarks.

Figure 3 below compares 2023 energy use intensity (EUI) for Lakeshore's Corporate facilities against industry standards provided in Energy Star Portfolio Manager's Technical Reference - Canadian Energy Use Intensity by Property Type[5]. Note that not all facilities were included in the benchmarking analysis. Most energy benchmarks are designed for commercial buildings and calculate energy use intensity on a gross floor area basis. The energy consumption at these facilities is primarily driven by weather factors. However, energy consumption at facilities such as water and wastewater assets as well as parks are influenced by different operational factors, making direct comparisons less applicable.

[5] https://portfoliomanager.energystar.gov/pdf/reference/Canadian%20National%20Median%20Table.pdf

Figure 3 - Facility Energy Use Intensity Benchmarking



The benchmarking exercise identified that six of the fifteen sites met or exceeded the Energy Star benchmark (i.e. their energy use intensity was at or below benchmark value). However, nine sites that did not meet the benchmark are:

- Atlas Tube Recreation Centre
- Comber Community Centre
- Comber Library
- Fire Station #4 (Ruscom Station)
- Fire Station #5 (Comber)
- Marina Building
- OPP Building
- Public Works East Garage
- Town Hall

The Energy Conservation Measures (ECMs) described later in this report will assist in bringing these facilities closer to the benchmark EUI.

Further observations about each specific facility's benchmarking results are provided in their respective audit reports.

3.2 Establishing Targets (2024-2028)

Lakeshore is targeting a **5%** reduction in overall annual energy consumption for facilities, W&WW sites and parks by the end of 2028, relative to 2023 levels. This target reflects a meaningful but practical step toward greater energy efficiency across municipal operations. It is based on total energy use, not adjusted for changes in population or service levels, making it an absolute target rather than a per capita one. As growth is expected to continue in the Lakeshore area over the next several years, this target becomes more ambitious in practice, requiring improved energy performance despite increasing demands on facilities and infrastructure.

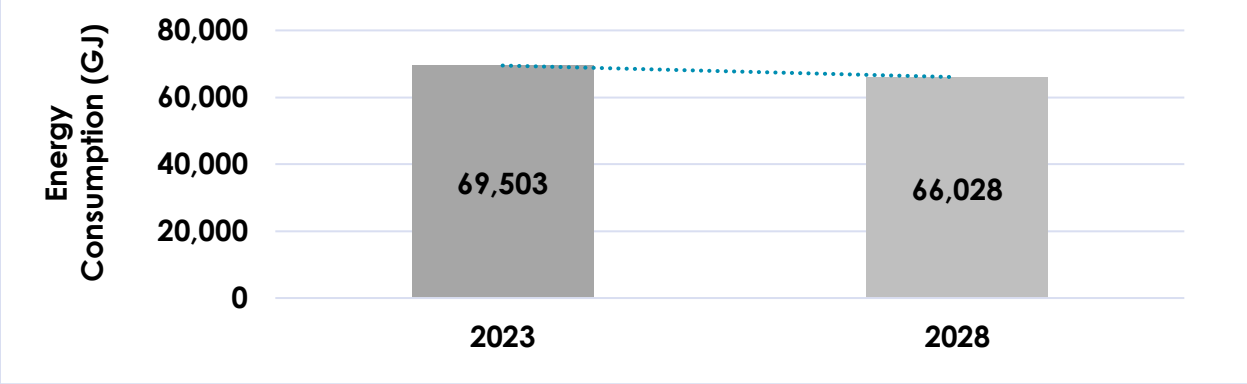
This 5% reduction goal is aligned with best practices in municipal energy management and is comparable to commitments in nearby communities[6]. By pursuing a target in this range, Lakeshore is balancing ambition with feasibility, providing a clear and measurable objective for energy conservation planning and implementation.

Table 5 and Figure 4 below summarize the 2023 baseline energy consumption, the reduction target, and the resultant target consumption for 2028.

Table 5 - 2024-2028 Energy Reduction Target

2023 Energy Consumption (GJ)	Energy Reduction Target	2028 Energy Consumption Target (GJ)
69,503	5%	66,028

Figure 4 - 2024-2028 Energy Reduction Target



[6] For example, the City of Windsor has established a 6% overall energy reduction goal in its 2024–2028 Energy Management Plan. Ref: 2024-2028_Energy_Management_Plan.pdf

4. The Future: 2024-2028 Energy and GHG Reduction Strategies

4.1 Energy Audit Findings and Strategic Recommendations

This section summarizes key findings from Lakeshore's Level 1 energy audits and outlines strategic next steps to support implementation and continuous improvement. It includes a consolidated ECM matrix highlighting common retrofit opportunities across facilities, W&WW sites, and parks, as well as recommendations for deeper Level 2 audits, Building Automation System (BAS) standardization, and improved utility data management through software integration. These findings provide a practical foundation for prioritizing investments and enhancing Lakeshore's long-term energy and emissions performance.

4.1.1 Audit ECM Matrix

The ECM matrix (Table 6) below provides a convenient, high-level summary of ECMs identified in the Level 1 energy audits for each site. The sites are organized by category, corresponding to the colour legend provided in Appendix A. An "X" in the table represents an opportunity for the ECM identified at the respective site.

The "Appliance Upgrades" category includes Energy Star appliances, high-efficiency furnaces, AC units, commercial washing machines, and domestic hot water heater upgrades.

The "Other HVAC Controls" category covers measures such as garage door heater interlocks, VFDs for air handler fans, destratification fans, HVAC controls recommissioning, exhaust fan controls, HVAC dampers, thermostat setpoint adjustments, and BAS optimization or replacement.

This ECM matrix offers Lakeshore a practical, at-a-glance reference to track and prioritize implementation opportunities across its facilities, W&WW sites, and parks. It can serve as a checklist to guide project planning, funding applications, or future audits, while helping staff quickly identify which locations share similar retrofit needs. Standardizing common upgrades (such as LED tube replacements, HVAC controls, or appliance models) can reduce costs by creating economies of scale, simplifying procurement, and streamlining both maintenance and future replacements. Consistency across sites also improves staff familiarity with equipment, reduces training requirements, and supports more efficient inventory management of spare parts.

More details on specific ECMs (including site existing conditions, qualitative savings estimates, and non-financial considerations) can be found in the respective facility's Level 1 audit report.

These Level 1 audits are primarily qualitative in nature. They are walkthrough assessments that serve to identify opportunities but do not include detailed energy savings estimates or financial analysis. Based on the opportunities identified, a conservative estimate of the combined energy savings across all identified ECMs if fully implemented would be in the range of 10-15 percent. The estimated total cost of

implementing these measures is projected to be in the range of $200-400k (exclusive of internal labor) based on typical retrofit pricing for municipal buildings.

Internal labour requirements may include technical staff time for project coordination and oversight, maintenance staff to assist with tasks such as fixture swaps, equipment replacements, or commissioning, and municipal resources for materials handling, utility shut-downs, or site access preparation. In some cases, staff may also be needed to manage contractor activities, provide operational knowledge of building systems, or handle follow-up work such as preventative maintenance on newly installed equipment.

The average effective useful life of the recommended measures is expected to be 10 to 15 years, aligning with industry norms for equipment and controls upgrades.

Table 6 - Level 1 Energy Audit Potential ECM Matrix

Facility/Park	LED Lighting Retrofit	Lighting Occupancy Controls	Smart/ Programmable Thermostats	Building Envelope Improvements	Appliance Upgrades	Other HVAC Controls	Other Unique ECMs
Atlas Tube Recreation Centre	x	x				x	
Marina Building	x				x	x	
Libro Community Centre	x	x				x	
Comber Library	x	x				x	
Comber Community Centre	x	x	x		x	x	
Stoney Point Library	x	x				x	
Fire Station #1	x		x	x	x		
Fire Station #2	x		x		x		
Fire Station #3	x	x			x		
Fire Station #4	x	x	x		x	x	
Fire Station #5	x	x	x				
Lions Park							
Stoney Point Park	x	x					
Ladouceur Park/Lions Club Park		x					
Lakeview Park							
West Beach							
Optimist Park	x						
Maidstone Park	x	x					
Centennial Park	x						
Leffler Peace Park							

Facility/Park	LED Lighting Retrofit	Lighting Occupancy Controls	Smart/ Programmable Thermostats	Building Envelope Improvements	Appliance Upgrades	Other HVAC Controls	Other Unique ECMs
River Ridge Park		x				x	
Shanahan Park							
Geralyn Tellier-Perdu Memorial Park		x					x
Comber Community Centre Park		x					x
Operations Centre		x		x		x	x
Town Hall	x	x	x				
Public Works West Garage	x	x			x		
OPP Building	x		x	x		x	
Public Works East Garage	x	x	x		x		
Denis St. Pierre WWTP	x	x	x				
Haycroft Pumping Station	x	x	x				
South Woodslee WWTP	x		x				
North Woodslee WWTP	x	x	x				
Comber Pumping Station	x	x	x				
John George WTP	x	x	x		x	x	x
Stoney Point WTP	x	x	x		x		

4.1.2 Additional Recommendations

4.1.2.1 Level 2 Audit Recommendations and Strategic Review of Past Audits

The Level 1 energy audits, benchmarking, and energy/GHG analyses conducted across Lakeshore's facilities provide a high-level assessment of energy performance, identifying key trends and opportunities for improvement. These initial evaluations help pinpoint sites where energy consumption patterns, operational inefficiencies, or benchmarking comparisons suggest a need for deeper investigation.

For facilities with significant energy savings potential, a more detailed energy audit is recommended. Typically in such cases municipalities receive maximum benefit from a Level 2 equivalent audit. Unlike the qualitative nature of Level 1 audits, Level 2 audits provide quantitative estimates for ECM metrics, including projected energy savings, implementation costs, and financial payback. This data-driven approach offers greater confidence in decision-making and investment planning for ECM implementation. A Level 2 equivalent audit can incorporate the most valuable elements of the defined ASHRAE Level 2 audit requirements and omit less actionable elements to ensure best value for the municipality.

Based on the findings from the initial assessments, the following sites have been identified as strong candidates for Level 2 equivalent energy audits.

1. **Town Hall**

   The Town Hall was one the poorest performers in the benchmarking exercise and was undergoing renovations during the initial Level 1 audit, which likely impacted energy performance. Despite being audited previously in 2014, its 2023 EUI remains significantly above the Canadian average, indicating persistent inefficiencies and ongoing opportunities for cost-effective improvements. It is recommended to complete a Level 2 audit at this site once the facility is back in regular use, with monitoring of energy performance through 2026 to better establish post-renovation consumption patterns.

2. **Operations Centre**

   Despite performing well in the benchmarking exercise, the Operations Centre is a key candidate for further analysis due to being one of the larger energy-consuming facilities in Lakeshore. A Level 2 audit would enable more detailed quantification of ECMs identified during the Level 1 assessment and could also include a preliminary assessment of the feasibility of a solar PV system above the garage. Additionally, reviewing the facility's electricity interval data as part of the audit could provide deeper insight into operational patterns, peak demand behavior, and potential cost savings opportunities, offering a level of analysis not possible through the utility bill data used in the Level 1 audit.

3. **Fire Station #4**

Despite its limited operating hours, Fire Station #4 performed poorly in the benchmarking analysis with an EUI roughly 50% higher than the Canadian average. A Level 2 audit will help clarify the sources of inefficiency and further identify viable ECMs.

Although the sites identified above represent relatively low energy consumption compared to Lakeshore's overall totals (Table 4), this is largely because just three facilities (Atlas Tube Recreation Centre, Denis St. Pierre WWTP, and John George WTP) together account for over 80% of Corporate energy consumption and emissions. As a result, other sites appear smaller in relative terms but still present meaningful opportunities for targeted efficiency improvements.

Lakeshore is also encouraged to revisit the findings of previously completed Level 2 audits from 2014 (Denis St. Pierre WWTP, Stoney Point WTP, Maidstone Public Works Garage, John George WTP) and 2019 (Atlas Tube Recreation Centre, Libro Community Centre/Library). While many of these sites remain significant energy users, we recommend first prioritizing a strategic comparison as opposed to immediately completing updated Level 2 audits.

A focused review of these audits, paired with updated utility rates and current facility operating conditions, can help determine:

- Which ECMs have already been implemented,
- Which remain outstanding and viable,
- And how expected savings and costs should be recalibrated.

This strategic review approach delivers high value at lower cost by leveraging prior analytic work as a foundation for targeted action. If this strategic review identifies that gaps persist such as new systems or controls on site, we recommend commissioning new Level 2 energy audits for those specific sites.

4.1.2.2 Building Automation System (BAS) Standardization

The effectiveness of Lakeshore's existing BAS vary across sites. Several facilities experiencing ongoing issues related to system reliability, connectivity, and maintenance. Connectivity failures often require manual on-site intervention, increasing staff workload and reducing operational efficiency. Additionally, a lack of readily available, qualified technicians for troubleshooting and training has further complicated system management.

To improve system reliability, streamline maintenance, and enhance energy management, Lakeshore should consider implementing a standardized BAS platform across all major sites. A unified system with consistent controls and interfaces would simplify operations, improve remote monitoring capabilities, and reduce downtime associated with technical failures. Standardization would also facilitate staff training, ensuring personnel can efficiently operate and maintain the system across multiple facilities.

While retrofitting all sites to a common platform may present interoperability challenges, this transition should be considered when replacing major HVAC equipment and other BAS-controlled loads. A phased approach, aligned with capital upgrades, would help mitigate integration challenges while progressively moving toward a more reliable and efficient automation system.

4.1.2.3 Improve Utility Data Management through Software Integration

Lakeshore currently manages utility data by manually entering information from bills or requesting historical records from utility providers such as Hydro One, ELK, and Enbridge. This manual process is time-consuming, can be prone to errors, and limits the ability to analyze energy performance effectively.

Adopting an energy management software solution would automate data collection, improve accuracy, and centralize utility cost and consumption data. These platforms can integrate directly with utility providers or use automated bill parsing, reducing or eliminating the need for manual entry. Built-in dashboards and reporting tools allow staff to monitor trends, identify savings opportunities, and detect billing anomalies.

Several municipalities have successfully implemented platforms like EnergyCAP[7] to streamline energy tracking and reporting. For example, the City of Peterborough uses EnergyCAP to manage and analyze electricity and natural gas data across its facilities, as outlined in their 2024–2028 Corporate Energy Management Plan[8].

In our experience such tools can significantly enhance data management and decision-making capabilities. EnergyCAP is provided as an example. Aladaco is not affiliated with any vendor and a review of commercially available options is recommended.

Costs for these tools are typically divided into two components:

- **Software license fee**: Ranges from $5,000 to $15,000+ annually, depending on the number of meters and selected features.
- **Professional services fee**: Covers implementation, training, and database setup. This cost varies based on system complexity and data readiness.

Though these systems require ongoing investment, they can substantially reduce administrative workload and support more strategic, data-driven energy management.

4.1.2.4 Corporate Energy Efficiency and Low-Carbon Alternatives Policy

To support Lakeshore's commitment to reducing energy consumption and enhancing sustainability, it is recommended that the municipality adopt a Corporate Energy Efficiency and Low-Carbon Alternatives Policy. This policy would establish a structured approach to evaluating energy systems and fleet vehicle upgrades, ensuring that

[7] Energy Management & Monitoring Solutions | EnergyCAP
[8] City of Peterborough Corporate Energy Management Plan Update 2024-2028

energy efficiency and low-carbon options are systematically considered in capital investment decisions.

Policy Overview

The proposed policy mandates that for all energy system or fleet vehicle upgrades exceeding a specified dollar threshold, departments must:

- Evaluate at least one high-efficiency or low-carbon alternative.
- Conduct a comprehensive life cycle cost analysis (LCCA) for each alternative to assess long-term economic viability, considering factors such as energy savings, maintenance, and operational costs.

This approach emphasizes a holistic understanding of costs over the asset's lifespan, moving beyond initial capital expenditures. By doing so, it encourages informed decision-making that balances fiscal responsibility with environmental stewardship.

Flexibility and Practicality

Unlike more prescriptive mandates (e.g., requiring all-electric new builds), this policy offers flexibility. It does not eliminate conventional options but ensures that energy-efficient and low-carbon alternatives are duly considered and assessed. This balanced approach is designed to garner broader support from both Council and staff, facilitating practical implementation without compromising on energy and sustainability goals.

Transparency and Accountability

Incorporating LCCA into the evaluation process enhances transparency, providing council with clear, quantifiable metrics to inform their decisions. This aligns with best practices in asset management and has been adopted by other Ontario municipalities. For example, the City of Peterborough has integrated LCCA into their design procedures for all energy projects[9].

Implementation Considerations

- **Threshold Determination**: Establish clear financial thresholds that trigger the policy's requirements, ensuring applicability to significant projects without overburdening routine operations.
- **Standardized Tools**: Develop or adopt standardized LCCA tools and templates to facilitate consistent and efficient evaluations across departments.
- **Training and Support**: Provide training for relevant staff to ensure competency in conducting LCCA for energy projects and understanding its implications. Opportunities could include:

[9] Corporate-Energy-Management-Plan.pdf

- formal certifications such as the Certified Energy Manager (CEM) designation offered by the Association of Energy Engineers (AEE) and Canadian Institute for Energy Training (CIET), which covers implementation of energy management plans and financial analysis of energy projects
- participation in the Dollars to $ense Energy Management Workshops[10] offered by CIET and TdS Dixon, which provide practical training on linking energy savings to financial performance and developing business cases

Both of these options may be eligible for training incentives[11] through the IESO Save on Energy Programs. Other options, such as municipal asset management courses or targeted workshops on life cycle cost analysis, can also strengthen staff capacity to evaluate both technical and financial aspects of energy projects

- **Monitoring and Review**: Implement mechanisms to monitor the policy's application and effectiveness, allowing for periodic reviews and adjustments as necessary.

By adopting this policy, Lakeshore can systematically integrate energy efficiency and low-carbon considerations into its capital planning processes, supporting its broader sustainability objectives while maintaining fiscal prudence.

4.2 Renewable Energy Integration Opportunities

Integrating renewable energy technologies into Lakeshore's infrastructure can significantly enhance sustainability, reduce greenhouse gas emissions, and promote long-term economic benefits. This section explores three viable options: Solar PV Systems, Wind Energy, and Biogas Cogeneration, detailing their technologies, benefits, limitations, and specific opportunities/general feasibility within Lakeshore.

4.2.1 Solar PV

Technology Overview: Solar PV systems convert sunlight directly into electricity using semiconductor materials. These systems can be installed on rooftops, ground-mounted, or integrated into building designs to supply clean energy.

Benefits:

- **Renewable Energy Source:** Utilizes abundant solar energy, reducing reliance on fossil fuels.
- **Lower Electricity Bills:** Generates on-site electricity, decreasing energy costs.
- **Low Maintenance:** Requires minimal upkeep with long operational lifespans.

Limitations:

[10] Dollars to $ense Energy Management Workshops™ - CIET
[11] Training Incentives | Save on Energy

- **Intermittent Energy Production:** Dependent on sunlight availability, leading to variable output.
- **Initial Investment:** High upfront costs for equipment and installation.
- **Space Requirements:** Adequate space needed for installation to achieve desired energy output.

Current and Potential Applications in Lakeshore: The Atlas Tube Centre currently operates a solar PV system under a FIT contract, as discussed in Section 2.3. Discussions are underway to expand this system through a net-metering arrangement, allowing energy generated to directly offset on-site consumption. If approved by Council and funded, the proposed project would add approximately 870kW$_{DC}$ of new solar PV capacity -830kW$_{DC}$ on the rooftop and 40kW$_{DC}$ from a solar canopy added near the pickleball courts.

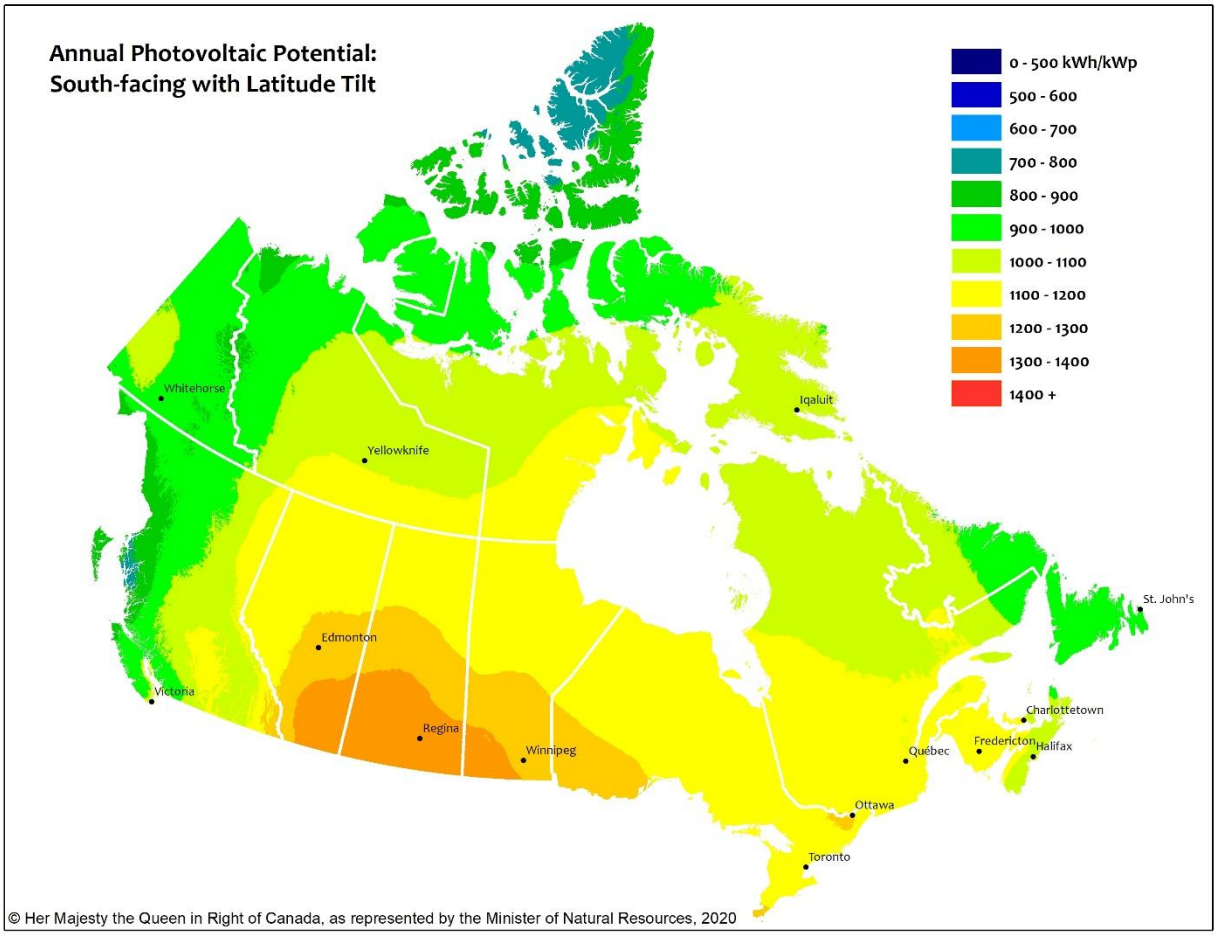
Audit observations indicate considerable roof space available for additional rooftop solar PV installations, particularly over the garage area at the Operations Centre. Other potential sites include the Comber Community Centre and several fire halls/public works garages, which feature large, flat roofs suitable for solar arrays.

Ground-mounted solar PV systems may also be a viable option for Lakeshore. It is recommended that Lakeshore review available land at Corporate facilities to identify potential sites for future installations.

General Solar Feasibility in Lakeshore: Lakeshore benefits from a favorable solar resource, with average annual solar irradiation levels of approximately 4 kWh/m²/day, according to Natural Resources Canada (NRCan)[12]. This places it among the better-performing regions in Ontario for solar energy production, making solar PV a viable and productive option for reducing electricity demand and emissions. The region's relatively high number of sunny days and consistent solar exposure support strong system performance and return on investment.

[12] https://natural-resources.canada.ca/energy-sources/renewable-energy/photovoltaic-potential-solar-resource-maps-canada

Figure 5 - Canadian Map of Solar Generation Potential (Natural Resources Canada)[12]



The estimated annual energy production of about 1,200-1,300 kWh per kWdc of installed solar capacity in the Lakeshore region is higher than the Canadian average (Figure 5). This means that a 10kWdc system can be expected to offset approximately 12,000-13,000kWh of facility grid consumption annually.

The cost of installing solar PV systems varies but typically ranges from an installed price of $2,000 to $3,000 per kWdc, depending on system size and installation specifics.

Given these factors, the integration of additional solar PV capacity is recommended as a future initiative, to be pursued when budget availability and external funding opportunities align.

Current Funding Opportunity: The Save On Energy Retrofit Program has a new offering of significant incentives for solar PV systems aimed at load displacement. Key eligibility criteria stipulate that these must be rooftop systems, serve to reduce on-site energy consumption and cannot be net-metered. This means that all generated electricity must be used directly on-site rather than fed back into the grid. Incentives include:

- **Microgeneration Projects (up to 10 kWdc):** Eligible for $1,000 per kWdc.

- **Small-Medium Generation Projects (greater than 10 kW up to 1 MWac):** Eligible for $860 per kWac.

Both incentive offerings are capped at 50% of eligible project costs.

4.2.2 Wind

Technology Overview: Wind energy systems harness wind currents to drive turbines, generating electricity. These systems can range from small-scale installations for individual use to large wind farms supplying power to the grid.

Benefits:

- **Clean Energy Production:** Generates electricity without emitting greenhouse gases.
- **Cost-Effective:** After initial installation, wind energy has low operational costs.
- **Scalable:** Can be implemented at various scales to meet different energy needs.

Limitations:

- **Site Specificity:** Requires locations with consistent, strong wind speeds for optimal performance.
- **Aesthetic and Noise Concerns:** Potential visual and auditory impacts on local communities.
- **Wildlife Impact:** Risk of harm to birds if not properly sited.

General Wind Feasibility in Lakeshore: Lakeshore's proximity to Lake St. Clair suggests there may be potential for wind energy development. However, an analysis using NRCan's RETScreen Expert software showed an average daily wind speed of 4.8 m/s (17.35 km/h) in the area. According to NRCan's Wind Energy Systems Guide[13], this wind speed is considered poor for high-efficiency wind energy generation. While these findings suggest limited viability, site-specific assessments would still be required to determine whether localized conditions could support wind energy projects.

The cost of installing wind turbines varies significantly based on scale and location, ranging from as low as $1,600[14] (utility-scale) to $9,000[15] (small systems) per kW of installed capacity. As any of Lakeshore's wind applications impacting Corporate assets would fall under the small system category, this renewable energy option is less economically attractive than Solar PV. As such, further exploration of wind options is not recommended at this time but could be revisited in the next CDMP.

[13] WindEnergy_buyersguide_ENG.pdf
[14] CER – Market Snapshot: The cost to install wind and solar power in Canada is projected to significantly fall over the long term
[15] Electricity generation using small wind turbines for home or farm use | ontario.ca

4.2.3 Biogas Cogeneration

Technology Overview: Biogas cogeneration, also known as combined heat and power (CHP), involves capturing biogas produced through the anaerobic digestion of organic waste, typically at wastewater treatment plants or landfill sites, and using it as fuel to simultaneously generate electricity and usable heat. This methane-rich gas is often flared for safety and odor control, resulting in wasted energy potential. Cogeneration systems instead convert that biogas into productive energy in the form of electricity and heat, offering an efficient and environmentally responsible alternative.

Benefits:

- **Energy Recovery:** Turns a waste byproduct into a valuable energy source, improving overall facility efficiency.
- **GHG Reduction:** Captures and utilizes methane, a potent greenhouse gas, reducing emissions significantly.
- **Operational Resilience:** Provides on-site power and heat, improving energy reliability and lowering utility costs.
- **Circular Economy:** Aligns with sustainability goals by integrating waste management and energy generation.

Limitations:

- **Upfront Cost:** High capital investment is required for CHP systems and supporting infrastructure.
- **Maintenance Needs:** Systems are technically complex and require skilled operation and regular upkeep.
- **Feedstock Dependency:** Energy generation relies on a consistent and sufficient supply of organic material, such as sewage sludge.

Potential Application in Lakeshore: Lakeshore's existing wastewater treatment systems are aerobic, which means biogas cogeneration is not currently feasible. However, this remains a viable opportunity for any future wastewater treatment facilities. Should Lakeshore consider upgrading or developing new WWTP infrastructure, they are encouraged to revisit biogas CHP as a strategic sustainability measure. In such a scenario, engaging its operating partners, the Ontario Clean Water Agency (OCWA), and external consultants to conduct biogas potential assessments would be a prudent next step.

Several Ontario municipalities have already adopted this technology with success. For example, the Region of Waterloo has implemented biogas cogeneration systems at

multiple wastewater facilities[16], including in Kitchener and Galt, to reduce operating costs and emissions by using digester gas to generate electricity and heat onsite.

Funding Opportunities: The Save On Energy Industrial Energy Efficiency Program (IEEP) offers significant financial incentives for waste energy recovery projects, such as biogas cogeneration systems. Incentives are based on the amount of electricity generated and offset from the grid. Because biogas cogeneration systems also produce usable heat—often for space or water heating—they can reduce natural gas consumption as well. As a result, they may also qualify for Enbridge incentives targeting natural gas reduction. Lakeshore is encouraged to explore these funding opportunities, along with other available programs listed in Appendix D.

4.3 Implementation Plan

Achieving Lakeshore's energy conservation and emissions reduction targets will require a structured, strategic approach. This Implementation Plan outlines the key actions and frameworks recommended to meet the established 5% energy reduction target by 2028, as detailed in Section 3.2.

4.3.1 Key Strategies for Achieving Established Goals

To support consistent progress over the 2024–2028 planning period, Lakeshore should follow a clear and actionable implementation framework. These strategies integrate policy, project execution, and data-driven oversight to prioritize investments, streamline operations, and track results effectively. Figure 6 below outlines the five-step implementation framework that is recommended to form the backbone of Lakeshore's energy management efforts.

[16] Wastewater treatment plant innovation wins award – Region of Waterloo

Figure 6 - Five-Step Implementation Framework

Implement Utility Data Software and Monitor Progress

As detailed in Section 4.1.2.3, deploy an energy tracking platform to automate data collection, monitor savings, and support annual reviews to track progress toward the 2028 target.

Implement the Corporate Energy Efficiency and Low-Carbon Alternatives Policy

Adopt and apply the policy described in Section 4.1.2.4 to all capital projects meeting specified thresholds. This policy ensures that energy efficiency and lifecycle costing are formally integrated into project planning and procurement across departments.

Deploy Identified ECMs from Level 1 and past Level 2 audits

Use the ECM Matrix (Table 6) as a foundation for action.

Also perform a strategic review of opportunities identified in past Level 2 audits.

Emphasize measures with high impact and cost efficiency, including:

- ► Bulk purchasing common retrofit measures such as LED linear fixtures, flat panels, and tubes.
- ► Standardized deployment of occupancy sensors and smart thermostats.
- ► Prioritize facilities with multiple applicable ECMs for more efficient project bundling and procurement.

Conduct Level 2 Energy Audits at Key Facilities

Perform deeper audits at the sites identified in Section 4.1.2.1 to obtain detailed savings projections, cost estimates, and payback periods. These audits will inform capital budgeting and unlock more substantial opportunities.

Implement Capital ECMs During Major Renovations

Align capital ECM execution with facility lifecycle events (e.g., HVAC replacements, roof upgrades) to reduce disruption and maximize cost-effectiveness.

4.3.2 Resource Allocation and Program Management Framework

Lakeshore's Division Leader – Energy Management and Utilities will serve as the program lead for ECDMP implementation. Their responsibilities will include:

- Overseeing ECM implementation and tracking.
- Coordinating with asset managers, capital planners, maintenance and procurement staff.
- Managing external consultants for Level 2 audits or complex retrofit designs.
- Reporting on progress to relevant stakeholders.

Support will be provided by:

- Departmental staff tasked with specific measures (e.g., Parks, Recreation, Water/Wastewater).
- Finance staff to coordinate budget alignment and fund tracking.
- IT and operations teams to assist with BAS integration and utility data platforms.

To ensure consistency and efficiency:

- Lakeshore may standardize retrofit specifications (e.g., LED lighting, BAS platforms). Standardizing common upgrades across facilities can reduce overall costs through economies of scale, simplify procurement, and streamline future maintenance and replacements. It also allows staff to become more familiar with a consistent set of technologies, reducing training needs and improving efficiency in managing spare parts.
- Project bundling can be used to streamline procurement and reduce unit costs.

4.4 Anticipated Challenges and Solutions

4.4.1 Project Implementation Challenges

Achieving Lakeshore's proposed energy reduction target will require coordinated effort, long-term investment, and sustained support from staff and decision-makers.

While this ECDMP outlines a practical roadmap of ECMs and strategic recommendations, it is important to acknowledge that implementation challenges are anticipated. These challenges are not unique to Lakeshore; they reflect broader considerations in the municipal sector, including resource constraints, aging infrastructure, and evolving policy landscapes. Identifying and proactively addressing these barriers will be key to successful implementation.

Table 7 - Anticipated Challenges and Solutions

Challenge	Description	Potential Solutions or Mitigation Strategies
Lack of Capital Budget	Many ECMs and fuel-switching projects require significant upfront investment, which may not always align with available municipal capital budgets.	Explore external funding opportunities listed in Appendix D. Note that program eligibility varies by project type and may require minimum project sizes.
Limited Staff Resources	Implementing ECMs across departments requires staff time, technical expertise, and project coordination that may not be readily available. A further challenge is that the Division Leader – Energy Management and Utilities is currently a temporary full-time role. This creates uncertainty for future implementation of the program framework, which is a multi-year approach requiring consistent leadership and long-term planning.	To mitigate these challenges, it is recommended that the Division Leader – Energy Management and Utilities position be made permanent, providing the consistent leadership needed to implement the framework, oversee energy initiatives, and guide long-term energy and GHG reduction planning. Additional internal support can be provided by assigning departmental staff to support with specific initiatives. External consultants can also be engaged as needed to support technical design, feasibility assessments, and implementation planning for more complex projects.
Project Complexity	Some projects (e.g., HVAC upgrades, fuel switching, building automation standardization) require complex technical and operational planning.	Leverage the results of energy audits to develop detailed scopes, cost estimates, and timelines. Bundle projects to reduce disruption and improve project value. Leverage the expertise of unbiased energy consultants where necessary.
Low Economic Return on Fuel Switching	Projects that involve switching from natural gas to electricity often have poor paybacks under current market conditions, especially with the potential removal of the federal carbon tax.	Consider applying an internal cost of carbon or assigning value to GHG reductions to justify projects that otherwise fall short on financial metrics alone.

Challenge	Description	Potential Solutions or Mitigation Strategies
Uncertainty in Incentive Programs	External funding programs are subject to change and often have variable eligibility requirements, deadlines, and performance thresholds.	Stay informed of updates to programs such as Save On Energy, Enbridge, and the Low Carbon Economy Fund. Consider developing internal tracking tools or leveraging consultant support.
Siloed Budgeting Processes	Energy cost savings are often realized in one department while capital costs are borne by another, creating a disconnect in incentives.	Promote cross-departmental collaboration and energy literacy in budgeting. Consider internal mechanisms like a revolving energy fund.
Aging Infrastructure	Many buildings and systems are at or near end-of-life, which can limit the ability to implement ECMs without major capital upgrades.	Align ECM implementation with planned capital upgrades to reduce duplication and increase cost-effectiveness.
Council Priorities and Budget Decisions	Traditional budgeting processes often focus on line items rather than strategic outcomes, potentially deprioritizing energy projects despite their long-term value.	Advocate for rolling, outcome-based budgeting linked to strategic goals. Engage council transparency with clear project metrics (cost, savings).

Funding and Financing Considerations

A recurring challenge in municipal energy planning is securing the upfront capital needed to implement recommended measures. Lakeshore should proactively explore the full range of external funding programs listed in Appendix D, including programs from the IESO, Enbridge, NRCan, and FCM. It is important to note that:

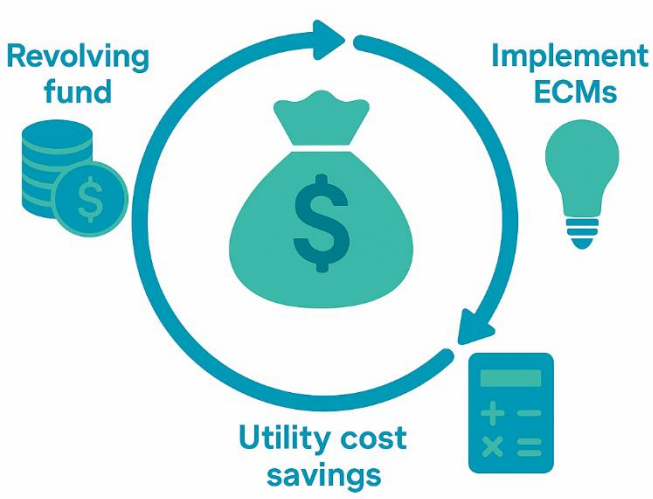
- Program eligibility varies depending on project size, type, and energy savings.
- Some programs have minimum consumption thresholds or performance reporting requirements.
- Programs and incentive levels are subject to change, so early engagement is recommended.

Revolving Energy Fund – A Potential Internal Solution

To address internal funding gaps and build long-term financial capacity, Lakeshore is strongly recommended to explore creating a Revolving Energy Fund (Figure 7). This type of fund operates by:

- Allocating initial seed funding (e.g., from reserve accounts or initial project savings).
- Using the fund to implement ECMs that generate utility cost savings, and
- Returning a portion or all of the savings back into the fund to finance future energy projects.

Figure 7 - Revolving Energy Fund Concept



This model creates a self-sustaining funding mechanism that grows over time and reduces dependence on external grants or annual budget cycles. Revolving funds are used successfully in many Canadian municipalities to accelerate progress on energy and climate goals.

For example, the Town of Caledon in Ontario established a Corporate Energy Revolving Fund (CERF) using revenue from municipally-owned solar projects and repurposed energy funds[17],[18]. The fund finances efficiency upgrades and is replenished by savings from reduced utility costs and incentive programs. This approach has enabled Caledon to continuously reinvest in additional energy projects while improving financial and environmental performance.

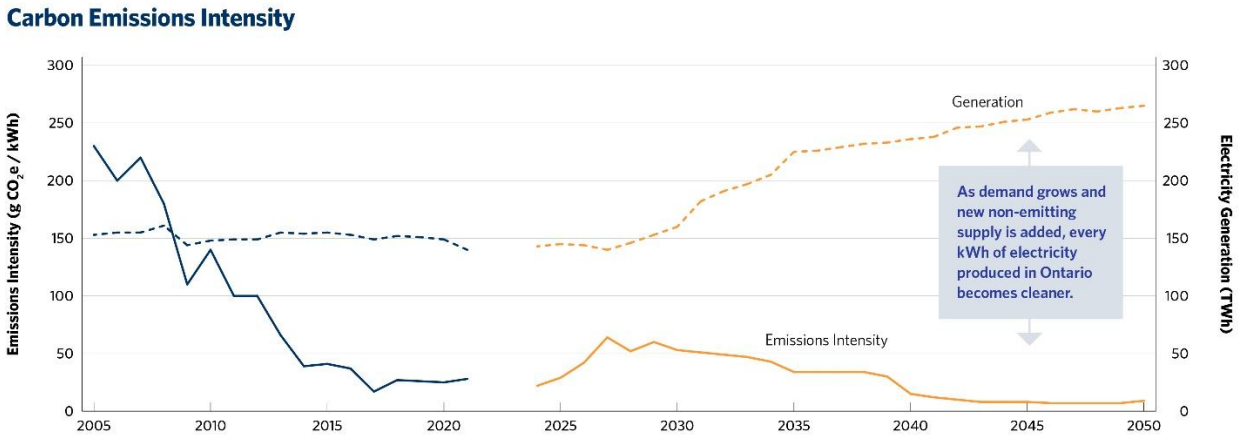
4.4.2 Ontario Electricity Emissions Projections

Ontario's electricity supply is primarily generated from non-emitting sources, with nuclear and hydroelectric power making up the largest share of the energy mix. This reliance on clean energy has kept the province's GHG emissions factor for electricity production relatively low. However, electricity demand is expected to grow significantly - by 75% - from 151 terawatt-hours (TWh) in 2025 to 263 TWh by 2050.

[17] Town to complete eco-friendly projects thanks to Energy Revolving Fund | Caledon Citizen
[18] Caledon's Corporate Energy Revolving Fund is sustaining itself

To meet this rising demand, Ontario plans to add more non-emitting energy sources, such as wind, solar, hydro, and biofuel generation. Despite these efforts, additional natural gas-fired generation will also be required in the energy mix to ensure reliability during peak periods. As a result, the emissions intensity of electricity is expected to increase notably in the short term before leveling off and ultimately declining post-2030 (Figure 8).

Figure 8 - Ontario Total Electricity Generation and Emissions Intensity Projections (IESO)[19]



What this means is that for the same amount of electricity consumed, Lakeshore's electricity-related emissions are expected to rise in the short term. While Lakeshore has not established a GHG reduction target (but rather an energy reduction target) for the 2024-2028 term, this trend remains important, as it will significantly influence the emissions profile reported in the next ECDMP. Therefore, reducing electricity consumption through improved energy efficiency remains a key strategy, not only for achieving energy reduction targets but also for managing GHG emissions in future planning and reporting efforts.

[19] Six Graphs and a Map: 2024 Annual Planning Outlook and Emissions Update

5. Fleet Energy Consumption and GHG Emissions

Lakeshore operates a fleet of vehicles to support the delivery of municipal services, including road and park maintenance, fire services as well as transportation for facilities, engineering, building and by-law staff. These vehicles currently rely on gasoline or diesel and contribute to Lakeshore's overall energy consumption and GHG emissions profile.

Since the previous ECDMP, there has been a gap in available fleet fuel consumption data. However, near the end of 2023, Lakeshore implemented a new fuel management system that enables accurate tracking of fuel use by vehicle. This system will support both aggregated and disaggregated reporting, improving data accuracy and enhancing the ability to monitor and manage fleet-related emissions over time.

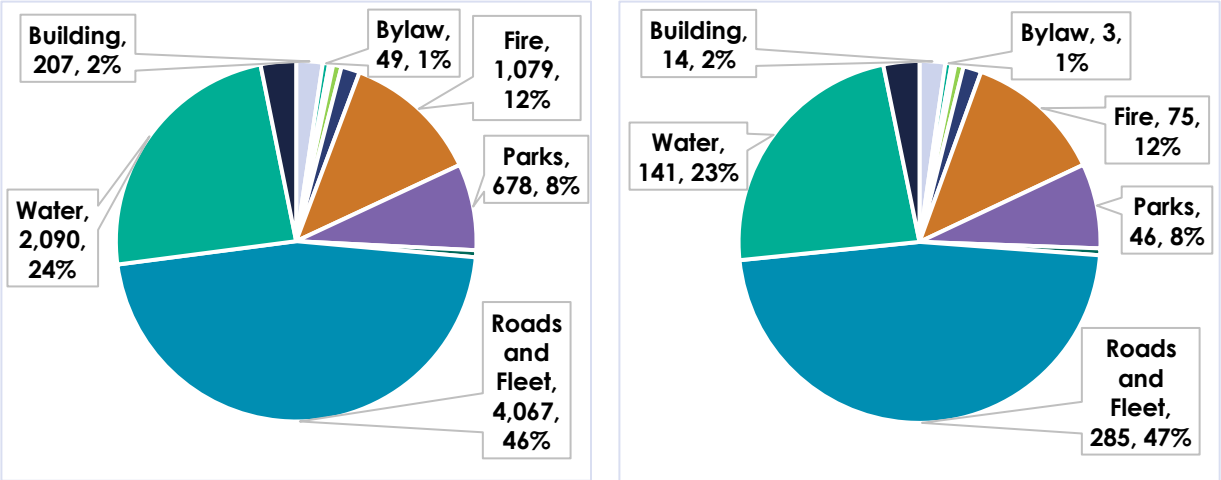
A comparison of available 2024 fleet fuel data versus that reported for 2018 in the 2019 ECDMP (labelled "Fleet and Equipment") is provided in Table 8 below. Total fleet energy consumption and GHG emissions have remained virtually unchanged since 2018. This is a positive outcome, as population growth over this period has increased the demand for municipal services, often necessitating additional vehicles. Maintaining stable fuel use and emissions despite fleet expansion reflects improved efficiency in fleet operations and management.

Table 8 - Fleet Energy Consumption and GHG Emissions (2024 vs 2018)

Metric	2018	2024	Change (%)
Energy Consumption (GJ)	8,675	8,747	<1%
GHG Emissions (tCO2e)	604	604	0%

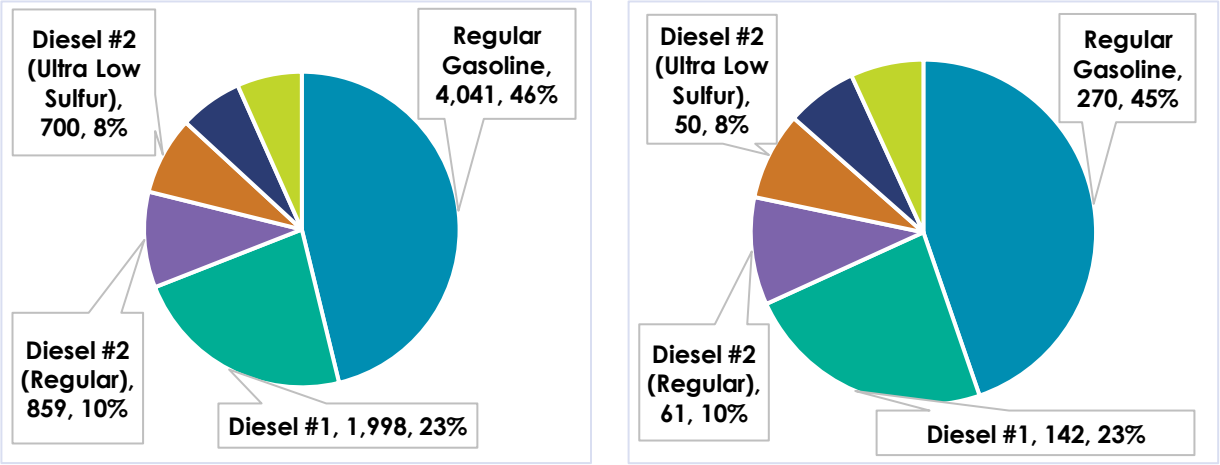
A breakdown of 2024 fleet fuel data by department is provided in Figure 9 below. For visual convenience, not all contributors have data labels.

Figure 9 - Fleet Energy Consumption (GJ - left) and GHG Emissions (tCO2e - right) by Department



A breakdown of 2024 fleet fuel data by fuel type is provided in Figure 10 below. For visual convenience, only the top 4 largest contributors have data labels. The remaining 2 contributors are Diesel #2 (Ultra Low Sulfur Dyed) and Diesel Off-Rd, which combined account for approximately 13% of energy consumption and 14% of GHG emissions.

Figure 10 - Fleet Energy Consumption (GJ - left) and GHG Emissions (tCO2e - right) by Fuel Type



Per Figure 10, there is a relatively even split of energy and emissions from gasoline-powered and diesel-powered vehicles. This implies a similar, relatively even split between the use of light-duty (primarily gasoline-powered) and medium/heavy-duty (primarily diesel-powered) vehicles. These proportions are important when identifying efficiency solutions and in development of a phased fleet electrification strategy.

5.1 Electrifying Municipal Vehicle Fleet

Electrifying Lakeshore's municipal vehicle fleet presents the largest opportunity to reduce fleet-related GHG emissions. This is because the emissions associated with driving an electric vehicle (EV) using electrical energy from Ontario's grid are significantly lower than those from driving a gasoline or diesel vehicle. Transitioning to EVs will not only reduce emissions but also lower long-term operating costs due to higher efficiencies and reduced maintenance requirements of electric drivetrains. Grant opportunities are often available to help subsidize both vehicle purchases and charging infrastructure, and Lakeshore should continue to actively explore these programs to reduce project costs.

Lakeshore currently owns and operates two dual-port Level 2 EV chargers, located at Atlas Tube and Lakeview Park. These chargers are for public use and not fleet use. They provide valuable insight into EV charger operation and user behavior, offering lessons that can inform future expansion. Understanding utilization patterns, maintenance requirements, and energy demands from these initial installations will help optimize the deployment of additional chargers across the municipality.

5.1.1 Phased Approach to Fleet Electrification

A structured, phased approach is recommended to transition the municipal fleet to electric vehicles while ensuring the necessary charging infrastructure is in place.

5.1.1.1 Phase 1: Light-Duty Vehicle Electrification

The first phase of electrification should focus on replacing light-duty vehicles, such as sedans and SUVs, currently used by the building, engineering, by-law departments as well as certain vehicles in water, fire and parks departments. These vehicle types have widely available electric alternatives[20] that are highly cost-effective when considering the total cost of ownership. Additionally, incentives are available to help offset the initial cost of EVs (see Appendix D for potential funding sources).

To support these vehicles, a staged rollout of charging infrastructure is proposed in consultation with Lakeshore's Fleet Management Program. This phased approach aligns with upcoming municipal fleet lease renewals, ensuring that charging capacity is ready as EVs are introduced. Phase 1 is expected to be completed within the ECDMP period (2024–2028).

Phase 1a (2026) – Operations Centre: Install Level 2 charging stations to serve municipal fleet vehicles based at this hub.

Phase 1b (2027) – Town Hall: Install Level 2 charging stations to support Town Hall fleet vehicles.

Phase 1c (2028) – Atlas Tube Recreation Centre: Install additional charging stations (details to be finalized) to support fleet vehicles assigned to this location.

For Phases 1a-c above, the number of chargers/ports should align with the Municipal Fleet lease renewal program.

Prior to installation, electrical capacity at each site should be reviewed to confirm available load and determine whether upgrades are required. Where possible, energy efficiency measures may be implemented to free up capacity and minimize costly transformer or panel upgrades.

5.1.1.2 Phase 2: Medium- and Heavy-Duty Vehicle Electrification

The second phase will focus on the electrification of medium-duty and heavy-duty vehicles, including road maintenance trucks and other specialized municipal vehicles. Currently, electric alternatives for these vehicle types are limited, but future advancements in technology and vehicle availability will make this transition more feasible.

---

[20] Plug 'N Drive provides a comprehensive list of electric vehicles (primarily light and medium-duty) available in Canada. This list is filterable by MSRP, vehicle type, brand and more. Electric Vehicles | PlugNDrive Buyer's Guide

Phase 2 will also involve the deployment of higher-power Level 2 chargers (15kW+) and Level 3 DC fast chargers (DCFC) to support larger vehicles with higher battery capacities. These chargers will be essential for high-duty-cycle or critical vehicles that must remain available at all times. The East and West Public Works yards are key locations for future charging infrastructure expansion to accommodate these vehicles as the fleet transitions over time.

6. Conclusion

The Municipality of Lakeshore's 2024 ECDMP provides a practical foundation for reducing energy consumption, managing costs, and lowering emissions across municipal operations. Building on progress achieved since 2019, this CDMP integrates practical recommendations with Lakeshore's broader objectives of sustainable infrastructure and responsible asset management.

Implementation will follow the five-step framework introduced in Section 4.3, guiding Lakeshore through planning, funding, execution, monitoring, and continuous improvement. To ensure effective delivery, measures will be sequenced with annual budget approvals and aligned with major facility renewal projects, maximizing both cost-effectiveness and operational benefits. A summary of Key Recommendations with high-level timelines and expected impact is provided in Table 9 below.

Table 9 - Summary of Key Recommendations

Recommendation	Timeline	Alignment	Expected Impact
Utility Data Management Software	Immediate	2026 Budget year	Streamline utility tracking, improve energy reporting and analysis, assist Energy Management and Utilities Division in decision making.
Adopt corporate energy/low-carbon policies	2026	Corporate purchasing policy and bylaw	Provide a structured evaluation of efficiency and low-carbon investments, provide energy efficient options for procurement.
Implement Level 1 Audit ECMs and perform strategic review of past Level 2 Audits	2026-2028	Future budget cycles and facility upgrades where possible.	5% energy reduction by 2028, 10-15% potential if all ECMs are implemented.
Conduct Level 2 Audits at priority sites: Town Hall, Operations Centre, and Fire Station #4.	2026-2028	Post renovations for Town Hall	Refine project scopes and potential additional savings.
Phase 1 Municipal Fleet Electrification: Light Duty Vehicles and EV	2026-2028	Future budget cycles	Immediate fleet GHG reductions and operational cost savings.

Recommendation	Timeline	Alignment	Expected Impact
infrastructure at (a) Operations Centre, (b) Town Hall, (c) ATRC			
Phase 2 Municipal Fleet Electrification: Medium/Heavy Duty Vehicles	Beyond 2028	Future budget cycles and as the EV technology advances.	Long-term fleet decarbonization
Explore renewable integration (solar PV expansion etc.)	2026-2027	Solar PV expansion initiatives	Long-term emissions reductions and energy resiliency.

Together, these actions provide a practical roadmap for Lakeshore to reduce energy consumption and GHG emissions, improve energy resilience, and deliver on Council's sustainability commitments. Achieving the 5% reduction target by 2028 will mark tangible progress, while the broader pipeline of measures positions Lakeshore for deeper savings and low-carbon opportunities beyond this plan. Success will depend on strong coordination, strategic investment, and consistently integrating energy considerations into everyday decision-making. This will enable Lakeshore to lead by example in building a more efficient and resilient future, while complementing the broader Community Energy Management Plan now underway.

Long-Term Financial Planning and Funding Model

Achieving the objectives of this ECDMP will require sustained financial commitment over the five-year planning horizon. To support implementation of identified ECMs across municipal facilities, it is recommended that Lakeshore allocate approximately $125,000 per year over the next five years. In parallel, advancing fleet electrification through EV charging and electrical infrastructure upgrades will require an additional $125,000 per year over the same period. These planned annual investments, supported by available incentive programs and internal funding mechanisms such as a Revolving Energy Fund, will enable Lakeshore to systematically implement projects, reduce long-term operating costs, and achieve the targeted energy and emissions reductions set out in this Plan.

7. Disclaimer

This document was prepared by Aladaco in close collaboration with Lakeshore's Division Leader of Energy Management & Utilities and is intended solely for Lakeshore's use. Other parties should not rely on this report in whole or in part. The information contained herein is based on data available at the time of preparation and is subject to limitations, assumptions, and qualifications stated herein.

Aladaco applied professional judgment in the development of this report with respect to estimates and opinions on costs, schedules, and technical matters, based on its experience and the information available at the time of report preparation. Aladaco cannot guarantee the accuracy of such estimates or opinions due to potential changes in market conditions or other factors outside of its control.

Reliance on these estimates is at the reader's own risk. By acceptance of this report, Lakeshore acknowledges these limitations and confirms that the report satisfies the requirements of the scope of work.

8. Acronyms

BAS: Building Automation System

CDD: Cooling Degree Day

ECM: Energy Conservation Measure

ECDMP: Energy Conservation and Demand Management Plan

EUI: Energy Use Intensity

EV: Electric Vehicle

FIT: Feed-In Tariff

GHG: Greenhouse Gas

HDD: Heating Degree Day

HVAC: Heating, Ventilation, and Air Conditioning

IESO: Independent Electricity System Operator

LCCA: Life Cycle Cost Analysis

LED: Light Emitting Diode

NRCan: Natural Resources Canada

OCWA: Ontario Clean Water Agency

O. Reg. 25/23: Ontario Regulation 25/23: *Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans*

PV: Photovoltaic

WTP: Water Treatment Plant

WWTP: Wastewater Treatment Plant

W&WW: Water and Wastewater

9. Glossary

Carbon Dioxide Equivalent (CO_2e)

A common unit of greenhouse gas (GHG) emissions. CO2e represents the equivalent carbon dioxide emissions that have an equivalent global warming potential to the actual emissions of all GHG from a site, end-use, or measure (CO2, CH4, etc.).

Cooling Degree Day (CDD)
A measure of how warm the outdoor air is relative to a base temperature (typically around 18°C). The higher the CDD value, the greater the cooling demand required to maintain indoor comfort. CDDs are commonly used to estimate building energy consumption for air conditioning.

Energy Conservation Measure (ECM)

Measures that improve the energy efficiency of a facility and offer energy cost savings. ECMs in this report include retrofits and low-cost / no-cost upgrades.

Energy Use Intensity (EUI)

A benchmarking metric that measures a building's energy performance, expressed as energy consumption per unit area over a year (e.g., ekWh or GJ/m²). Lower EUI values indicate more energy-efficient buildings.

Equivalent Energy

The summation of all energy used for the building (typically gas and electricity) in a common unit (typically ekWh or GJ).

Greenhouse Gas (GHG)

A gas that traps heat in the Earth's atmosphere. They contribute to the greenhouse effect by absorbing infrared radiation, e.g., carbon dioxide and chlorofluorocarbons.

Heating Degree Day (HDD)
A measure of how cold the outdoor air is relative to a base temperature (typically 18°C). The higher the HDD value, the greater the heating demand required to maintain indoor comfort. HDDs are commonly used to estimate building energy consumption for space heating.

Life Cycle Cost Analysis (LCCA)

A method of assessing the total cost of ownership of an asset or system, including acquisition, operation, maintenance, and disposal over its entire life.

Net Metering

A billing arrangement that allows excess electricity generated by a renewable system (like solar PV) to be fed into the grid in exchange for utility bill credits.

Photovoltaic (PV)

A technology that converts sunlight directly into electricity using solar panels.

Revolving Energy Fund

A self-sustaining funding mechanism where utility savings from energy efficiency projects are reinvested into future energy improvements.

Appendices

Appendix A - Asset List (Facilities/W&WW Sites/Parks)

Colour Legend:

Community Facilities
Parks
W&WW Sites
Fire Stations
Service and Admin Facilities

Facility/Park/W&WW Site Name	Category	Address	Township	Gross Floor Area (m^2)
Atlas Tube Recreation Centre	Community Facilities	447 Renaud Line	Belle River	18,542
Centennial Park	Park	1031 County Road 22	Belle River	N/A
Comber Community Centre	Community Facilities	7100 Community Centre Street	Comber	617
Comber Community Centre Park	Park	7100 Community Centre Street	Comber	N/A
Comber Library	Community Facilities	6405 Main Street	Comber	164
Comber Pumping Station	W&WW Sites	6528 Taylor Avenue	Comber	297
Denis St. Pierre WWTP	W&WW Sites	276 Rourke Line	Belle River	262
Fire Station #1 (Puce)	Fire Stations	1031 County Road 22	Belle River	502
Fire Station #2 (LR203)	Fire Stations	1465 Lakeshore Road 203	Maidstone	484
Fire Station #3 (Belle River)	Fire Stations	592 St. Charles Street	Belle River	506
Fire Station #4 (Ruscom Station)	Fire Stations	2095 County Road 31	Ruscom Station	392
Fire Station #5 (Comber)	Fire Stations	6400 Main Street	Comber	538
Geralyn Tellier-Perdu Memorial Park	Park	1250 County Road 31	Sant Joachim	N/A

Facility/Park/W&WW Site Name	Category	Address	Township	Gross Floor Area (m^2)
Haycroft Pumping Station	W&WW Sites	6995 Lakeshore Road 303	Stoney Point	172
John George WTP	W&WW Sites	492 + 497 Lakeview Drive	Belle River	5,946
Ladouceur Park/Lions Club Park	Park	245 Ouellette Street	Belle River	N/A
Lakeview Park	Park	535 Lakeview Drive	Belle River	N/A
Leffler Peace Park	Park	405 Old Tecumseh Road	Belle River	N/A
Libro Community Centre	Community Facilities	1925 South Middle Road	Woodslee	817
Lions Park	Park	999 Quenneville Drive	Lighthouse Cove	N/A
Maidstone Park	Park	1566 Oakwood Drive	Belle River	N/A
Marina Building	Community Facilities	600 Lake Street	Belle River	474
North Woodslee WWTP	W&WW Sites	1766 Oriole Park Drive	Woodslee	251
Operations Centre	Service and Admin Facilities	304 Rourke Line	Belle River	3,651
OPP Building	Service and Admin Facilities	774 Notre Dame Street	Belle River	1,016
Optimist Park	Park	775 Notre Dame Street	Belle River	N/A
Public Works East Garage	Service and Admin Facilities	2095 County Road 31	Ruscom Station	980
Public Works West Garage	Service and Admin Facilities	1089 Puce Road	Lakeshore	1,289
River Ridge Park	Park	1100 Oakwood Avenue	Belle River	N/A
Shanahan Park	Park	1465 Lakeshore Road 203	Maidstone	N/A
South Woodslee WWTP	W&WW Sites	52 King Street	Woodslee	60
Stoney Point Library	Community Facilities	800 Comber Sideroad	Stoney Point	89
Stoney Point Park	Park	800 Comber Sideroad	Stoney Point	N/A

Facility/Park/W&WW Site Name	Category	Address	Township	Gross Floor Area (m^2)
Stoney Point WTP	W&WW Sites	6011 St. Clair Road	Stoney Point	585
Town Hall	Service and Admin Facilities	419 Notre Dame Street	Belle River	1,244
West Beach Park	Park	121 West River Street	Belle River	N/A

Appendix B - Asset List (Fleet)

Department	Identifier	Model
Building	Veh: 630	2015 Nissan Micra
Building	Veh: 639	2017 Ford Focus
Building	Veh: 643	2018 Ford Escape
Building	Veh: 659	2020 Ford Escape
Building	Veh: DGBC	2022 Ford Escape
Bylaw	Veh: 661	2020 Ford Escape
Bylaw	Veh: 673	2020 Ford Escape
Drainage	Veh: 653	2019 Ford F150
Engineering	Veh: 654	2019 Ford Escape
Engineering	Veh: 671	2022 GM Equinox
Engineering	Veh: 675	2022 Ford F150
Facilities	Veh: 627	2014 Ram CV Minivan
Facilities	Veh: 682	2023 Ram Pro Master 2500
Fire	Veh: 2699	2022 Ford Explorer
Fire	Veh: 3162	2008 Spartan Rosenbauer
Fire	Veh: 3163	2008 Spartan Rosenbauer
Fire	Veh: 3164	2008 Spartan Rosenbauer
Fire	Veh: 3165	2008 Spartan Rosenbauer
Fire	Veh: 3464	Ford F150
Fire	Veh: 3507	2022 Ford Explorer
Fire	Veh: 4291	2022 Ford Escape
Fire	Veh: 4933	2022 Ford Escape
Fire	Veh: 5418	2003 Freightliner FL80
Fire	Veh: 5419	2003 Freightliner FL80
Fire	Veh: 5797	2000 Spartan Saulsbury
Fire	Veh: 6000	2016 Dodge Ram
Fire	Veh: 6792	2008 Spartan Rosenbauer
Fire	Veh: 6793	2008 Spartan Rosenbauer
Fire	Veh: 7378	2004 Spartan Smeal
Fire	Veh: 772	2015 Dodge Durango
Fire	Veh: 9356	1997 Freightliner FL70
Fire	Veh: Command 1	2022 Ford Explorer
Fire	Veh: Command 2	2022 Ford Explorer
Fire	Veh: Command 3	Ford F150
Fire	Veh: Engine 1	2000 Spartan Saulsbury
Fire	Veh: Engine 2	2008 Spartan Rosenbauer
Fire	Veh: Engine 3	2008 Spartan Rosenbauer

Department	Identifier	Model
Fire	Veh: Engine 4	2008 Spartan Rosenbauer
Fire	Veh: Engine 5	2003 Freightliner FL80
Fire	Veh: FPO 1	2022 Ford Escape
Fire	Veh: FPO 2	2022 Ford Escape
Fire	Veh: Ladder 1	2004 Spartan Smeal
Fire	Veh: Rescue 1	1997 Freightliner FL70
Fire	Veh: Rescue 3	2008 Spartan Rosenbauer
Fire	Veh: Support 1	2016 Dodge Ram
Fire	Veh: Tanker 2	2003 Freightliner FL80
Fire	Veh: Tanker 4	2008 Spartan Rosenbauer
Fire	Veh: Tanker 5	2008 Spartan Rosenbauer
Parks	Veh: 1643	Massey Tractor
Parks	Veh: 620	2013 Ford F350
Parks	Veh: 621	2014 Ford F150
Parks	Veh: 635	2016 Ram 1500
Parks	Veh: 645	2018 GM Silverado
Parks	Veh: 649	2019 Ford F150
Parks	Veh: 658	2019 Ford F450
Parks	Veh: 663	2020 Ford Escape
Parks	Veh: 669	2022 Kubota RTV 1100
Parks	Veh: 672	2021 Kubota RTV 1100
Parks	Veh: 677	2022 Ford F-150
Parks	Veh: 686	2024 Ram 2500
Parks	Veh: FL2611	Massey Tractor
Recreation	Veh: 655	2019 Ford F150
Roads	Veh: 304	1990 John Deer Grader
Roads	Veh: 317	2006 Sterling Truck
Roads	Veh: 319	1992 John Deere Grader
Roads	Veh: 321	2007 John Deere Loader
Roads	Veh: 602	2008 Volvo Grader
Roads	Veh: 603	2007 International Truck
Roads	Veh: 607	2010 Ford F550
Roads	Veh: 609	2010 International Truck
Roads	Veh: 618	2012 Freightliner Truck
Roads	Veh: 622	John Deere Backhoe
Roads	Veh: 623	2014 Mack
Roads	Veh: 624	2013 Mack Truck
Roads	Veh: 625	2014 Ford F150
Roads	Veh: 629	2015 Ford F550

Department	Identifier	Model
Roads	Veh: 632	2015 Freightliner Truck
Roads	Veh: 636	2017 Mack
Roads	Veh: 637	2017 McCormick Tractor
Roads	Veh: 640	2017 Ford F150
Roads	Veh: 641	2018 Freightliner
Roads	Veh: 642	2017 Ford F150
Roads	Veh: 646	2018 Ford F550
Roads	Veh: 651	2019 Ford F150
Roads	Veh: 652	2019 Ford F150
Roads	Veh: 657	Kubota Skidsteer
Roads	Veh: 664	2019 Mack Truck
Roads	Veh: 665	2020 JCB Backhoe
Roads	Veh: 667	2020 Ford F-150
Roads	Veh: 674	2022 Ford F150
Roads	Veh: 678	2022 Freightliner Truck
Roads	Veh: 679	2022 Ram 4500
Roads	Veh: 680	Case Tractor
Roads	Veh: 691	Ravo
Roads	Veh: 693	Case 521 Loader
Roads	Veh: 8501008198271173	Sweeper
Water	Veh: 407	2008 Ford F-250
Water	Veh: 610	2010 Ford F450
Water	Veh: 617	Chev Rental Van
Water	Veh: 626	2014 Chevrolet Equinox
Water	Veh: 628	2014 Dodge SXT Minivan
Water	Veh: 631	2016 Ford F450
Water	Veh: 633	2016 Dodge Journey
Water	Veh: 634	2016 Dodge Journey
Water	Veh: 644	2018 GM Silverado
Water	Veh: 647	2018 Chevrolet Silverado
Water	Veh: 648	2018 Ford F550
Water	Veh: 650	2019 Ford F150
Water	Veh: 662	2020 Ford Escape
Water	Veh: 676	2022 Ford F-150
Water	Veh: 683	2024 Ford Escape
Water	Veh: 684	Chevy 1500 4x4

Appendix C - Water and Wastewater Plant Volumetric Flow Rates

Facility	2019 m^3	2020 m^3	2021 m^3	2022 m^3	2023 m^3
Denis St. Pierre	4,882,528	5,492,108	5,051,821	4,124,009	4,785,727
North Woodslee	16,665	16,082	16,176	15,426	19,602
South Woodslee	16,563	17,042	15,436	15,341	16,477
Wastewater Total	**4,915,756**	**5,525,232**	**5,083,433**	**4,154,776**	**4,821,806**
John George	3,429,149	3,626,906	3,507,596	3,913,805	3,525,830
Stoney Point	639,051	650,370	677,873	776,716	728,124
Water Total	**4,068,200**	**4,277,276**	**4,185,469**	**4,690,521**	**4,253,954**

Appendix D - Potential Funding Sources

Funding Source/Program Name	Funding Entity	Program Description	Funding Amount
Green Municipal Fund	Federation of Canadian Municipalities (FCM)	Funding to implement studies and capital projects at Partners for Climate Protection (PCP) Program Milestone 4. Several funding streams covering projects such as planning and development of sustainable affordable housing, stormwater management/quality studies, fleet electrification.	Both loans and grant funding that vary based on project.
Zero Emissions Vehicle Infrastructure Program (ZEVIP)	Natural Resources Canada (NRCan)	The Zero Emission Vehicle Infrastructure Program (ZEVIP) provides funding towards the deployment of electric vehicle (EV) chargers and hydrogen refuelling stations across Canada. It operates on an annual calendar of application windows. Funding for smaller EV charging projects with under 20 Level 2 connectors or 2 fast-chargers can be found through organizations authorized to redistribute a component of the ZEVIP funding.	Up to 50% of your total project costs. Max funding amount dependent on charger level: Level 2: $5,000/connector Level 3: $100,000/connector
Save On Energy - Instant Discounts Program	IESO	Instant, point-of-sale discounts are available for existing commercial, agricultural, industrial, institutional and multi-unit	Ranges from $2/unit for T5 LED tubes to $140/unit for high-lumen LED Highbay fixtures

Funding Source/Program Name	Funding Entity	Program Description	Funding Amount
		residential buildings and facilities in Ontario that purchase eligible lighting products from participating distributors/dealers.	
Save On Energy - Retrofit Program	IESO	Provides prescriptive and custom (based on energy and demand savings) incentives for a variety of electricity reduction measures such as high-efficiency lighting, HVAC, motors, compressed air measures as well as variable frequency drives.	Custom incentives are the higher of $1200/kW or $0.13/kWh of savings. Prescriptive incentives vary based on measure type, size, application. Some incentive caps apply.
Save On Energy - Energy Performance Program	IESO	Rewards organizations on a pay-for-performance basis for making behavioural and operational changes that support capital investment projects, enabling them to grow their energy savings over a number of years. Participating facilities must consume >1.5GWh annually, however up to 5 similar facilities can be aggregated to meet this threshold.	Participants receive a performance incentive based on electricity savings, calculated as the incentive rate multiplied by metered savings against a baseline model. Rates are $0.15/kWh for savings on weekdays from June 1 to September 30 (3–9 p.m. EDT) and $0.04/kWh for all other periods.

Funding Source/Program Name	Funding Entity	Program Description	Funding Amount
Incentives for Zero-Emission Vehicles (iZEV and iMHZEV)	Transport Canada	Point of sale incentives for Canadian organizations who buy or lease an eligible vehicle. Eligible vehicles range from light to heavy-duty vehicles and must be: battery-electric plug-in hybrid electric hydrogen fuel cell	Range from as low as $625 for a 12-month lease of a light-duty plug-in hybrid vehicle to $200,000 for the purchase of certain heavy-duty zero-emission vehicles. Some vehicle MSRP restrictions apply.
Enbridge Natural Gas Efficiency Programs	Enbridge	A range of prescriptive and custom programs providing incentives to offset costs of upgrading to energy-efficient natural gas equipment (or other equipment affecting natural gas consumption). Measures include: • Boilers • Condensing make-up air units • Air curtains/door dock seals • Destratification fans • Demand-controlled ventilation • Heat and energy recovery ventilators Funding also available for on-site energy assessments in some circumstances.	Range based on equipment type, size and application. Enbridge Energy Solutions Advisors are employed to consult with to match potential natural gas reduction projects with the proper funding stream.
Low Carbon Economy Fund (LCEF)	Govt. of Canada	Provides financial support for organizations to implement large GHG reduction projects and	Applicants may request from $1-25M in funding.

Funding Source/Program Name	Funding Entity	Program Description	Funding Amount
		employ low-carbon technologies. Program is competitive (merit-based) with a $170M budget. The most cost-effective types of projects: • Waste diversion • Biomass retrofits • Industrial retrofits • Anaerobic digesters • Waste heat recovery • HVAC system retrofits • Carbon capture and utilization • District energy system upgrades	Max cost-share specific to municipalities is 50%, therefore an eligible project must have expenditures (project costs) >$2M.
Canadian Infrastructure Bank – Green Infrastructure Programs	Canadian Infrastructure Bank, in partnership with SOFIAC	Building Retrofits Initiative provides attractive financing to reduce investment barriers and decarbonize buildings. Offers a team of experts that work with the public and private sector as well as other market participants to modernize and improve the energy efficiency of existing buildings.	Varies based on project