Region of Durham's 2024 to 2029 Energy Conservation and Demand Management Plan

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1. Introduction

The Regional Municipality of Durham (the Region) is required under Ontario Regulation 25/23 (formerly Ontario Regulation 507/18) of the Electricity Act to publish an updated five-year Energy Conservation and Demand Management (ECDM) Plan by July 1st, 2024. This plan has been reviewed and approved by senior management and is designed to educate and inform Regional staff, elected officials, and the public about the Region's past and future efforts to reduce energy consumption and related greenhouse gas (GHG) emissions from corporate operations.

This report will describe the Region's 2023 energy consumption profile, renewable energy generation, and previous and future energy efficiency measures undertaken at Regional facilities across operating divisions. A core interdepartmental ECDM Plan renewal team comprised of staff from the Office of the CAO Strategic Initiatives Division, the Finance Department, Works Department Facilities Design, Construction & Asset Management Division, as well as the Works Department Infrastructure Analytics Team. This core team collaborated with numerous divisional and agency representatives to collect feedback in order to set the strategic direction for energy efficiency for corporate fleet and facility operations for the 2024 to 2029 ECDM Plan period.

2. Background and Context

The Regional Municipality of Durham is an upper-tier municipality comprised of eight local municipalities with a total population of almost 750,000 across an area of 2,535 square kilometres.[1] As one of the fastest-growing regions in Ontario, Durham Region's population is expected to grow to approximately 895,000 by 2026 and 960,000 by 2031. This projected growth in population will increase demand for services and supporting infrastructure.

Durham Region delivers a wide range of services to its residents and visitors that include:

- Court Services
- Family and Children's Services
- Housing Services
- Seniors Services including Long-Term Care Homes
- Planning and Economic Development
- Police Services
- Public Health and Paramedic Services
- Public Works including planning and maintenance of Regional Roads, Bridges and Storm Draining Systems
- Solid Waste Management
- Public Transit
- Water/Wastewater Treatment, Storage, Pumping and Distribution

[1] The eight local municipalities in Durham Region include the Cities of Oshawa and Pickering, the Towns of Ajax and Whitby, the Municipality of Clarington, and the northern rural Townships of Brock, Scugog, and Uxbridge.

To support these services, Durham Region owns and/or operates assets in the form of buildings, transit vehicles, fleet vehicles, water supply and wastewater facilities, various equipment as well as all supporting infrastructure (e.g., traffic control signals, telecommunications infrastructure).

In 2023, the operation of these corporate assets collectively emitted approximately 178,000 tonnes of GHG (carbon dioxide and equivalents), representing a small fraction (estimated at approximately three per cent) of total GHG emitted by the greater Regional community. Climate mitigation (including energy efficiency) and adaptation initiatives have been a Regional priority for many years. Following Regional Council's adoption of the prior ECDM Plan (2019 to 2024), the Region took significant steps to address climate change, sustainability, and energy efficiency including the continued alignment of various Regional plans and strategies, as noted below. [2]

2.1. Durham Region Official Plan

In May 2023 Regional Council adopted a new Regional Official Plan to guide decisions on long-term growth and development and provide policies to ensure an improved quality of life. The Regional Official Plan includes policies and objectives that align with the ECDM Plan, These objectives include ensuring reduction of overall GHG emissions and other air pollutants generated by the Region's own corporate activities, striving towards a net-zero corporate carbon footprint, and prioritization of energy efficient and low carbon design in corporate buildings supported by approved policy.

2.2. Asset Management Plan and Strategic Asset Management Policy

In 2019, Regional Council approved the Region's Strategic Asset Management Policy which encapsulates the Region's asset management goals, process, and policies. Among the goals of the Strategic Asset Management Policy is to demonstrate leadership in sustainable asset management, including investments to reduce energy usage and GHG emissions, and adapt to climate change. As part of the asset management planning process, lifecycle analysis is used to ensure consideration of all operating and capital costs required for an asset to deliver its targeted service level over its useful life. Life cycle analysis considers initial acquisition, repairs, maintenance, and rehabilitation, through to eventual asset decommissioning costs. The 2024 Asset Management Plan (Report #2024-COW-29), which complies with O. Reg. 588/17, is being considered by Regional Council on June 26, 2024. The Region's 2022 Asset Management Plan was adopted by Regional Council on June 29, 2022.

[2] Following a 2009 Regional Council directive, corporate climate change initiatives and reporting were integrated into established business processes, including business plans and budgets, asset management and risk management programs.

2.3. Corporate Climate Action Plan

In March 2021, Council approved a Corporate Climate Action Plan (CCAP) including GHG emissions reduction targets for corporate operations, as shown in **Error! Reference source not found.** below, and a corporate carbon budget management framework that aligns with the Region's business planning and budget process. Through a system of reporting and accountability linked to existing budget processes, the Region is driving implementation of energy efficiency and GHG reduction initiatives across corporate departments and divisions. An annual CCAP update report is presented to Council that outlines progress made against corporate GHG targets including initiatives which contribute to improved energy efficiency and reductions in GHGs.

Figure 1: Corporate Climate Action Plan Targets

2.4. Durham Standard

In April 2023, Regional Council adopted a corporate standard for all Regional facilities, including new building construction and existing building renovation and expansion projects, to support alignment with regional policy. The Durham Standard is applicable to Regionally-owned and operated facilities (and to Regionally-leased facilities, to the extent possible). Specific to building sustainability and resilience, the Durham Standard sets a zero GHG intensity design target and requires high energy efficiency performance in new construction and building retrofits. The Standard does make provisions for on-site combustion of fossil fuels for backup power requirements.

The Durham Standard directs staff to consider off-site impacts to improve community connectivity, encourage active transportation, and reduce community-wide GHG emissions. These measures include considering multimodal infrastructure strategies and transportation demand management measures to reduce single occupancy vehicle trips; provision for a minimum number of electric vehicle (EV) chargers in parking areas; and using refrigerants that have an ozone depletion potential of zero (or below threshold global warming potential levels).

2.5. Water and Wastewater GHG Emissions Management Strategy

The Water and Wastewater (W&WW) GHG Emissions Management Strategy (the 'Strategy'), as presented to Regional Council on May 17, 2024 through Report #2024-INFO-34, charts a path to decarbonizing water supply and wastewater treatment operations over the next 20 years. Key elements of the Strategy include:

- A framework for quantifying and reporting GHG emissions from the Region's W&WW system assets, based on best practices;
- Baseline GHG emissions for tracking progress;
- GHG reduction targets specific to the W&WW sector that identifies the limitations and gaps in meeting CCAP GHG reduction targets;
- Key performance indicators (KPI) for each W&WW system, as applicable; and
- Developing an action plan for future improvements and a roadmap for GHG reductions for the Region's W&WW facilities including prioritizing initiatives to achieve GHG reduction targets with a goal of net zero by 2045.

Fugitive process emissions related to methane (CH_4) and nitrous oxide (N_2O) account for the majority of GHG emissions for wastewater utilities in Ontario. When implementing the Strategy, the potential trade-offs between energy efficiency and process emission reductions will require careful consideration. While numerous targeted measures have been identified and assessed within the Strategy, three opportunities in particular account for more than 90 per cent of the overall GHG reduction potential identified during the strategy development, including:

- Reduction of wastewater treatment process N_2O emissions – employing actual monitoring and mitigation versus current theoretical emission quantification methods;
- Wastewater thermal energy recovery from the collection system – utilizing recoverable thermal energy to support heating and cooling with potential of more than 40 MW of thermal capacity identified across the Regional network;[3] and,
- Upgrade of biogas to renewable natural gas (RNG) for grid injection - ability to meet all plant internal heating requirements and make supply available to displace conventional natural gas supplies at other Regional facilities or make available for marketing to outside entities.

The Strategy is a key roadmap towards improving energy efficiency and achieving measurable GHG emission reductions across Regional W&WW assets which will be incorporated into the Region's capital budget and nine-year capital forecast.

[3] For context, 40MW is equivalent to the electricity demand of approximately 2,500 homes.

2.6. Light-Duty Fleet Electrification Plan

In April 2023, Regional Council approved the Durham Region Light-Duty Fleet Electrification Plan which outlined preliminary target years for 100 per cent electrification by each of the Region's four fleet groups (paramedic services, police service, transit service, and public works). The Plan provides a high-level strategy for replacing the Region's existing light-duty fleet to low and zero carbon options, outlining the proposed number and level of EV chargers needed by facilities to support this transition. Implementation of this plan will require coordination between fleet and facility managers to ensure that there is adequate EV charging capacity at Regional facilities to support vehicle electrification.

Further discussion on progress on fleet electrification initiatives including the implementation of supporting EV charging infrastructure can be found in Section 5.3.2 g).

2.7. Durham Region Transit Fleet Electrification Plan

In 2022, Regional Council endorsed DRT's Electrification Plan to transition all fleet vehicles to zero emission technologies by 2037. The Plan includes a coordinated suite of initiatives including battery electric vehicles, charging equipment, and related electrical and depot maintenance facility infrastructure upgrades that sets the foundation for the transition to zero emissions vehicles and was dependent on the receipt of significant senior government funding.

Further discussion on the progress of DRT's Fleet Electrification Plan initiatives including the implementation of supporting EV charging infrastructure, facility upgrades, and bus procurement can be found in Section 5.3.2 g).

3. Scope of Energy Conservation and Demand Management Plan

The ECDM plan is a corporate-wide plan that focuses on energy and GHG emissions resulting from the Region's service delivery to residents and for which the Region has direct control over in its management (e.g., excludes contracted services). It does not include community-generated GHG emissions, or emissions that fall outside the geographic boundary of the Region. The Region utilizes several hundred facilities and corporate fleet vehicles to support the delivery of Regional services (including both Regionally-owned or leased facilities and/or fleets).

As noted in Section 2 above, Regional operations form a small portion of total community-wide GHG emissions, but assets under municipal control, such as those providing transit service, do have an impact on community-wide emissions.

An overview of Regional operations within the scope of the updated ECDM Plan is outlined in **Error! Reference source not found.**. This summary is an overview of corporate assets utilizing utility-billed energy as of year-end 2023.

Table 1: Regional Asset Profile by Operational Area as of Year-End 2023

Operational Area	Description
Child Care Facilities	Four Regionally-owned childcare centres with total combined gross floor area (GFA) of just over 18,100 sq. ft.
Transit Facilities & Fleet	Two Regionally-owned transit maintenance sites (includes multiple end-use accounts) with total combined GFA of just under 188,000 sq. ft.[2] 182 total fleet vehicles including 40-foot and 60-foot diesel buses and PHEV buses and light-duty non-revenue vehicles (includes four gas PHEV with remainder consisting of diesel and gasoline vehicles)
Paramedic Services Facilities & Fleet	Eight Region-owned stations (Headquarters (HQ) incl. Logistics Building) and three leased facilities with total combined GFA of over 76,500 sq. ft. 82 total ambulances and light-duty supervisory/emergency response/other vehicles (all gasoline with exception of one hybrid light duty vehicle)
Long-Term Care Facilities	Four Region-owned LTC facilities, total combined GFA over 717,000 sq. ft.
Social Housing Facilities	17 Durham Regional Local Housing Corporation (DRLHC) bulk-metered seniors' buildings (just under 600,000 sq. ft) and DRLHC family units in the City of Oshawa (over 388,000 sq. ft).
Works Depots & Fleet	Five Region-owned Works Depots with total combined GFA of over 145,800 sq. ft. (including salt/sand domes, sheds, etc.). Almost 400 total gasoline, diesel, hybrid and/or PHEV fueled vehicles (light, medium and/or heavy duty)[3]
Police Services Facilities & Fleet	Eight Region-owned buildings and twelve leased facilities with total combined GFA of over 478,000 sq. ft. (not including NextGen towers, related infrastructure, and associated loads) Almost 400 owned and/or leased marked and/or unmarked vehicles including 65 hybrid and/or full electric light-duty vehicles (remaining are gasoline, diesel, and other fuel e.g., marine)
Solid Waste Management Facilities	Five Regionally-owned locations with total combined GFA of over 37,000 sq. ft. (not including Materials Recovery Facility (MRF) or Durham York Energy Centre (DYEC) which are operated under contract). End-use accounts shared with Garrard Rd. Water PS and Reservoir.

Operational Area	Description
Regional HQ & Other Offices/Misc. Facilities	Seven Region-owned facilities, including Regional HQ and 101 Consumer Dr. facility (Health Protection and Traffic Operations) with total GFA of over 715,000 sq. ft. (not including the parking garage). Additional leased space for Health, Social Services, and other office spaces (several locations) with total GFA of over 114,000 sq. ft.
Traffic Signals	Almost 500 individually-billed traffic signal related accounts.
Water Supply	15 water supply plants and well systems, 20 water pumping stations, 19 water storage facilities and other miscellaneous vertical infrastructure.
Sanitary Sewerage	11 wastewater treatment facilities (including Duffin Creek WPCP), 55 wastewater pumping stations and other miscellaneous vertical infrastructure.

Notes:

- As per O. Reg. 25/23, energy reporting covers all energy usage for all Region-owned and leased facilities and includes corporate fleet fuel usage. Contracted services (including leased facilities and/or fleets) which the Region is not directly responsible for energy consumption and billing are not included. Fleets consist of on-road vehicles; fuel consuming equipment is not included in summary.
- Does not account for reduced available sq. ft. area due to fire at 710 Raleigh Ave. in August 2023.
- Works vehicles also include administrative/support vehicles for other Regional operations including courier and water billing services, LTC, Social Housing, construction services, plant, and traffic.
- Total infrastructure and assets in-service may vary at different time of year. Totals above coincide with year-end 2023 totals as reflected in the 2024 Asset Management Plan (Report #2024-COW-29).

4. Corporate Energy Consumption and Greenhouse Gas Emissions

4.1. Current Status

In 2023, Durham Region was billed for a gross total of approximately 1,520 megajoules (MJ) of energy (estimated 1,195 MJ net), which represents a gross billed cost of $48.4 million (including York Region share of Duffin Creek WPCP) and resulted in 56,200 tonnes of CO_2e (estimated 47,900 tonnes CO_2e net of York Region's estimated share of Duffin Creek WPCP) corporate energy related GHG emissions. This energy use and related GHG emissions are the direct result of critical services provided by the Region. Table 2 provides a breakdown of 2023 GHG emissions, energy, and cost by broad-class operating area.

Table 2: Breakdown of 2023 Gross GHG Emissions, Energy, and Cost[4]

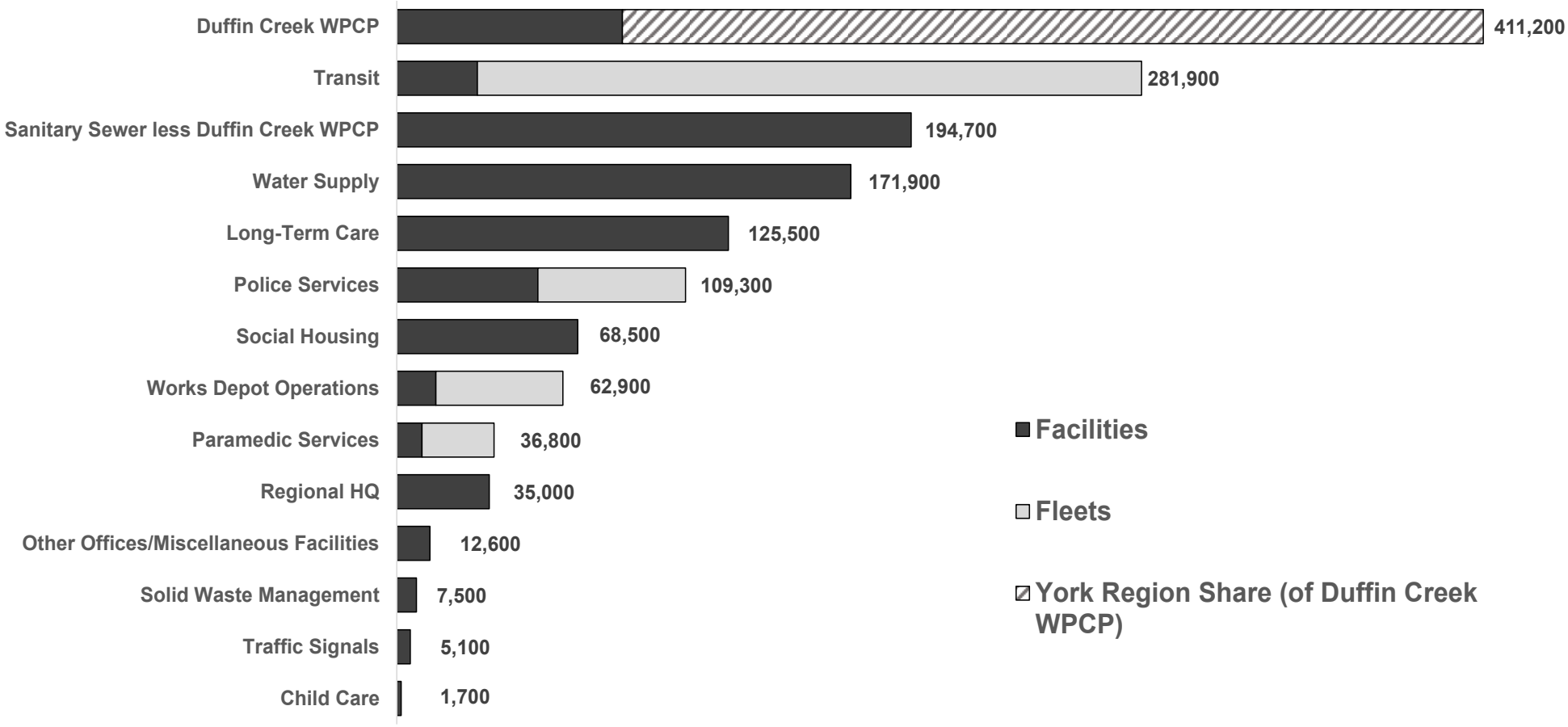
Source		GHG Emissions		Energy		Annual	
		Tonnes CO_2e	%	MJ	%	$millions	%
Buildings[5]		12,200	22%	359	24%	$9.3	19%
Transit Fleet		17,800	32%	251	17%	$10.9	23%
Non-Transit Fleet		9,300	16%	130	8%	$5.7	12%
Water and Wastewater Infrastructure		16,900	30%	780	51%	$22.5	46%
Gross Total		**56,200**	**100%**	**1,520**	**100%**	**$48.4**	**100%**
Estimated Net Total		**47,900**		**1,195**			

As noted in Figure 2 below, the Duffin Creek Water Pollution Control Plant (WPCP) represents Durham's largest billed share of total energy usage (gross billed, including York Region estimated share). Durham transit operations including both facilities and fleet energy usage are the next biggest share at 18 per cent (of gross billed totals) and sanitary sewer treatment operations (less Duffin Creek WPCP) and water supply represent 13 per cent and 11 per cent of gross billed energy, respectively. Following these, the next largest corporate energy users are long-term care buildings (8 per cent), the housing portfolio and police service offices (each 4 per cent), followed by Regional Headquarters (2 per cent).

Based on 2023 totals, fleet fuels as a whole represent approximately 25 per cent of the gross billed energy totals with transit fleet energy consumption representing approximately two-thirds of the fleet totals, followed by police service (15 per cent), public works operations (13 per cent) and paramedic services (7 per cent).

[4] Total costs are reported as gross and net of York Region's share of Duffin Creek WPCP apportioned according to co-ownership sharing arrangements. Totals may not add due to rounding.
[5] Buildings include traffic signals and lighting.

Figure 2: 2023 Energy Usage by Operational Area – Fleet and Facilities (Total MJ)



4.2. Historical Trends

The 2012 year was initially established as a baseline year for energy measurement in the Region's first ECDM Plan (2014 to 2019) and continues to be used to assess progress on energy consumption, cost, and associated GHG emissions over time. While the Region has previously only reported on facilities for prior ECDM Plan updates, given the growing interconnectedness of building and fleet operations with the planned electrification of corporate fleets, the Region has included data relating to its corporate fleets in this ECDM Plan update.

Figure 3: Gross Billed Facilities and Fleet Energy Costs and Usage (2012 - 2023)

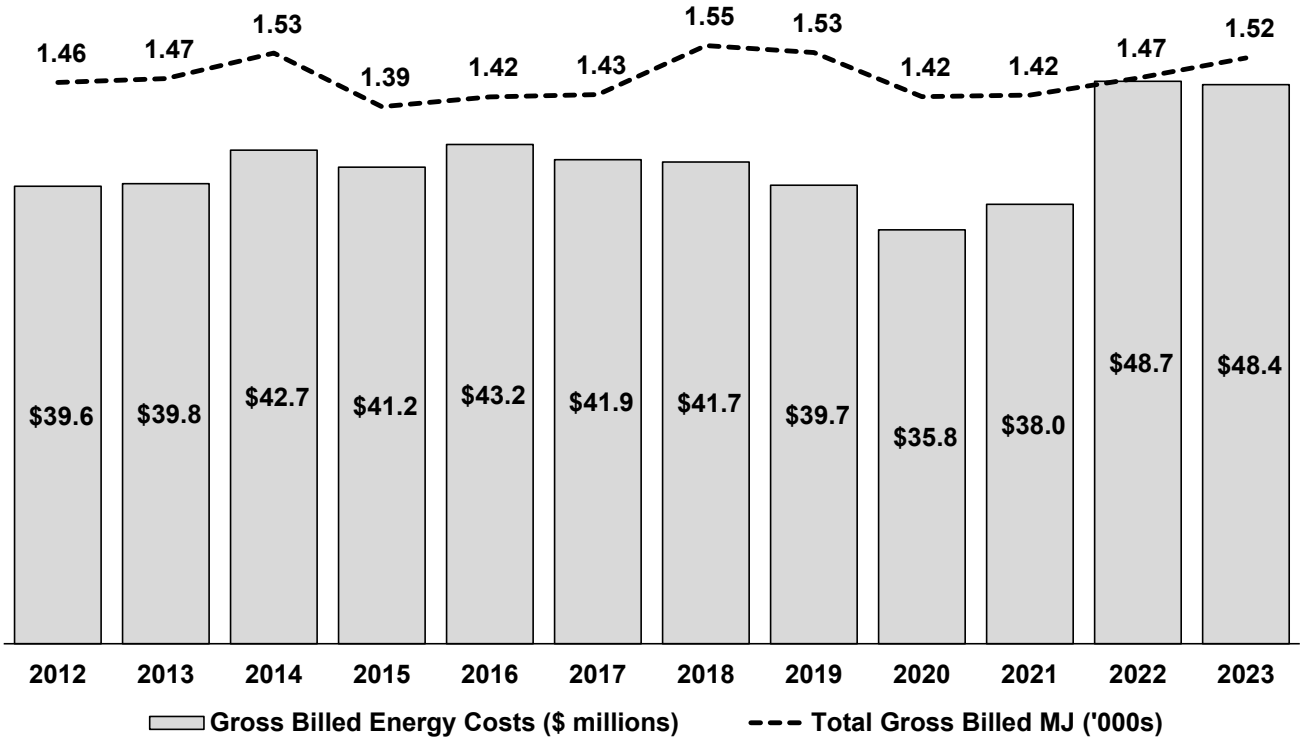
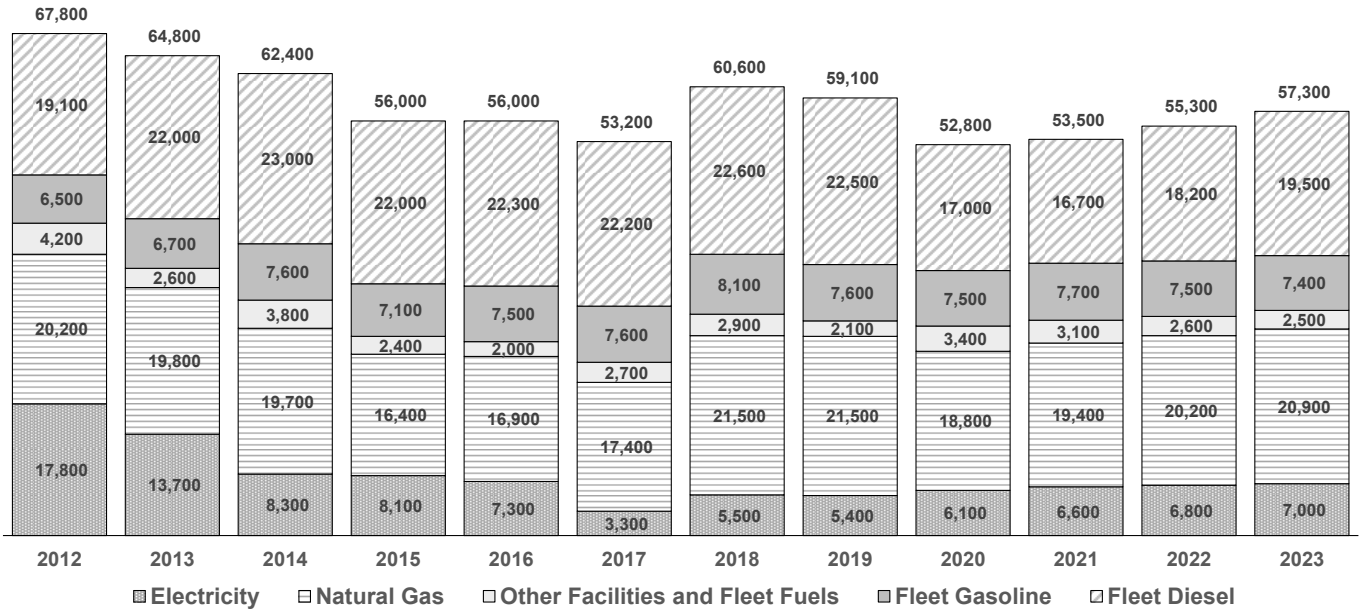


Figure 4: Gross Facilities and Fleet Emissions by Energy Type (2012 to 2023)



Additional technical metrics for energy performance and related costs over the 2012 to 2023 period are presented in Appendix A by operational program area.

5. Regional Progress in Alignment with Strategic Plans, Studies, and Directives

Regional staff continue to implement numerous technical measures and organizational improvements to enhance energy efficiency across program areas. The following sections outline the following:

- Progress made over the period of the prior ECDM Plan period as it relates to various organizational, behavioural, and technological initiatives;
- Corporate goals and objectives for energy efficiency for the 2024 to 2029 period;
- Progress underway to advance the revised goals and objectives; and
- Specific technical ECDM and related sustainability measures completed, underway, or planned.

5.1. ECDM Plan Organizational Measures: 2019 to 2024 Progress

Energy efficiency and conservation can be enhanced through organizational (e.g., policy, procedures), behavioural (e.g. awareness, engagement) and technical (e.g. equipment and/or digital control) initiatives. The 2019 to 2024 ECDM Plan identified several objectives and actions targeting behavioural and organizational elements. Table 3 provides a summary of some of the key areas of progress made in advancing energy efficiency. Refer to Appendix A for a list of technical measures completed through the course of the 2019 to 2024 ECDM plan (year-to-date) including proposed and/or planned near-term measures.

5.2. ECDM Plan Update for 2024 to 2029: Alignment with Corporate Sustainability Objectives

The ECDM Plan renewal has been developed through cross departmental and inter-disciplinary strategic consultations under the guidance of senior management. These included key personnel across major program areas plus feedback and guidance from the Facilities Decarbonization Functional Working Group (including input from the Green Fleet Working Group members) and the Corporate Climate Leadership Committee. The resulting goals, objectives, and actions in Table 4 target areas for improvement regarding behavioral and organizational elements and seek to ensure further alignment with current planning processes and overarching sustainability plans and strategies. Measures through asset management planning, studies, plans, audits, and assessments will be considered through annual Business Planning and Budget processes.

Table 3: 2019 to 2024 ECDM Goals and Objectives with Progress/Updates

Objectives	Progress/Updates	Challenges/Gaps
Goal 1: Formalize a corporate network that establishes clear lines of authority and accountability for energy management		
a) Establish a corporate energy network & organization chart, ensuring senior management involvement, communications, and support.	• Development of a Corporate Climate Governance and Management Structure, as outlined in Section 2.3, builds clearer lines of governance and internal accountability. • Corporate Climate Leadership Committee, consisting of senior level staff from across departments, meets quarterly to provide leadership, oversight, and direction. • Functional Working Groups established to provide subject matter input towards development and acceleration energy transition plans.	• Need to develop all remaining Working Groups and Implementation Team to support the framework. • Further work can be done to improve communications and information sharing between Working Groups, Implementation Team, and Leadership Committee. • Consider expanding participation on Working Groups across departments to highlight initiatives being implemented including operational strategies. • Ensure that energy management and GHG targets are embedded in all corporate plans and studies. • Need to launch a communication plan for energy management under the Implementation Team.
b) Establish energy user groups in key operational areas (e.g., HQ, DRPS, RDPS, LTC & DRLHC).	• Three Certified Energy Managers retained full time by the Region, supporting corporate energy and sustainability initiatives across all operational areas. • Energy Management Plans are now a required part of engineering design for vertical process infrastructure (e.g., water and wastewater treatment plants).	• Need to formalize energy user groups for access to utility platform, customize reporting, and training. • Need to create opportunities to showcase successes, discuss challenges/opportunities at operational level. • Need better lines of communication across operational areas to the Working Groups to discuss initiatives and challenges. • Operational areas have suggested potential for tenant engagement around energy conservation that may be integrated into current tenant fire safety meetings. • Opportunity to educate staff on energy efficiency, greenhouse gas calculations, energy reporting.

Objectives	Progress/Updates	Challenges/Gaps
c) Implement energy objectives through asset management / life-cycle planning, business planning, and budget processes.	• Corporate Strategic Asset Management (AM) Policy acknowledges the roles of the climate working groups in advising on the identification, assessment, and implementation on climate mitigation and adaptation measures. A key part of AM analysis and strategy development requires consideration of asset-related risk and resiliency. • Energy Management Plans are now a required part of engineering design for vertical process infrastructure. • Utility Platforms and energy reporting tools are inclusive of water consumption information for benchmarking. • Sustainability Office and Finance staff meet three times a year with Divisions to discuss GHG emissions across operations, planning, and future budget, providing support, and reporting. • Addition of climate lens to departmental Budget and Forecast templates to ensure climate evaluations are embedded in the development of current year budget and forecast submissions. • Green Fleet Working Group have added life-cycle costing into planning and replacement schedule, as per Light-Duty Fleet Electrification Plan.	• Need greater visibility and tracking of water usage by facility going forward. Historical water consumption cost and consumption data to be added to data platform. • Need to ensure that water conservation measures are applied through Durham Standard where fixture replacement and retrofits are undertaken. • Consider strengthening energy and GHG emissions in the AM Policy renewal. • Need to operationalize energy and GHG reporting through decision making, annual budget process, annual inventory update, and Council reports. • Need to improve project database sharing between design, capital, and operations staff for accountability, including finance & technical staff. • Need to tie energy and GHGs into AM and project planning at operational level. • Need to work to ensure cost estimates are accurate and reflect various energy efficient and low carbon options. • Continue to work to bundle more "related" work across the portfolio rather than piecemeal initiatives for greater efficiencies and savings. • Improve the development of AM and lifecycle plans with identifying cost savings by initiatives/project to validate projects that may have a higher upfront cost offset by operational savings.

Objectives	Progress/Updates	Challenges/Gaps
Goal 2: Enhance corporate energy awareness, education, and information sharing		
a) Formalize a process for the annual review, dissemination and coordination of capacity-building training opportunities, seminars, and subject-matter experts for staff.	• Annual review of energy and GHG emission reductions undertaken are tracked through carbon budgeting process and annual inventory update. • Working Group information sessions with guest speakers provide education on existing services. • Corporate communications focused on GHG-reduction initiatives through updates to senior leadership on key initiatives. • Staff continue to participate in training sessions including Envision, Energy Star Portfolio Manager, RetScreen, asset/energy management platforms, etc.	• Need to review roles and responsibilities for Communications Plan to be hosted by Implementation Team to cover all energy and GHG needs. • Need project delivery staff training focused on decarbonization technologies and systems.
b) Improve communication and recognition of achievements through establishment of an Energy Communications Plan.	• Funding opportunities shared with user groups for applicable projects. • Ongoing funding such as Enbridge Gas and SaveOnEnergy shared with Working Groups. • Development of W&WW GHG Management Strategy provides recommendations to communicate with external stakeholders and regulatory requirements.	• Communications and responsibility noted earlier. • Insider website no longer hosts energy data repository although same historical billing information made available to staff through utility platform. • Consider ways to better communicate energy performance of corporate operations to those not directly involved in Working Groups. • Consider enhanced web presence through corporate intranet and public-facing web interface. • Recognize successful initiatives and champion achievements at the staff level. • Assess opportunities for showcasing successful initiatives corporate-wide.

Objectives	Progress/Updates	Challenges/Gaps
Goal 3: Standardize approaches and continue integration of energy conservation into asset management, financial planning, and budget processes		
a) Develop more comprehensive process for analysis of energy baselines and the identification of viable opportunities.	• Region is completing comprehensive GHG Emission Reduction Pathways studies as noted in Section 5.3.1. • Durham Standard sets the minimum performance level required for capital projects, as noted in Section 2.4. • Durham Standard outlines processes to achieve the required performance at the lowest lifecycle cost. • Climate Mitigation and Environmental Initiatives Reserve Fund established in 2019 to further support energy and climate initiatives. • The Region has been successful in securing external funding and incentives to date and will continue to maximize funding opportunities in the future.	• Progress is being made through various operating divisions on development of comprehensive GHG Emission Reduction Pathway studies but full cycle of completion not yet achieved and no ASHRAE Level 2 or 3 audits in place for many of these facilities. • "Project-ready" list is frequently reviewed but challenging to maintain as projects in advance state of readiness often proceeding regardless. Shovel-ready project lists could perhaps be reviewed with frequency at Working Group meetings to ensure lists are up to date and reflect where background studies have been completed.

Objectives	Progress/Updates	Challenges/Gaps
b) Improve ongoing business case development through asset management planning.	• Durham Standard noted above. • GHG Emission Reduction Pathways findings will determine suitability for renewable energy systems and process to evaluate technical and financial feasibility. • Development of W&WW GHG Emissions Management Strategy involves the establishment of baseline GHG emissions for water distribution, wastewater collection and treatment processes applicable to Regional facilities.	• Resources and expertise of the Working Groups should be further leveraged where projects being investigated can be further discussed. • Challenges currently exist with developing business cases to support project budgets. Detailed assessment and options consideration at the design stages will identify energy savings to be included in business cases to support budget investment. • Development of GHG Emission Reduction Pathways will provide greater understanding of baseline conditions and impacts of various potential measures. However, the studies are still in early stages of development so the complete "road map" has yet to be fully developed. Once developed these "road maps" can be incorporated in future capital budgets and forecasts.
c) Continue development and implementation of appropriate standards and standardized processes.	• Durham Standard noted above. • Performance at the lowest lifecycle cost through Durham Standard noted above.	• Durham Standard still requires the development of a Renewable Energy Plan. • Findings of the GHG Emission Reduction Pathways studies will determine suitability for renewable energy systems and establish evaluation of technical and financial feasibility options.

Objectives	Progress/Updates	Challenges/Gaps
Goal 4: Enhance energy monitoring, performance measurement, and reporting		
a) Improve building and equipment performance monitoring capabilities.	• Continued migration of energy sub-metering systems for water and wastewater vertical infrastructure and HQ to a single web-based platform: o Two-thirds of sub-meters on platform; o staff can access data for facilities; o one sub-meter for all vertical infrastructure; o now applied to all new vertical infrastructure and retroactively to existing facilities as upgraded. • Access to online portals through Local Distribution Companies (LDCs) provide access to interval metered commercial accounts. • Region reports annual energy benchmark reporting through Energy Star Portfolio Manager. • Migration of corporate energy billing data to secure cloud-based platform which is an add-on to the Region's existing Building Condition Assessment & AM software. • Works Facilities Maintenance staff continuously improving centralized building automation systems (BAS) diagnostic functions.	• Currently sub-metering system does not contain sub-metering for significant natural gas loads. Continue investigating this option. • Currently sub-metering on centralized systems is not available beyond HQ and in-service water and sewer accounts. Continue investigating this option. • Utility-based portals not always inclusive of all accounts greater than 50 kilowatts (kW) and method of access not through centralized single portal. • All hourly, daily, and monthly billing data will not be available through a single centralized source, as this function is not available on utility platform. • Water consumption data is not yet included in Utility Data for Regional facilities. Consumption metrics still require development. • Compliance-driven requirements may on occasion conflict with energy conservation ambitions and can be subject to change.

Objectives	Progress/Updates	Challenges/Gaps
b) Implement energy targets and performance measures.	• CCAP established GHG emission reduction targets as presented in Figure 4. • Durham Standard includes minimum targets for performance around GHG and energy usage. • GHG Emission Pathways Studies will present recommendations for net zero operations in corporate facilities. • As noted in Goal 3, the GHG Emission Reduction Pathways studies are instrumental in creating the roadmap to transitioning facilities to Net Zero. • Annual energy reporting through Energy Star Portfolio Manager has the ability to benchmark against municipal peers through open data format. • W&WW GHG Emissions Management Strategy will provide recommendations for systems improvements to reduce GHG emissions from the operations and processes as well as recommend a long-term strategy around biogas usage, other green alternatives, among other considerations.	• Specific energy performance metrics have not yet been established, as the comprehensive Pathways roadmap is the next step on building a holistic plan for facility decarbonization. • Need to develop a process to separate the effects of fleet electrification from facility operations to benchmark consumption by facilities versus fleet. • With changes in operations and patterns of occupancy across Regional facilities including a hybrid work model and continued movement to modernized workspaces, further review and assessment of building utilization levels will be needed to evaluate building performance and overall space requirements. • Considering alternative metrics to provide added context to energy intensity by facility and performance over time (e.g., energy use intensity (EUI) using per occupant metrics by facility).

Table 4: Updated 2024 to 2029 ECDM Goals and Objectives

Goals	Objectives
Goal 1 - Governance: Further strengthen the established corporate governance framework to ensure clear lines of oversight, accountability, and financing for implementation of energy and GHG emissions management initiatives	• Continued engagement of corporate leadership at Commissioner/Director level through Corporate Climate Leadership Committee (CCLC), Implementation Management Team, and Working Groups. Establish the mandate and terms of reference for new Working Groups, not yet active. • Work towards development and tracking of suitable department and CCLC-endorsed energy, water, and GHG performance targets by operational area and at suitable asset sub-levels, particularly LTC. • Ensure relevant energy and GHG-related key performance indicators (KPI) for facilities, fleet, W&WW operations, and that they are available and considered as part of regular program-level reviews and performance measurement. • Support decision making, effective oversight, and direction on energy, water, and GHG initiatives, improve annual data collection and identify and address gaps such as the need for supporting studies. • Improve the carbon forecasting process with access to improved energy and GHG estimation methods and available information obtained through supporting studies/plans. • Where appropriate, continue to leverage the Climate Change Mitigation and Environmental Initiatives Reserve Fund for project start up and matching funding opportunities. • Staff will continue to apply for external funding and incentives to maximize funding opportunities for regional projects including utility-based grants and incentives (e.g., Enbridge Gas demand side management (DSM) programs, IESO SaveOnEnergy incentives) and grant and program financing options available through levels of senior government. • Opportunity to improve leveraging of internal resources such as: o BAS support from Facilities Management for LTC, o energy managers to engage with Facilities staff for grant incentive eligibility and funding applications, o expansion of sub-metering capabilities for facilities, o consolidation of metering into a centralized server for improved access to real time data.

Goal 2 – Education and Knowledge Mobilization: Enhance corporate energy awareness, education, and information sharing within and across operational areas	• Establish an Energy Communications Plan that utilizes channels for communication to highlight corporate initiatives, lessons learned, successes in energy management, and climate mitigation efforts. • Formalize a process for the annual review, dissemination, and coordination of capacity-building training opportunities and seminars for staff including presentation and supply of relevant materials and information by subject matter experts. • Leverage available grant funding opportunities to support education and training opportunities. • Improve communications and recognition of achievement through communicating energy strategies, successes, and sharing of knowledge throughout the corporation. • Improved department-wide awareness of available grant/funding opportunities to support energy, water, and GHG-related initiatives (along with continued maintenance of eligible, shovel-ready projects). • Develop energy and water consumption dashboards for the utility platform with associated training for facility managers, operators, frontline, and finance staff to raise awareness of facility data, costs, and GHG emissions. • Develop a Policy and Standard for Sustainable Infrastructure Design for linear assets. • Support divisions in developing tenant engagement and awareness campaigns to help encourage positive behaviors around energy and water consumption. • Create an energy managers community of practice that connects staff across the MUSH (municipalities, universities, school boards and hospitals) sector to share lessons learned on energy efficiency through the implementation of the Durham Greener Buildings program.

Goal 3 – Process Management: Continue to standardize approaches to further integrate energy conservation and climate mitigation and adaptation considerations into asset management, project scoping and implementation, business planning, and budget processes.	• Develop more comprehensive process for analysis of energy baselines with development of relevant asset and sub-asset level KPIs for facilities and fleets supported by key studies. • Once GHG Emissions Reduction Pathway studies are complete, need to develop a comprehensive asset-level roadmap across portfolios for the purpose of developing potential financing strategies and integrating this work into the Region's capital budget and nine-year forecast. • Work towards integration of initiatives identified in the W&WW GHG Management Strategy into the business planning and budget process. • Improve on department-level business case development for projects with establishment of common inputs and financial performance indicators including rates of return, paybacks, energy input assumptions. • Work to ensure project costing estimates are reflective of newer and sometimes more complex technologies. • Develop a sustainable infrastructure design policy and standards for linear assets including transportation, W&WW, and waste management projects and facilities. • Improve linkages between design, capital, and operations staff including among multiple user groups inclusive of fleet for new construction and major renovations of facilities. This will include enhanced collaboration with respective LDCs. Ensure AM process and life-cycle costing considers complete cost of ownership with consideration of climate change mitigation/adaptation implications on a life-cycle basis. • Continue the implementation of Durham Standard-defined processes for project evaluation. • Establish inter-departmental working group to develop a Renewable Energy Generation and Carbon Offsets Purchasing Procedure/Policy (as recommended in development of Durham Standard).

5.3. Corporate Initiatives Underway

The following sub-sections outline key areas of focus and related progress being made in alignment with the strategic plans, initiatives and directives as outlined throughout Section 2.

5.3.1. Building Retrofitting & GHG Emissions Reduction Pathways Studies

Regional staff have initiated comprehensive GHG Emission Reduction Pathways Studies for all non-water supply and sanitary sewer (process-related) facilities which will provide a comprehensive road map to achieving net zero GHG emissions. The studies will include the development of detailed energy modelling including a baseline "business-as-usual" model and net zero GHG outcome model and will recommend technology options, assess available electrical grid capacity and potential limitations, provide schematic designs in addition to preliminary cost estimates by initiative. The GHG Emission Reduction Pathway Studies will also assess the need for facility recommissioning where a facility has experienced significant operational changes over time (e.g., Long-Term Care facilities due to operational adjustments brought forward due to new and/or amended Ministry regulations). Through a 20-year implementation plan, the detailed studies will outline the technical measures and operational strategies to take the Region's facilities to net zero GHG emissions, including assessing potential for on-site renewable energy generation opportunities. Once completed, the implementation plans will be incorporated into future capital budgets and forecasts.

5.3.2. Energy Generation and Energy/Carbon Offsets

As outlined within the Durham Community Energy Plan (DCEP), energy generation and the ability to displace the need for higher GHG-emitting energy sources plays a crucial role in advancing corporate and community climate goals. The following sections outline related work to-date across corporate operations.

a) Solar Photovoltaic Technologies

The Region has experience with rooftop solar photovoltaic (PV) systems where current Regional applications to-date have been operating under IESO microFIT power purchase agreement (PPA) contracts. Details on the existing rooftop solar PV systems are shown in Table 5.

Table 5: DRLHC Rooftop Solar PV System Performance Summary

Location	Generation Capacity	Date of Operation	Contract Rate (/kWh)	Contract Expiry	Performance (Up to April 2024)
Bowling Green Towers, 850 Green St. Whitby	10 kW capacity	August 2011	$0.802	August 2031	Cumulative 165,000 kWh generation to grid; PPA revenues of almost $131,800
King Charles Court, 155 King St. E, Oshawa	10 kW capacity	April 2013	$0.549	April 2033	Cumulative 117,000 kWh generation to grid; PPA revenues of over $61,500
Dean Heights, 439 Dean Ave., Oshawa	10 kW capacity	April 2013	$0.549	April 2033	Cumulative 117,000 kWh generation to grid; PPA revenues of over $61,600
Windsor Place, 315 Colborne St. W, Whitby	10 kW capacity	April 2013	$0.549	April 2033	Cumulative 122,000 kWh generation to grid; PPA revenues of over $64,000

Prior to the expiry of the PPA contracts, the Region will assess opportunities to repurpose the rooftop solar PV systems to operate under a net metering or a behind the meter configuration to assist in offsetting site electricity usage to help further lower utility costs and associated GHGs.

As of the date of this updated Plan, the Region is also developing two new rooftop solar PV systems, consisting of:

- ~59 kW rooftop solar PV system for the new Seaton Paramedic Station and Training Facility in Pickering which will operate under a net metering configuration; and
- ~140 kW rooftop solar PV system for the new Beaverton Supportive Housing facility which will operate under a net metering configuration where it is estimated that up to 50 per cent of the building's electrical load requirements will be met by the generation system (with net building energy requirements being met solely by electricity).

Staff are also assessing opportunities to install rooftop solar PV systems at Fairview Lodge Long-Term Care home and at Regional Headquarters where detailed costing and engineering work has been undertaken for the sites. In addition, there may be opportunity for a rooftop solar PV system for the Traffic Operations/Health Protection facility located at

101 Consumers Dr., Whitby, subject to further review and assessment of feasibility following the deep energy retrofit measures underway through the facility optimization and modernization work.

Additional investigative work in assessing solar PV generation opportunities using established screening and evaluative criteria is to be undertaken as part of the Durham Standard, as outlined in Section 2.4.

b) Durham York Energy Centre

The Durham York Energy Centre (DYEC) produces energy from the combustion of municipal solid waste (MSW). The facility has a gross electrical output of up to 17.5 MW of electricity and a net output of ~14 MW, where ~2 MW are used to power internal DYEC operations. The remaining electricity, sold back to the grid through the IESO, is enough to power approximately 10,000 homes per year. From the date of operations until end of April 2024, the DYEC has generated in excess of 837 million kWh of electricity to grid and provided over $69 million in revenues paid by the IESO through Hydro One Networks to offset the costs of waste processing and is shared with York Region.

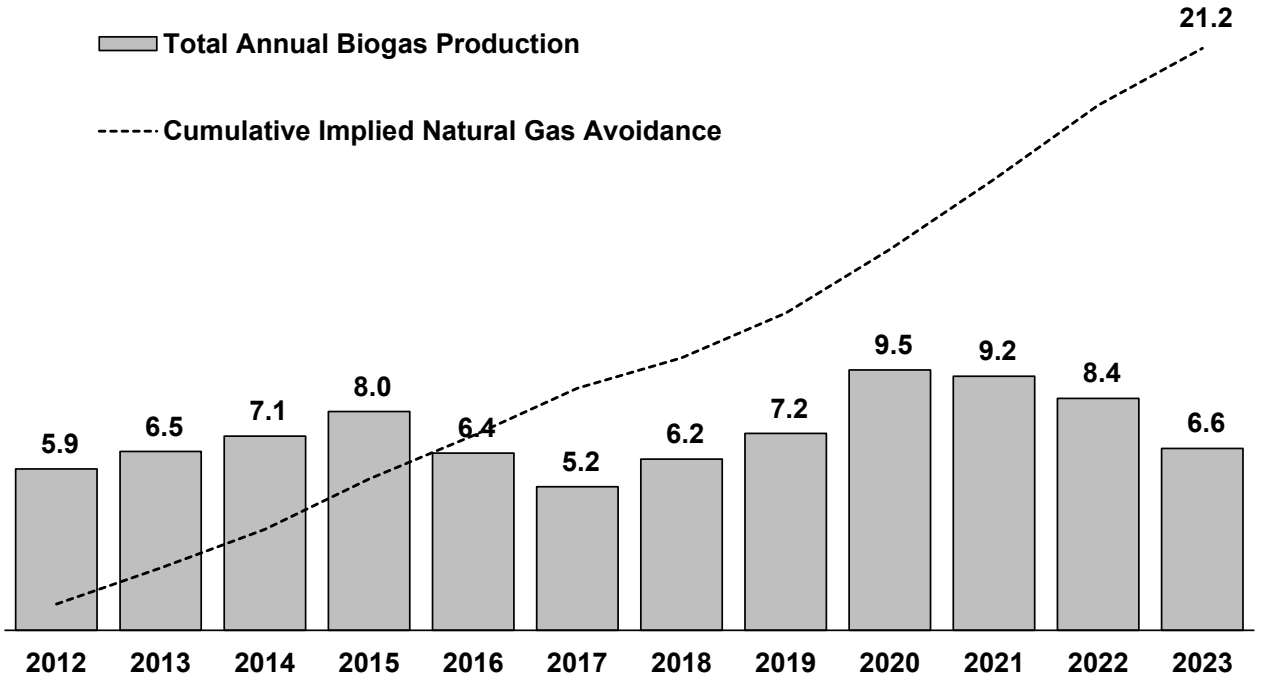
The DYEC, with limited infrastructure investment, has the technical capability of supplying a portion of its steam output to support a District Energy (DE) system (a centralized thermal energy supply) for adjacent residential and commercial end-use customers for their domestic space and water heating requirements. Through Report #2024-COW-1, Regional Council endorsed in principle the concept of a DE system in the Courtice Transit Oriented Community (CTOC) that leverages waste heat from DYEC. As of the date of this Plan, further work continues to assess ownership and delivery models, work to integrate DE concepts into the CTOC Secondary Plan, assess external and senior government funding/grant sources to support the project and update the preliminary business case. Furthermore, potential synergies with major end-users (e.g., Courtice WPCP) may assist in avoiding conventional natural gas use for heating requirements in the future (or create opportunity for RNG production which can be injected into the natural gas distribution system and utilized in Regional facilities and/or used for beneficial use elsewhere).

c) Biogas Production, Utilization, and Upgrading Opportunities

Digester gas (biogas) is a by-product of the AD process at secondary wastewater treatment facilities and is utilized in dual-fuelled boilers for process and internal heating purposes at several Regional wastewater treatment plants. To-date, digester gas has served to materially displace site natural gas usage, decrease flaring requirements, and reduce energy costs and associated GHGs through a self-produced renewable energy.

Figure 5 shows implied natural gas avoidance across the Region's five wastewater treatment facilities that produce digester gas (including Duffin Creek WPCP). It is estimated that from 2012 to 2023 (inclusive) over 21 million cubic metres of cumulative natural gas usage has been displaced or avoided as a result of the utilization of biogas in plant processes (i.e., dual-fired boilers) which equates to ~36,800 tonnes of CO_2e avoidance.

Figure 5: Wastewater Plant Biogas Production and Implied Natural Gas Avoidance (millions of cubic metres (m3))



While GHG and energy cost avoidance from displaced fossil fuels is notable, there remains potential to further biogas utilization opportunities given an average of almost 60 per cent of all raw biogas produced across all five wastewater treatment plants is flared. Staff recognize the potential for this renewable energy source and have completed several key studies which have assessed biogas utilization options for Regional wastewater facilities, including:

- Courtice WPCP Integrated Resource Recovery (IRR) Phase 2 Study - completed in August 2020 and built upon the work of the prior Phase 1 Study (completed July 2017). It reviewed, among other initiatives, pre-digestion pre-treatment processed to increase overall biogas production to offset conventional energy sources (contingent on an optimal biogas utilization strategy being in place);
- Duffin Creek WPCP Integrated Resource Recovery (IRR) Study - completed August 2021, the study assessed the technical and financial viability of several shortlisted opportunities including, but not limited to, AD gas biogas purification to RNG for injection into the Enbridge Gas distribution system for marketing and/or internal use at Regional facilities; and
- W&WW GHG Emissions Management Strategy - April 2024, the study (as outlined in Section 2.5) built on prior IRR studies and assessed biogas optimization strategies to enhance production and utilization of RNG for self-consumption and/or market excess production (may also consist of separately marketing the physical commodity and the associated environmental attributes).

Based on the anticipated biogas production from the Region's wastewater facilities, including Duffin Creek WPCP, there is potential to generate sufficient RNG to offset all on-site heating requirements. There are also sufficient additional volumes that could be used to offset conventional natural gas usage at other Regional facilities through the Region's managed natural gas pool (see Section 5.3.2 f) for more details). In addition, there may be opportunities to further increase overall RNG output and GHG reduction potential should the Region's RNG development program be combined with additional strategies, including but not limited to, thermal hydrolysis pre-treatment and/or on-site sewer thermal energy recovery.

Biogas upgrading to RNG, and injection initiatives are being planned within the Region's current 10-year capital program for wastewater services (i.e., Duffin Creek WPCP) and similar initiatives for the remaining plants will be assessed for potential future implementation.

There may also be opportunities for production of RNG through organics processing in the future. Following Regional Council's decision to pause the procurement process for the Mixed-Waste Pre-Sort and Anaerobic Digestion (AD) Project in June 2022, staff developed an Organics Management Plan, endorsed by Council in March 2023 (Report #2023-WR-3). As noted in Report #2023-WR-3, the next steps to move the Region's organics management plan forward comprise of short- and long-term processes. The short-term process provides operational continuity by securing third- party organics processing capacity at a suitable AD facility beyond the end date of the current organics processing contract of June 30, 2024.

The long-term process focuses on the future viability of the Region's AD Project. Regional staff will monitor the performance of the short-term organics management plan and adjust the long-term organics management plan requirements as appropriate. A future AD facility may provide additional opportunities for RNG production, whether for internal use and/or external marketing opportunities.

d) Geothermal Systems

Geothermal systems are technologies which harness heat within the earth for heat or to generate electricity, heating and/or cooling. Geothermal systems are a renewable energy source which can provide a sustainable baseload energy supply with low GHG emissions. The Region is proceeding on work utilizing geothermal technology as part of two new construction projects:

- Seaton Paramedic Station and Training Facility (Pickering) - includes a geothermal system that will provide heating and cooling for the building. Combined with a solar PV, this facility will effectively be a zero-carbon building (anticipated 2024 completion); and
- Clarington Police Complex Phase 2 (Clarington) - designed to include a geothermal field for heating and cooling although the facility will maintain natural gas service as backup for emergency redundancy (anticipated March 2025 completion).

While the technology yields notable potential, the opportunities for geothermal systems may be limited due to site-specific considerations (e.g., geotechnical factors) and the significant upfront cost. However, as noted in Section 5.3.2 e), renewable energy resources will be investigated as part of the Durham Standard and implemented based on site suitability and technical and financial feasibility.

e) Durham Standard and Development of a Renewable Energy Generation Plan

Although the Durham Standard does not directly prescribe renewable energy for new facility development, it does offer targets that can be used in facility design that, in principle, cannot be achieved without some sort of onsite generation:

- Total energy use intensity limit of 100 ekWh/m^2 and thermal energy use demand intensity of 30 ekWh/m^2;
- 50 per cent energy use intensity improvement over Ontario Building Code SB-10;
- Passive House Certification; or
- Canada Green Building Council Zero Carbon Building Certification.

Going forward, the Durham Standard will also involve the development of a Renewable Energy Generation Plan which will include a number of activities, including but not limited to the review of Regional assets to identify the potential for solar, geo-exchange, and RNG generation based on location characteristics, as part of, or coordinated with, the facility-level zero-carbon planning process. This will include consultation with LDCs to determine available energy distribution/transmission system capacity. Assets with high potential (e.g., structural loads, existing power capacity, etc.) will be further assessed for project viability.

The Plan will also outline the process for developing supporting business cases and potential procurement methods, financing options, investment criteria and propose a program implementation strategy (with consideration of appropriate timing for installation, alongside other concurrent asset renewal and related activities).

The Durham Standard recommends the establishment of a cross-departmental working group to develop the procedures for this initiative where it is envisioned that the findings and recommendations of the GHG Emission Reduction Pathways Studies will be leveraged to help identify suitable renewable energy generation opportunities across Regional portfolios.

f) Durham Standard and Energy/Carbon Offset/Credit Policy

The Durham Standard also recommends the development of a corporate policy and process for retaining energy and/or environmental attributes and related credits/offsets which will allow for the potential marketing of excess attributes and related credits/offsets in the future. Appropriate protocols and processes for accreditation and 3rd party verification will need to be established in order to ensure credibility of such instruments and the energy and/or reductions/avoidance they are associated with. Opportunities in this area may include, but are not limited to, credits created from

avoided methane emissions in landfills, and attributions associated with the production of RNG.

As part of developing an overarching corporate policy and process for retaining energy, environmental attributes and related credits/offsets, staff will need to identify potential initiatives for which the Region may wish to retain such instruments which could include collaboration on community-based waste heat recovery projects, support for residential and/or commercial retrofit activities and certain contracted services (e.g., waste collection services). Staff will also consider areas where such instruments may be retained to offset corporate GHG emissions.

g) Fleet Decarbonization Initiatives

As previously noted, given the growing interconnectedness between building operations and fleets (whether for public and/or for corporate fleets) with increased electrification, the undertaking of the Region's corporate ECDM Plan must now consider the planning of building and fleet assets and supporting infrastructure in a holistic manner where close collaboration must be undertaken with LDCs to understand system capacity availability.

To-date, notable progress has been made towards the implementation of EV chargers to ensure the necessary infrastructure is in place to align with the procurement of vehicles reliant on the chargers. As of the date of this ECDM Plan, the Region has been successful in securing several rounds of funding under Natural Resources Canada's (NRCan) Zero Emission Vehicle Infrastructure Program (ZEVIP) which has, and continues to support, the planning and delivery of numerous EV chargers Region-wide.

Through collaborative submissions with local municipal and other broader public sector (BPS) partners, the Region itself has been approved for over $1.5 million in federal funding which, upon completion of all installations, along with previously installed chargers (non-ZEVIP supported installs), will see a network of over 140 total Level 2 and Level 3 chargers across Region-owned facilities to support a combination of public and/or corporate fleet charging activities. Additional details regarding specific locations of EV charger installations can be found in Appendix A.

Going forward, the Durham Standard will require that EV charging equipment be provided for a minimum of 30 per cent of total parking spaces while providing electrical rough-ins for remaining spots to accommodate future charging infrastructure. Furthermore, to reduce single occupant vehicle trips, the Durham Standard notes that if providing more than the minimum parking required under the Zoning By-law, the excess spaces must be dedicated priority parking spaces for low-emitting vehicles, carpooling/ridesharing and/or for publicly accessible spaces dedicated to shared vehicle systems such as carsharing, ridesharing, or micro-mobility systems.

As it relates to corporate light-duty fleets, as noted in Section 2.6, the Region has completed and adopted a Light-Duty Fleet Electrification Plan. The plan sets out the required number and type of EV chargers needed to support the integration of plug-in

hybrid EVs (PHEV) and full EVs for corporate fleet. Preliminary targets are for 100 per cent light-duty fleet electrification by operational division. A plan for conversion or replacement of non-transit medium- and heavy-duty fleets will be developed in the future, as suitable technology options become more readily available.

Specific to DRT service, as noted in Section 2.7, the DRT Fleet Electrification Plan includes numerous initiatives what will assist in transitioning the fleet operations to net zero GHG. Near-term initiatives to advance this program include:

- DRT's E-Bus Pilot is partially supported by Infrastructure Canada's Canada Community-Building Fund (CCBF) funding, where $12.1 million will fund the purchase of six battery electric buses (delivery is expected by mid-2024) and associated charging infrastructure. The Region is also leveraging the expertise of EnerForge, the non-regulated arm of local utility OPUC, to deliver the installation and support the ongoing maintenance of the pilot charging infrastructure being installed at DRT's 710 Raleigh Ave. maintenance depot facility;
- Partnering with the Canada Infrastructure Bank (CIB) to secure low-interest debt financing to support the incremental purchase cost of up to 98 battery-electric buses. Repayment of the loan will be sourced from anticipated savings realized from reduced maintenance and fuel costs over the life of the electric buses (compared to conventional diesel buses); and,
- Planning the design and construction of a new flagship net zero GHG transit operations and maintenance facility at 2400 Thornton Rd. in Oshawa, capable of hosting a fleet of zero emission vehicles.

While not related to fleet electrification, staff are investigating a potential pilot on the use of renewable diesel as a seasonal alternative for medium- and heavy-duty fleet vehicles, excluding winter periods. A non-binding Request-for-Information (RFI) was undertaken in the Fall 2023 to assess market opportunities and understand the range of product offerings from various vendors as well as associated environmental benefits and potential operating implications. Renewable diesel is a cleaner, green fuel, which could potentially reduce GHG emissions from summer diesel by 60 per cent or more on a life-cycle basis. Potential cost implications continue to be assessed considering price premiums and potential exemptions on applicable carbon fuel surcharges.

Regular updates on the progress of Light-Duty Fleet Electrification Plan implementation (including replacement of the existing internal combustion engine fleet vehicles, DRT electrification initiatives and other fleet decarbonization initiatives) will be provided through annual CCAP reporting to Regional Council.

5.3.3. Energy Procurement and Commodity Management

Aside from the implementation of technical measures and operational strategies aimed at improving asset performance and reducing energy costs, GHG emissions and optimizing

overall total cost of ownership, the Region is actively managing its utility accounts to mitigate price risks and provide enhanced degrees of budget predictability.

a) Commodity Cost and Utility Rate Structure Management

The Region (including DRLHC) has over 700 electricity end-use accounts across OPUC, Elexicon Energy and Hydro One Networks and over 450 natural gas end-use accounts with Enbridge Gas (accounts partially or fully active in 2023). Given the complexities in managing various account structures and to assist with Regional rate structure and price hedging strategies, the Region also retains the services and support of energy advisors to provide market intelligence (e.g., budget forecast support, regulatory updates, and administrative support for the Region's energy end-use accounts.

Examples of electricity management strategies can, where beneficial, include hedging and Regulated Price Plan (RPP) strategies and Industrial Conservation Initiative (ICI) Program support (including peak demand curtailment notifications)

Most of the Region's natural gas accounts (except DRLHC accounts) are managed under a Direct Purchase Agreement (DPA) framework with Enbridge Gas. This allows the Region, supported by its natural gas advisor, to manage the physical commodity portion of the Enbridge natural gas bill. Governed by Master Service Agreements (MSA) with Enbridge, all nominations, balancing and management of physical balances (Banked Gas Account) are undertaken through the Entrac portal system. Base supply agreements with pre-qualified natural gas suppliers ensure a competitive process for natural gas purchases.

The base DPA framework also enables the utilization of future self-produced and/or externally procured RNG at Regional facilities. To further the Region's understanding of RNG supply opportunities, in early-2023, the Region completed a non-binding RFI to understand potential opportunities for direct procurement of RNG supply for use within the Region's managed pools (as well as term, volumes, pricing, etc.) and to understand RNG marketability and pricing arrangements should the Region eventually produce its own RNG.

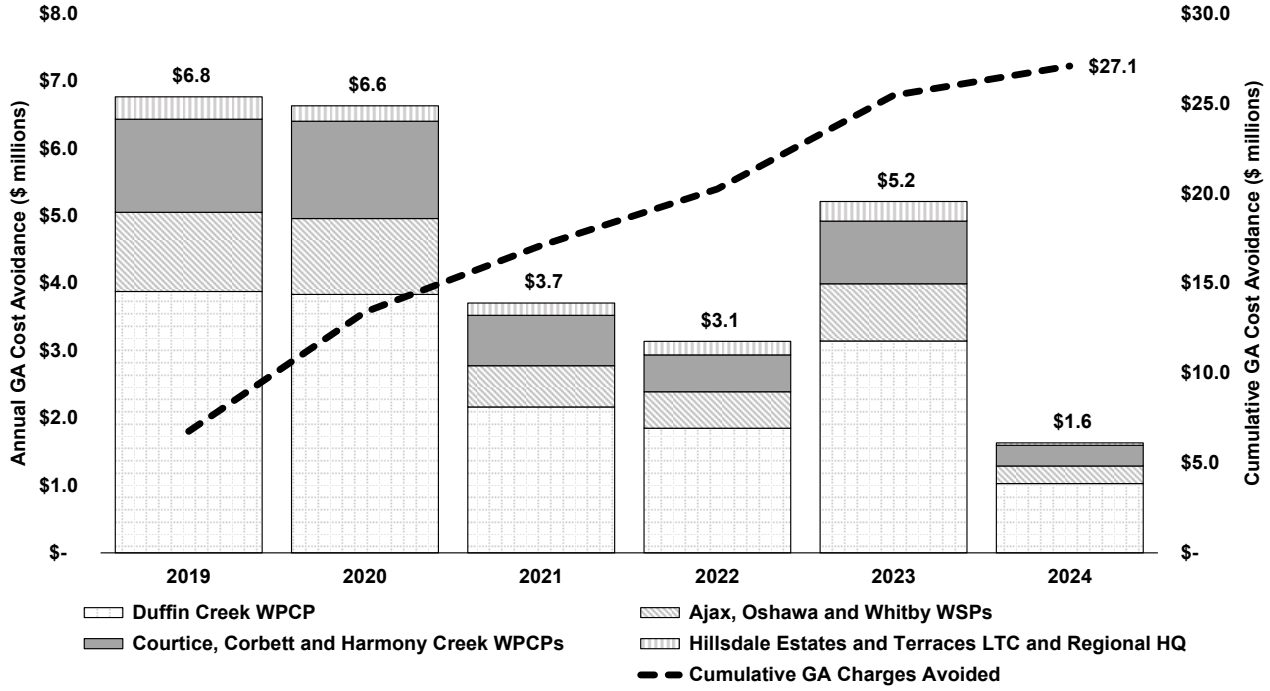
DRLHC natural gas accounts are billed according to default Enbridge system gas rates or are enrolled in the Housing Services Corporation (HSC) natural gas bulk purchase program (mainly family units in the City of Oshawa). The Region is regularly provided with program price and term options for managing the commodity and transportation portion of the invoice.

5.4. Additional Electricity Demand Management Initiatives

The Region has been an active participant in the IESO's Industrial Conservation Initiative (ICI) program. Per Ontario Regulation 429/04 under the Electricity Act, 1998, customers who participate in the ICI program (classified as Class 'A' customers), pay the Global Adjustment (GA) charge based on their percentage contribution to the top five peak Ontario demand hours (i.e., peak demand factor) over a 12-month base period. Remaining Class 'B' customers continue to pay the GA charge on a kWh-basis intended to recover the balance of GA-related costs among the rate-base.

The Region currently has eleven accounts with a Class 'A' designation (all generally 1 MW or more or aggregate to 1 MW threshold) under the ICI program for the purposes of determining GA costs. To-date, the Class 'A' designation has applied to various Regional accounts since July 1, 2017, and more specifically, has been applicable to the Duffin Creek WPCP Sub 2/1 account since July 1, 2015. As shown in Figure 6, to-date the Region has benefitted significantly from ICI program participation, where it is estimated that from January 2019 to the end of April 2024, the Region has avoided over $25.7 million in GA charges.

Figure 6: Regional Industrial Conservation Initiative Cost Avoidance Summary



To the extent that fleet electrification (e.g., electrification of bus fleets) and fuel switching of building fuel systems (e.g., switch to electric boilers, non-gas heat pumps, etc.) adds to facility electrical demand, there is an increased likelihood of account eligibility and greater participation in the ICI program, which may alter utility cost structures and approaches to managing building operations. The Region currently coordinates peak demand reductions during system-wide peak periods with the support of IESO market data and recommendations from our electricity advisor. Going forward the Region may consider the viability of leveraging renewable energy generation, storage infrastructure and/or strategic management of operations/loads to maximize the potential financial benefits of Class 'A' eligibility.

5.4.1. Performance Monitoring and Reporting

To further drive energy conservation, the Region has been working to improve access to utility billing data including consumption and cost, to improve the reporting and visibility of energy information and proactively identify trends and identify operational issues.

a) Energy and Water Consumption and Cost Data Tracking and Reporting

In 2023, the Region procured a third-party cloud-based, secure energy and sustainability data tracking platform. It will provide staff access and track relevant energy and water consumption and cost data over time, benchmark industry targets, identify potential savings opportunities, and create customizable reports. The platform will also allow staff to create consumption baselines and cost avoidance reports using built-in weather normalization features and allow for assessment of GHG emissions.

With broad rollout of the dashboard, training and the ongoing development of customized dashboards and reports, staff envision this platform will provide greater opportunities to monitor utility consumption and drive energy management improvements. There is also flexibility to extract and export data for the Region's annual energy and GHG reports, including through Energy Star Portfolio Manager (ESPM), in compliance with O. Reg 25/23 under the *Electricity Act*.

b) Real-Time Power Monitoring and Sub-Metering

Power meters provide granular, real-time (and historical) power data to any user who has access to a corporate computer and the applicable vendor web application. Power data may be used by any Regional staff member to gain valuable insights into facility operations. The data can also support the implementation of energy saving measures, determining requirements for existing facility upgrades, and settling billing discrepancies with electrical utilities. As most power meters have the ability to detect and log power quality issues, facility managers and operations staff have the ability to identify whether the power issues are coming from the LDC side or whether it is specific to the facility itself.

To date, there has been 186 power meters installed throughout the various facilities, namely water and wastewater treatment facilities and pumping stations. Over the next several years, the Region will focus efforts on expanded coverage and consolidation of existing power meters into a centralized power monitoring server at Regional Headquarters.

c) Annual Corporate Reporting and Update on ECDM Initiatives

Tracking and updates on the progress of key strategic initiatives, including ECDM measures and other climate mitigation projects, will continue to be presented quarterly to the Corporate Climate Leadership Committee.

Annual reporting to Regional Council on the corporate GHG inventory versus the interim and long-term GHG targets will continue to be undertaken through the annual CCAP progress update. This will include all GHG mitigation efforts, including ECDM initiatives which are key contributors to the Region's decarbonization goals.

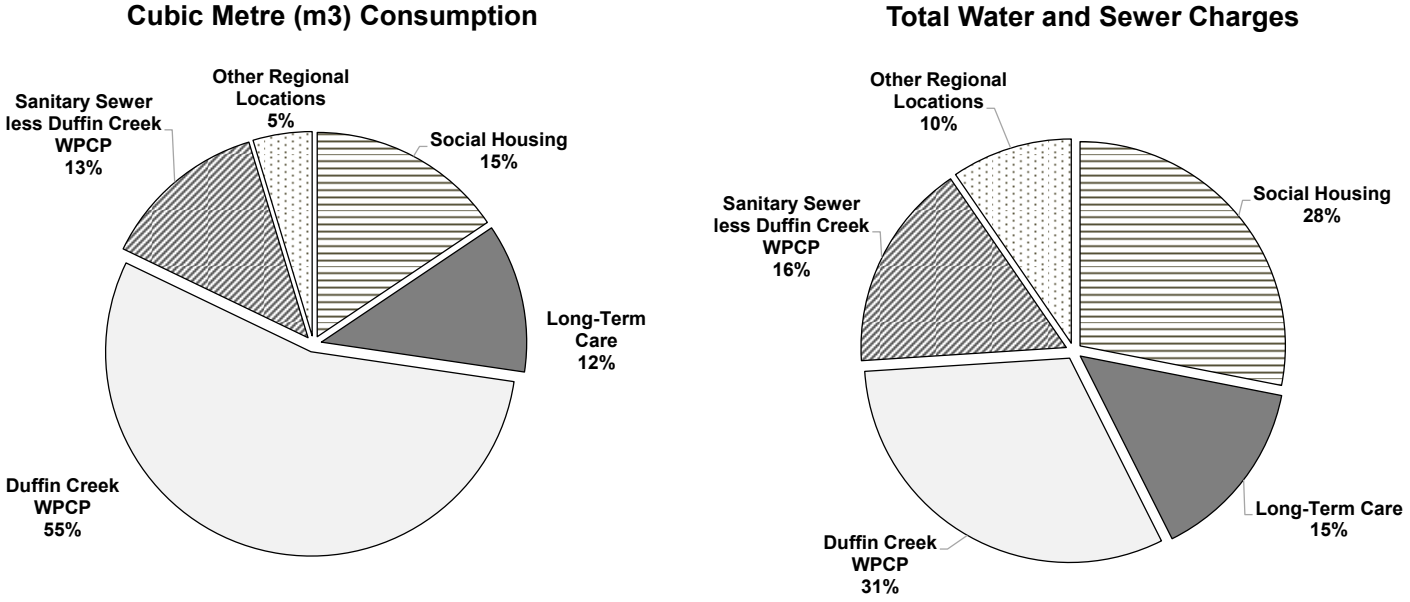
All of the Region's energy conservation initiatives support overarching corporate net zero GHG targets, including the monitoring of energy performance at Regional facilities. The Durham Standard has two EUI targets directly related to energy performance (see Section

2.4) which can be used to track progress on existing, and newly constructed facilities, and identify areas for further facility improvement.

5.4.2. Water Conservation Measures

Water usage and sanitary sewer discharge are material utility costs at Regional facilities, particularly for the Region's larger wastewater treatment facilities (including Duffin Creek WPCP), Long-Term Care facilities and the DRLHC seniors' buildings and family unit portfolio. The latter two operational areas are heavily driven by occupant end-usage. Excluding water and wastewater and solid waste operations, LTC and DRLHC total just under 90 per cent of all water consumption volumes. Figure 7 provides a high-level summary of 2023 water and sanitary sewer consumption and costs across billed Regional facilities, where it is estimated that operations were responsible for over $2.5 million in total volumetric and fixed charges and almost one million cubic metres (m^3) of usage.

Figure 7: 2023 Billed Water and Sanitary Sewer Consumption and Cost – Share by Operational Area[6]



Reductions in the treatment, pumping, and distribution of water as well as the discharge and movement of sanitary sewer, impacts energy and GHG emissions at the system-level given the Region is effectively the utility for water and wastewater services. As such, further promotion is needed on the reduction of water consumption across corporate operations.

The Region is moving towards integration of all historical water consumption and cost data across billed facilities (owned and/or leased) into the Region's newly procured, third-party

[6] Sanitary sewer metered volumes, where applicable, are equal to water consumption volumes for billing purposes. Charges across accounts will vary by meter size, total consumption volumes and other charges (e.g. fire line).

cloud-based, secure energy and sustainability data tracking platform (as noted in Section 5.4.1 a)). This will improve regular reporting and benchmarking of water consumption across facilities. In addition, the GHG Emission Reduction Pathways Studies for all Regional facilities will also make recommendations for water consumption savings.

6. Conclusion: Looking Forward

Looking forward, plans for 2024 to 2029 will focus on implementing the strategic plans outlined in this document, notably the:

- Implementation of the Durham Standard;
- Implementation and reporting of the Corporate Climate Action Plan;
- Completion of all GHG Emissions Pathway Studies followed by a centralized plan that provides a roadmap for decarbonization of all corporate facilities;
- Approval and implementation of the Water and Wastewater GHG Emissions Management Strategy;
- Continued implementation of the Light-Duty Fleet Electrification Plan;
- Implementation of DRT's E-Mission Zero Program Plan;
- Continued installation of the EV charger network;
- Future development of district energy;
- Consideration of renewable energy and carbon offset options; and,
- Investigation of renewable natural gas options (e.g., biogas from anaerobic digestion processes).

These initiatives are anticipated to have significant and long-term energy and GHG reduction impacts, which will provide a strong foundation and strategic corporate alignment, as the Region moves forward.

7. Appendix A

Figure 8: Summary of Energy Efficiency Initiatives for 2019 to 2024 (YTD) Housing

Operational Area	Facility Name	Address	Municipality	Project Description	Total Est. Cost (Rounded)	Approx. In-Service Year	Electricity Savings (kWh)	Natural Gas Savings (m3)	Fuel Savings (L)	Estimated Operational Savings/Year	Incentive / Measure Value (if applicable)	Annual GHG Reductions (rounded)
Housing	Beatrice Terrace Seniors Building (DRLHC)	385 Beatrice St. E.	Oshawa	Boiler Replacement	$ 38,000	2019 and onward	Project expected to realize natural gas and related operational cost savings and GHG emission reductions					
Housing	Beaverton Supportive Housing	133 Main St. W	Beaverton	Installation of two (2) Level 2 electric vehicle chargers for public/corporate fleet usage and provision for additional future chargers	$ 40,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $10,000 (pending completion)	-
Housing	Beaverton Supportive Housing	133 Main St. W	Beaverton (Brock)	New facility construction including installation of rooftop solar PV system (with net metering to offset facility site load requirements)	$24.4 million	Anticipated 2024	Approximately 140 kW rooftop solar PV system for the facility which will operate under a net metering configuration where it is estimated that up to 50 per cent of the building's electrical load requirements will be met by the generation system (with net building energy requirements being met solely by electricity)					
Housing	Bowling Green Towers Seniors Building (DRLHC)	850 Green St.	Whitby	Emergency Boiler Replacement	$ 77,000	2020 and onward	Project expected to realize natural gas and related operational cost savings and GHG emission reductions					
Housing	Bowling Green Towers Seniors Building (DRLHC)	850 Green St.	Whitby	Replacement of the Domestic Water Distribution System, Suspended Ceiling System, and Corridor Lighting	$ 655,000	2022	Project expected to realize electricity and related operational cost savings and GHG emission reductions					
Housing	Brookside Apartments Seniors Building (DRLHC)	20 Perry St.	Uxbridge	Interior Lighting Upgrades	$ 20,000	2019 and onward	Project expected to realize electricity and related operational cost savings and GHG emission reductions					
Housing	Brookside Apartments Seniors Building (DRLHC)	20 Perry St.	Uxbridge	Replacement of domestic hot water boilers	$ 151,100	2021	Project expected to realize natural gas and related operational cost savings and GHG emission reductions					
Housing	Dean Heights Seniors Building (DRLHC0	439 Dean Ave.	Oshawa	Installation of three (3) Level 2 electric vehicle chargers for corporate fleet usage	$ 60,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $15,000 (pending completion)	-
Housing	Fairport Lodge Seniors Building (DRLHC)	1330 Foxglove Ave.	Pickering	Interior Lighting Replacements	$ 12,000	2020 and onward	Project expected to realize electricity and related operational cost savings and GHG emission reductions					
Housing	Fairport Lodge Seniors Building (DRLHC)	1330 Foxglove Ave.	Pickering	LED Lighting Upgrade	$ 11,600	2020 and onward	3,000 kWh	-	-	$ 360	$1,737	90 kg CO2e
Housing	Harwood Manor Seniors Building (DRLHC)	655 Harwood Ave. S	Ajax	Installation of three (3) Level 2 electric vehicle chargers for corporate fleet usage	$ 60,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $15,000 (pending completion)	-
Housing	Harwood Manor Seniors Building (DRLHC)	655 Harwood Ave.	Ajax	Interior Lighting Replacements	$ 18,000	2020 and onward	Project expected to realize electricity and related operational cost savings and GHG emission reductions					
Housing	Harwood Manor Seniors Building (DRLHC)	655 Harwood Ave.	Ajax	Lighting Upgrade	$ 12,000	2021 and onward	Project expected to realize electricity and related operational cost savings and GHG emission reductions					
Housing	Harwood Manor Seniors Building (DRLHC)	655 Harwood Ave.	Ajax	Lighting Upgrade	$ 17,700	2021 and onward	Project expected to realize electricity and related operational cost savings and GHG emission reductions					
Housing	Harwood Manor Seniors Building (DRLHC)	655 Harwood Ave., S	Ajax	Replacement of windows and doors	$ 2,110,000	2024 and onward	Project expected to realize electricity and/or natural gas and related operational cost savings and GHG emissions reductions					
Housing	Kellett Manor Seniors Building (DRLHC)	327 Kellett St.	Port Perry (Scugog)	Domestic Hot Water Boilers, Relocation & Replacement	$ 136,000	2020 and onward	Project expected to realize natural gas and related operational cost savings and GHG emission reductions					
Housing	Kellett Manor Seniors Building (DRLHC)	327 Kellett St.	Port Perry (Scugog)	Emergency Lighting Upgrade	$ 16,300	2022 and onward	Project expected to realize electricity and related operational cost savings and GHG emission reductions					

Figure 9: Summary of Energy Efficiency Initiatives for 2019 to 2024 (YTD) Housing continued

Operational Area	Facility Name	Address	Municipality	Project Description	Total Est. Cost (Rounded)	Approx. In-Service Year	Electricity Savings (kWh)	Natural Gas Savings (m3)	Fuel Savings (L)	Estimated Operational Savings/Year	Incentive / Measure Value (if applicable)	Annual GHG Reductions (rounded)
Housing	Kellett Manor Seniors Building (DRLHC)	327 Kellett St.	Port Perry (Scugog)	Hallway Lighting Upgrades (in Addition to DHW Recirculation Lines Project)	$ 230,000	2020 and onward	Project expected to realize electricity and related operational cost savings and GHG emission reductions					
Housing	King Charles Court Seniors Building (DRLHC)	155 King St. E	Oshawa	Back-Up Diesel Generator	$ 458,000	2020 and onward	Anticipated to enhance building climate resilience and help ensure continuity of operations					
Housing	King Charles Court Seniors Building (DRLHC)	155 King St. E	Oshawa	Building envelope upgrades	Supported by SHAIP grant funding	2024	Anticipated electricity and/or natural gas and related operational cost savings and GHG emission reductions					
Housing	King Charles Court Seniors Building (DRLHC)	155 King St., E	Oshawa	Installation of two (2) Level 2 electric vehicle chargers for corporate fleet usage	$ 40,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $10,000 (pending completion)	-
Housing	King Charles Court Seniors Building (DRLHC)	155 King St. E	Oshawa	Replacement of MAU unit	$ 289,000	2024	Project expected to realize electricity and/or natural gas and related operational cost savings and GHG emissions reductions					
Housing	King Charles Court Seniors Building (DRLHC)	155 King St. E	Oshawa	Replacement of windows and doors	$ 998,100	2023	Project expected to realize electricity and/or natural gas and related operational cost savings and GHG emissions reductions					
Housing	Nelson Seniors Building (DRLHC)	2 Nelson St.	Bowmanville (Clarington)	Domestic Hot Water Service	$ 185,000	2022 and onward	Project expected to realize electricity and/or natural gas and related operational cost savings and GHG emissions reductions					
Housing	Nelson Seniors Building (DRLHC)	4 Nelson St.	Bowmanville (Clarington)	Domestic Hot Water Service	$ 106,000	2022 and onward	Project expected to realize electricity and/or natural gas and related operational cost savings and GHG emissions reductions					
Housing	Nelson Seniors Building (DRLHC)	4 Nelson St.	Bowmanville (Clarington)	Lighting Upgrade	$ 3,100	2020 and onward	Project expected to realize electricity and related operational cost savings and GHG emission reductions					
Housing	Nelson Seniors Building (DRLHC)	2 Nelson St.	Bowmanville (Clarington)	Replacement of MAU unit	$ 135,000	2025	Anticipated electricity and/or natural gas and related operational cost savings and GHG emission reductions					
Housing	Spruce Haven Seniors Building (DRLHC)	103 Cameron St. W	Cannington (Brock)	Replacement of domestic hot water system including boiler	$ 160,000	2025	Anticipated electricity and/or natural gas and related operational cost savings and GHG emission reductions					
Housing	Spruce Lawn Apartments Seniors Building (DRLHC)	385 Rosa St.	Port Perry (Scugog)	Installation of two (2) Level 2 electric vehicle chargers for corporate fleet usage	$ 40,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $10,000 (pending completion)	-
Housing	Various Locations (DRLHC)	Various Locations	Various	Furnace Replacements	$ 94,000	2021 and onward	Project expected to realize electricity and natural gas and related operational cost savings and GHG emission reductions					
Housing	Various Locations (DRLHC)	Various Locations	Various	Furnace Replacements	$ 37,600	2021 and onward	Project expected to realize electricity and natural gas and related operational cost savings and GHG emission reductions					
Housing	Villa Valeau Seniors Building (DRLHC)	1910 Faylee Cres.	Pickering	Interior Lighting Upgrades	$ 12,000	2020 and onward	Project expected to realize electricity and related operational cost savings and GHG emission reductions					
Housing	Villa Valeau Seniors Building (DRLHC)	1910 Faylee Cres.	Pickering	Replacement of MAU unit and domestic hot water boilers	$ 508,000	2024 and onward	Project expected to realize electricity and natural gas and related operational cost savings and GHG emission reductions					
Housing	Wayside Apartments Seniors Building (DRLHC)	342 Main St.	Beaverton (Brock)	Interior Lighting Upgrades	$ 13,000	2019 and onward	Project expected to realize electricity and related operational cost savings and GHG emission reductions					

Figure 10: Summary of Energy Efficiency Initiatives for 2019 to 2024 (YTD) Housing continued

Operational Area	Facility Name	Address	Municipality	Project Description	Total Est. Cost (Rounded)	Approx. In-Service Year	Electricity Savings (kWh)	Natural Gas Savings (m3)	Fuel Savings (L)	Estimated Operational Savings/Year	Incentive / Measure Value (if applicable)	Annual GHG Reductions (rounded)
Housing	Windsor Place Seniors Building (DRLHC)	315 Colborne St. W	Whitby	Common Area Lighting Upgrades	$ 22,000	2021 and onward	Project expected to realize electricity and related operational cost savings and GHG emission reductions					
Housing	Windsor Place Seniors Building (DRLHC)	315 Colborne St. W.	Whitby	Emergency Lighting Upgrades	$ 18,000	2019 and onward	Project expected to realize electricity and related operational cost savings and GHG emission reductions					
Housing	Windsor Place Seniors Building (DRLHC)	315 Colborne St. W	Whitby	Installation of three (3) Level 2 electric vehicle chargers for corporate fleet usage	$ 60,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $15,000 (pending completion)	-
Housing	Windsor Place Seniors Building (DRLHC)	315 Colborne St., W	Whitby	Replacement of windows and doors	$ 916,000	2024 and onward	Project expected to realize electricity and/or natural gas and related operational cost savings and GHG emissions reductions					
Housing	Various Facilities	Various Locations	Various	Undertaking of GHG Emission Reduction Pathways studies including baseline and modified energy models to outline pathway to net zero by 2045	$ 400,000	Underway / planned	-	-	-	-	Up to $250,000 (pending completion)	-

Figure 11: Summary of Energy Efficiency Initiatives for 2019 to 2024 (YTD) Paramedics

Operational Area	Facility Name	Address	Municipality	Project Description	Total Est. Cost (Rounded)	Approx. In-Service Year	Electricity Savings (kWh)	Natural Gas Savings (m3)	Fuel Savings (L)	Estimated Operational Savings/Year	Incentive / Measure Value (if applicable)	Annual GHG Reductions (rounded)
Paramedic Services	Region of Durham Paramedic Services Headquarters	4040 Anderson St.	Whitby	Installation of four (4) Level 2 electric vehicle chargers for public/corporate fleet usage	$ 40,000	2021 and onward	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				$20,000	-
Paramedic Services	Seaton Region of Durham Paramedic Services Station	Concession Rd 5 & Sideline 16 Rd.	Pickering	Installation of two (2) Level 2 electric vehicle chargers for public/corporate fleet usage	$ 20,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $10,000 (pending completion)	-
Paramedic Services	Seaton Region of Durham Paramedic Services Station	Concession Rd 5 & Sideline 16 Rd.	Pickering	New facility construction	$14.2 million	Anticipated 2024	Approximately 59 kW rooftop solar PV system for the facility which will operate under a net metering configuration. Geothermal system will provide heating and cooling for the building (combined with solar will effectively be a zero-carbon building)					
Paramedic Services	Various Facilities	Various Locations	Various	Undertaking of GHG Emission Reduction Pathways studies including baseline and modified energy models to outline pathway to net zero by 2045	$ 100,000	Underway / planned	-	-	-	-	-	-

Figure 12: Summary of Energy Efficiency Initiatives for 2019 to 2024 (YTD) Solid Waste

Operational Area	Facility Name	Address	Municipality	Project Description	Total Est. Cost (Rounded)	Approx. In-Service Year	Electricity Savings (kWh)	Natural Gas Savings (m3)	Fuel Savings (L)	Estimated Operational Savings/Year	Incentive / Measure Value (if applicable)	Annual GHG Reductions (rounded)
Solid Waste	Clarington Household Special Waste Depot	1998 Bowmanville Ave.	Bowmanville (Clarington)	Installation of two (2) Level 2 electric vehicle chargers for corporate fleet usage	$ 24,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $10,000 (pending completion)	-
Solid Waste	Durham Recycling Centre	4600 Garrard Rd.	Whitby	Installation of two (2) Level 2 electric vehicle chargers for corporate fleet usage	$ 26,400	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $10,000 (pending completion)	-
Solid Waste	Durham York Energy Centre	1835 Energy Dr.	Courtice (Clarington)	Installation of two (2) Level 2 electric vehicle chargers for corporate fleet usage	$ 36,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $10,000 (pending completion)	-
Solid Waste	Durham York Energy Centre	1835 Energy Dr.	Courtice (Clarington)	LED Lighting Upgrade	$ 23,700	2021 and onward	249,900 kWh	-	-	$ 29,988	$7,740	7,500 kg CO2e
Solid Waste	Municipal Household Special Waste Facility	1998 Bowmanville Ave.	Bowmanville (Clarington)	Replacement of exterior lighting	$ 64,500	2022 and onward	Anticipated electricity and related operational cost savings and GHG emission reductions					
Solid Waste	Various Facilities	Various Locations	Various	Undertaking of GHG Emission Reduction Pathways studies including baseline and modified energy models to outline pathway to net zero by 2045	$ 100,000	Underway / planned	-	-	-	-	-	-

Figure 13: Summary of Energy Efficiency Initiatives for 2019 to 2024 (YTD) Long-Term Care

Operational Area	Facility Name	Address	Municipality	Project Description	Total Est. Cost (Rounded)	Approx. In-Service Year	Electricity Savings (kWh)	Natural Gas Savings (m3)	Fuel Savings (L)	Estimated Operational Savings/Year	Incentive / Measure Value (if applicable)	Annual GHG Reductions (rounded)
Long Term Care	Fairview Lodge Long-Term Care (LTC) Homes for the Aged	632 Dundas St. W	Whitby	Installation of four (4) Level 2 electric vehicle chargers for public/corporate fleet usage	$ 80,000	2022 and onward	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				$20,000	-
Long Term Care	Hillsdale Estates Long-Term Care (LTC) Homes for the Aged	590 Oshawa Blvd. N	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2021	-	-	-	$ 25,000	-	-
Long Term Care	Hillsdale Estates Long-Term Care (LTC) Homes for the Aged	590 Oshawa Blvd. N	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2022	-	-	-	$ 54,000	-	-
Long Term Care	Hillsdale Estates Long-Term Care (LTC) Homes for the Aged	590 Oshawa Blvd. N	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2023	-	-	-	$ 42,000	-	-
Long Term Care	Hillsdale Estates Long-Term Care (LTC) Homes for the Aged	590 Oshawa Blvd. N	Oshawa	Installation of four (4) Level 2 electric vehicle chargers for public/corporate fleet usage	$ 80,000	2022 and onward	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				$20,000	-
Long Term Care	Hillsdale Terraces Long-Term Care (LTC) Homes for the Aged	600 Oshawa Blvd. N	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2021	-	-	-	$ 21,000	-	-
Long Term Care	Hillsdale Terraces Long-Term Care (LTC) Homes for the Aged	600 Oshawa Blvd. N	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2022	-	-	-	$ 33,000	-	-
Long Term Care	Hillsdale Terraces Long-Term Care (LTC) Homes for the Aged	600 Oshawa Blvd. N	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2023	-	-	-	$ 39,000	-	-
Long Term Care	Hillsdale Terraces Long-Term Care (LTC) Homes for the Aged	600 Oshawa Blvd. N	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	Underway / planned	-	-	-	$4,000 (YTD Jan to Apr)	-	-
Long Term Care	Hillsdale Terraces Long-Term Care (LTC) Homes for the Aged	600 Oshawa Blvd. N	Oshawa	Installation of four (4) Level 2 electric vehicle chargers for public/corporate fleet usage	$ 80,000	2022 and onward	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				$20,000	-
Long Term Care	Lakeview Manor Long-Term Care (LTC) Homes for the Aged	133 Main St. W	Beaverton	Installation of four (4) Level 2 electric vehicle chargers for public/corporate fleet usage	$ 80,000	2022 and onward	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				$20,000	-
Long Term Care	Seaton Long-Term Care Home for the Aged Facility	Whitevale Rd. & Brock Rd.	Pickering	New facility construction	$144.8 million	Anticipated 2026	Facility expected to realize 30% less annual energy use and EUI versus ASHRAE 90.1 2013 Standard and with 74% fewer GHG (when measured on gross floor area basis)					
Long Term Care	Various Facilities	Various Locations	Various	Undertaking of GHG Emission Reduction Pathways studies including baseline and modified energy models to outline pathway to net zero by 2045	$ 300,000	Underway / planned	-	-	-	-	-	-

Figure 14: Summary of Energy Efficiency Initiatives for 2019 to 2024 (YTD) Offices

Operational Area	Facility Name	Address	Municipality	Project Description	Total Est. Cost (Rounded)	Approx. In-Service Year	Electricity Savings (kWh)	Natural Gas Savings (m3)	Fuel Savings (L)	Estimated Operational Savings/Year	Incentive / Measure Value (if applicable)	Annual GHG Reductions (rounded)
Offices	Regional Headquarters Administration Building	605 Rossland Rd. E	Whitby	Attempt to save 2% of electricity consumtion by optimizing the Building Automation System at Durham Region Headquarters Builiding	$ 75,000	2020 and onward	923,000 kWh	-	-	$ 110,760	-	27,690 kg CO2e
Offices	Regional Headquarters Administration Building	605 Rossland Rd. E	Whitby	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2019	-	-	-	$0.332 million	-	-
Offices	Regional Headquarters Administration Building	605 Rossland Rd. E	Whitby	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2020	-	-	-	$0.23 million	-	-
Offices	Regional Headquarters Administration Building	605 Rossland Rd. E	Whitby	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2021	-	-	-	$0.137 million	-	-
Offices	Regional Headquarters Administration Building	605 Rossland Rd. E	Whitby	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2022	-	-	-	$0.113 million	-	-
Offices	Regional Headquarters Administration Building	605 Rossland Rd. E	Whitby	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2023	-	-	-	$0.208 million	-	-
Offices	Regional Headquarters Administration Building	605 Rossland Rd. E	Whitby	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	Underway / planned	-	-	-	$48,000 (YTD Jan to Apr)	-	-
Offices	Regional Headquarters Administration Building	605 Rossland Rd. E	Whitby	Installation of four (4) Level 2 electric vehicle chargers for public/corporate fleet usage	$ 80,000	2021 and onward	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				$20,000	-
Offices	Regional Headquarters Administration Building	605 Rossland Rd. E	Whitby	Installation of six (6) Level 2 electric vehicle chargers for public/corporate fleet usage	$ 120,000	2019 and onward	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				-	-
Offices	Regional Headquarters Administration Building	605 Rossland Rd., E	Whitby	LED Lighting Retrofit	$ 82,200	Underway / planned	136,650 kWh	-	-	$ 16,398	$8,460	4,100 kg CO2e
Offices	Regional Headquarters Administration Building	605 Rossland Rd. E	Whitby	LED lighting upgrade - upgrade certain 4' flourescent fixtures to LED	$ 1,600	2022 and onward	25,000 kWh	-	-	$ 3,000	-	750 kg CO2e
Offices	Regional Headquarters Administration Building	605 Rossland Rd. E	Whitby	LED Retrofitting of Front Foyer	$ 26,600	2020 and onward	59,000 kWh	-	-	$ 7,080	$4,000	1,770 kg CO2e
Offices	Regional Headquarters Administration Building	605 Rossland Rd., E	Whitby	Main entrance revolving door system project	$ 232,000	Underway / planned	Anticipated electricity and/or natural gas and related operational cost savings and GHG emission reductions					
Offices	Regional Headquarters Administration Building	605 Rossland Rd. E	Whitby	Office Modernization Project	$27 million	Underway / planned	Anticipated electricity and/or natural gas and related operational cost savings and GHG emission reductions					
Offices	Various Facilities	Various Locations	Various	Undertaking of GHG Emission Reduction Pathways studies including baseline and modified energy models to outline pathway to net zero by 2045	$ 100,000	Underway / planned	-	-	-	-	-	-
Offices	Traffic Operations/Health Protection Division	101 Consumers Dr.	Whitby	Installation of four (4) Level 2 electric vehicle chargers for public/corporate fleet usage	$ 80,000	2021 and onward	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				$20,000	-
Offices	Traffic Operations/Health Protection Division	101 Consumers Dr.	Whitby	Office Modernization Project including major energy retrofitting	$18.6 million	Underway / planned	Deep retrofit will achieve high level of energy efficiency and near-zero GHG where measures include (but not limited to) window upgrades, replacement of natural gas RTU wiith electric units and energy recovery wheels as well as heating to be supplied through electric air source heat pumps and new BAS system controls					
Offices	Workplace Modernization Project (WMP) Office swing space	1500 Hopkins St.	Whitby	Installation of new ductless split A/C unit in electrical room	$ 10,200	2022 and onward	Anticipated electricity and related operational cost savings and GHG emission reductions					
Offices	Various Locations	Various Locations	Various	Participation in the IESO's Energy Manager Program	Staff salariy/related expenses	2019 to 2021	Electricity savings per IESO's EEM Program Targets. Operational cost benefits from electricity saved. Incentives and savings may also be related to other CDM initiatives outlined herein					

Figure 15: Summary of Energy Efficiency Initiatives for 2019 to 2024 (YTD) Police

Operational Area	Facility Name	Address	Municipality	Project Description	Total Est. Cost (Rounded)	Approx. In-Service Year	Electricity Savings (kWh)	Natural Gas Savings (m3)	Fuel Savings (L)	Estimated Operational Savings/Year	Incentive / Measure Value (if applicable)	Annual GHG Reductions (rounded)
Police	Durham Regional Police Service Central East Division	77 Centre St. N	Oshawa	BAS Replacement, water balancing, air balancing of AHU and VAV's	$ 158,200	2022 and onward	127,000 kWh	-	-	$ 15,240	-	3,810 kg CO2e
Police	Durham Regional Police Service Central East Division	77 Centre St. N	Oshawa	Boiler Upgrade	$ 432,800	2022 and onward	-	77,772 m3	-	-	$28,708	150,250 kg CO2e
Police	Durham Regional Police Service Central East Division	77 Centre St., N	Oshawa	Chiller Replacement Project	$ 582,000	2022 and onward	202,000 kWh	-	-	$ 24,240	$32,000	6,060 kg CO2e
Police	Durham Regional Police Service Central East Division	77 Centre St., N	Oshawa	Installation of two (2) Level 2 electric vehicle chargers for corporate fleet usage	$ 25,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $10,000 (pending completion)	-
Police	Durham Regional Police Service Central East Division	77 Centre St., N	Oshawa	LED Lighting Retrofit - Part A	$ 66,100	2022 and onward	47,887 kWh	-	-	$ 5,750	$10,675	1,440 kg CO2e
Police	Durham Regional Police Service Central East Division	77 Centre St., N	Oshawa	LED Lighting Retrofit - Part B	$ 39,100	2023 and onward	30,100 kWh	-	-	$ 3,612	$6,798	900 kg CO2e
Police	Durham Regional Police Service Central East Division	77 Centre St., N	Oshawa	LED Lighting Retrofit - Part C	$ 113,300	2023 and onward	41,760 kWh	-	-	$ 5,011	$9,522	1,250 kg CO2e
Police	Durham Regional Police Service Central West Division	480 Taunton Rd.	Whitby	Installation of two (2) Level 2 electric vehicle chargers for corporate fleet usage	$ 40,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $10,000 (pending completion)	-
Police	Durham Regional Police Service Centre for Investigative Excellence (Clarington Police Complex Phase 2)	2222 Bloor St/2046 Maple Grove Rd.	Courtice (Clarington)	Installation of four (4) Level 2 electric vehicle chargers for corporate fleet usage	$ 80,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $20,000 (pending completion)	-
Police	Durham Regional Police Service Clarington Police Complex Phase 2 New Construction	2222 Bloor St/2046 Maple Grove Rd.	Courtice (Clarington)	New facility construction	$102.75 million	Anticipated 2024	New facility will include a geothermal field for heating and cooling although will maintain natural gas service as backup for emergency redundancy					
Police	Durham Regional Police Service East Division (Clarington Police Complex)	2222 Bloor St/2046 Maple Grove Rd.	Courtice (Clarington)	Installation of two (2) Level 2 electric vehicle chargers for corporate fleet usage	$ 50,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $10,000 (pending completion)	-
Police	Durham Regional Police Service North Division	15765 Highway 12	Port Perry (Scugog)	Installation of two (2) Level 2 electric vehicle chargers for corporate fleet usage	$ 40,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $10,000 (pending completion)	-
Police	Durham Regional Police Service Operations Training Centre	4060 Anderson St.	Whitby	Installation of two (2) Level 3 fast electric vehicle chargers (>100kW each) for corporate fleet usage	$ 250,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $150,000 (pending completion)	-
Police	Durham Regional Police Service Regional Support Centre (Clarington Police Complex Phase 2)	2222 Bloor St/2046 Maple Grove Rd.	Courtice (Clarington)	Installation of four (4) Level 2 electric vehicle chargers for corporate fleet usage	$ 80,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $20,000 (pending completion)	-
Police	Durham Regional Police Service West Division	1710 Kingston Rd.	Pickering	Chiller and BAS System Upgrade	$ 346,000	2021 and onward	17,500 kWh	-	-	$ 2,100	$6,096	530 kg CO2e
Police	Durham Regional Police Service West Division	1710 Kingston Rd.	Pickering	Installation of two (2) Level 2 electric vehicle chargers for corporate fleet usage	$ 40,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $10,000 (pending completion)	-
Police	Various Facilities	Various Locations	Various	Undertaking of GHG Emission Reduction Pathways studies including baseline and modified energy models to outline pathway to net zero by 2045	$ 120,000	Underway / planned	-	-	-	-	-	-

Figure 16: Summary of Energy Efficiency Initiatives for 2019 to 2024 (YTD) Sanitary Sewer

Operational Area	Facility Name	Address	Municipality	Project Description	Total Est. Cost (Rounded)	Approx. In-Service Year	Electricity Savings (kWh)	Natural Gas Savings (m3)	Fuel Savings (L)	Estimated Operational Savings/Year	Incentive / Measure Value (if applicable)	Annual GHG Reductions (rounded)
Sanitary Sewer	Corbett Creek Water Pollution Control Plant	2400 Forbes St.	Whitby	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2019	-	-	-	$0.497 million	-	-
Sanitary Sewer	Corbett Creek Water Pollution Control Plant	2400 Forbes St.	Whitby	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2020	-	-	-	$0.633 million	-	-
Sanitary Sewer	Corbett Creek Water Pollution Control Plant	2400 Forbes St.	Whitby	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2021	-	-	-	$0.304 million	-	-
Sanitary Sewer	Corbett Creek Water Pollution Control Plant	2400 Forbes St.	Whitby	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2022	-	-	-	$0.261 million	-	-
Sanitary Sewer	Corbett Creek Water Pollution Control Plant	2400 Forbes St.	Whitby	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2023	-	-	-	$0.37 million	-	-
Sanitary Sewer	Corbett Creek Water Pollution Control Plant	2400 Forbes St.	Whitby	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	Underway / planned	-	-	-	$92,000 (YTD Jan to Apr)	-	-
Sanitary Sewer	Corbett Creek Water Pollution Control Plant	2400 Forbes St.	Whitby	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2019	-	245,300 m3	-	$ 110,400	-	470 tonnes CO2e
Sanitary Sewer	Corbett Creek Water Pollution Control Plant	2400 Forbes St.	Whitby	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2020	-	561,400 m3	-	$ 252,600	-	1,080 tonnes CO2e
Sanitary Sewer	Corbett Creek Water Pollution Control Plant	2400 Forbes St.	Whitby	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2021	-	520,200 m3	-	$ 234,100	-	1,010 tonnes CO2e
Sanitary Sewer	Corbett Creek Water Pollution Control Plant	2400 Forbes St.	Whitby	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2022	-	546,300 m3	-	$ 245,800	-	1,060 tonnes CO2e
Sanitary Sewer	Corbett Creek Water Pollution Control Plant	2400 Forbes St.	Whitby	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2023	-	485,700 m3	-	$ 218,600	-	940 tonnes CO2e
Sanitary Sewer	Corbett Creek Water Pollution Control Plant	2400 Forbes St.	Whitby	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	Underway / planned	-	259,100 m3 (YTD Jan to May)	-	$116,600 (YTD Jan to May)	-	500 tonnes CO2e (YTD Jan to May)
Sanitary Sewer	Corbett Creek Water Pollution Control Plant	2400 Forbes St.	Whitby	HVAC and BAS system replacement	$ 835,000	Underway / planned	Anticipated electricity and/or natural gas and related operational cost savings and GHG emission reductions					
Sanitary Sewer	Courtice Water Pollution Control Plant	100 Osborne Rd.	Courtice (Clarington)	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2019	-	-	-	$0.52 million	-	-
Sanitary Sewer	Courtice Water Pollution Control Plant	100 Osborne Rd.	Courtice (Clarington)	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2020	-	-	-	$0.503 million	-	-
Sanitary Sewer	Courtice Water Pollution Control Plant	100 Osborne Rd.	Courtice (Clarington)	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2021	-	-	-	$0.338 million	-	-
Sanitary Sewer	Courtice Water Pollution Control Plant	100 Osborne Rd.	Courtice (Clarington)	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2022	-	-	-	$0.237 million	-	-

Figure 17: Summary of Energy Efficiency Initiatives for 2019 to 2024 (YTD) Sanitary Sewer continued

Operational Area	Facility Name	Address	Municipality	Project Description	Total Est. Cost (Rounded)	Approx. In-Service Year	Electricity Savings (kWh)	Natural Gas Savings (m3)	Fuel Savings (L)	Estimated Operational Savings/Year	Incentive / Measure Value (if applicable)	Annual GHG Reductions (rounded)
Sanitary Sewer	Courtice Water Pollution Control Plant	100 Osborne Rd.	Courtice (Clarington)	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2023	-	-	-	$0.346 million	-	-
Sanitary Sewer	Courtice Water Pollution Control Plant	100 Osborne Rd.	Courtice (Clarington)	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	Underway / planned	-	-	-	$128,000 (YTD Jan to Apr)	-	-
Sanitary Sewer	Courtice Water Pollution Control Plant	100 Osborne Rd.	Courtice (Clarington)	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2019	-	535,200 m3	-	$ 240,800	-	1,030 tonnes CO2e
Sanitary Sewer	Courtice Water Pollution Control Plant	100 Osborne Rd.	Courtice (Clarington)	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2020	-	524,600 m3	-	$ 236,100	-	1,010 tonnes CO2e
Sanitary Sewer	Courtice Water Pollution Control Plant	100 Osborne Rd.	Courtice (Clarington)	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2021	-	530,000 m3	-	$ 238,500	-	1,020 tonnes CO2e
Sanitary Sewer	Courtice Water Pollution Control Plant	100 Osborne Rd.	Courtice (Clarington)	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2022	-	576,600 m3	-	$ 259,500	-	1,110 tonnes CO2e
Sanitary Sewer	Courtice Water Pollution Control Plant	100 Osborne Rd.	Courtice (Clarington)	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2023	-	515,200 m3	-	$ 231,800	-	1,000 tonnes CO2e
Sanitary Sewer	Courtice Water Pollution Control Plant	100 Osborne Rd.	Courtice (Clarington)	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	Underway / planned	-	199,000 m3 (YTD Jan to May)	-	$89,600 (YTD Jan to May)	-	390 tonnes CO2e (YTD Jan to May)
Sanitary Sewer	Courtice Water Pollution Control Plant	100 Osborne Rd.	Courtice (Clarington)	Turbo blower upgrade project	$ 400,000	Underway / planned	400,000 kWh	-	-	$ 48,000	-	12,000 kg CO2e
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Blower building optimization and aeration system (maximum opening valve strategy)	$ -	2019 and onward	1.2 million kWh	-	-	$ 144,000	-	36,000 kg CO2e
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2019	-	-	-	$3.876 million	-	-
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2020	-	-	-	$3.833 million	-	-
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2021	-	-	-	$2.163 million	-	-
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2022	-	-	-	$1.849 million	-	-
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2023	-	-	-	$3.142 million	-	-
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	Underway / planned	-	-	-	$1.027 million (YTD Jan to Apr)	-	-
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Compressor upgrades for new and old incinerator buildings	$ 90,000	Underway / planned	323,000 kWh	-	-	$ 38,760	-	9,690 kg CO2e

Figure 18: Summary of Energy Efficiency Initiatives for 2019 to 2024 (YTD) Sanitary continued

Operational Area	Facility Name	Address	Municipality	Project Description	Total Est. Cost (Rounded)	Approx. In-Service Year	Electricity Savings (kWh)	Natural Gas Savings (m3)	Fuel Savings (L)	Estimated Operational Savings/Year	Incentive / Measure Value (if applicable)	Annual GHG Reductions (rounded)
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2019	-	853,400 m3	-	$ 384,000	-	1,650 tonnes CO2e
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2020	-	1,094,800 m3	-	$ 492,700	-	2,110 tonnes CO2e
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2021	-	1,265,700 m3	-	$ 569,500	-	2,450 tonnes CO2e
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2022	-	1,134,900 m3	-	$ 510,700	-	2,190 tonnes CO2e
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2023	-	870,400 m3	-	$ 391,700	-	1,680 tonnes CO2e
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	Underway / planned	-	453,400 m3 (YTD Jan to May)	-	$204,000 (YTD Jan to May)	-	880 tonnes CO2e (YTD Jan to May)
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Exterior and Interior Lighting Upgrade	$ 307,800	2021 and onward	306,300 kWh	-	-	$ 36,756	$28,671	9,190 kg CO2e
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Installation of four (4) Level 2 electric vehicle chargers for corporate fleet usage	$ 80,000	2022 and onward	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				$20,000	-
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Installation of timers on Stage 3 secondary clarifiers scom removal motors	$ 6,000	2019 and onward	55,000 kWh	-	-	$ 6,600	-	1,650 kg CO2e
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Installation of variable frequency drive (VFD) on IF Fan Reactor 3	$ 60,000	2021 and onward	177,000 kWh	-	-	$ 21,240	-	5,310 kg CO2e
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Installation of variable frequency drive (VFD) on IF Fan Reactor 4	$ 60,000	2022 and onward	177,000 kWh	-	-	$ 21,240	-	5,310 kg CO2e
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Instlallation of ammonia control on one train at Stage 3	$ 180,000	Underway / planned	600,000 kWh	-	-	$ 72,000	-	18,000 kg CO2e
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Lighting upgrades for tunnels, maintenance and exterior areas	$ 48,130	2022 and onward	191,000 kWh	-	-	$ 22,920	$18,330	5,730 kg CO2e
Sanitary Sewer	Duffin Creek Water Pollution Control Plant	901 McKay Rd.	Pickering	Renovation and expansion of the Regional Environmental Lab	$10 million	Underway / planned	Anticipated net energy and related operational cost savings and GHG emission reductions versus a business-as-usual building standard					
Sanitary Sewer	Harmony Creek Water Pollution Control Plant	785 Colonel Sam Dr.	Oshawa	Aeration system upgrade	$ 443,400	2020 and onward	557,000 kWh	-	-	$ 66,840	-	16,710 kg CO2e
Sanitary Sewer	Harmony Creek Water Pollution Control Plant	785 Colonel Sam Dr.	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2019	-	-	-	$0.363 million	-	-
Sanitary Sewer	Harmony Creek Water Pollution Control Plant	785 Colonel Sam Dr.	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2020	-	-	-	$0.307 million	-	-

Figure 19: Summary of Energy Efficiency Initiatives for 2019 to 2024 (YTD) Sanitary Sewer continued

Operational Area	Facility Name	Address	Municipality	Project Description	Total Est. Cost (Rounded)	Approx. In-Service Year	Electricity Savings (kWh)	Natural Gas Savings (m3)	Fuel Savings (L)	Estimated Operational Savings/Year	Incentive / Measure Value (if applicable)	Annual GHG Reductions (rounded)
Sanitary Sewer	Harmony Creek Water Pollution Control Plant	785 Colonel Sam Dr.	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2021	-	-	-	$0.105 million	-	-
Sanitary Sewer	Harmony Creek Water Pollution Control Plant	785 Colonel Sam Dr.	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2022	-	-	-	$0.048 million	-	-
Sanitary Sewer	Harmony Creek Water Pollution Control Plant	785 Colonel Sam Dr.	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2023	-	-	-	$0.214 million	-	-
Sanitary Sewer	Harmony Creek Water Pollution Control Plant	785 Colonel Sam Dr.	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	Underway / planned	-	-	-	$86,000 (YTD Jan to Apr)	-	-
Sanitary Sewer	Harmony Creek Water Pollution Control Plant	785 Colonel Sam Dr.	Oshawa	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2020	-	137,100 m3	-	$ 61,700	-	260 tonnes CO2e
Sanitary Sewer	Harmony Creek Water Pollution Control Plant	785 Colonel Sam Dr.	Oshawa	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2021	-	237,400 m3	-	$ 106,800	-	460 tonnes CO2e
Sanitary Sewer	Harmony Creek Water Pollution Control Plant	785 Colonel Sam Dr.	Oshawa	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2022	-	436,800 m3	-	$ 196,500	-	840 tonnes CO2e
Sanitary Sewer	Harmony Creek Water Pollution Control Plant	785 Colonel Sam Dr.	Oshawa	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	2023	-	195,500 m3	-	$ 88,000	-	380 tonnes CO2e
Sanitary Sewer	Harmony Creek Water Pollution Control Plant	785 Colonel Sam Dr.	Oshawa	Digester gas utilization in boilers offsetting conventional natural gas usage	$ -	Underway / planned	-	91,500 m3	-	$41,200 (YTD Jan to May)	-	180 tonnes CO2e (YTD Jan to May)
Sanitary Sewer	Harmony Creek Water Pollution Control Plant	785 Colonel Sam Dr.	Oshawa	Replace 6 explosion proof two lamp 80W (input wattage 74W) T12 fixtures with 28.3W explosion proof LED fixtures	$ 16,200	2022 and onward	200 kWh	-	-	$ 24	-	6 kg CO2e
Sanitary Sewer	Lake Simcoe Water Pollution Contol Plant	885 Concession Rd. 5	Brock	Boiler replacement	$ 368,000	2022 and onward	Anticipated natural gas and related operational cost savings and GHG emission reductions					
Sanitary Sewer	Newcastle Water Pollution Control Plant	1000 Toronto St.	Newcastle (Clarington)	Boiler replacement	$ 110,700	2022 and onward	Anticipated natural gas and related operational cost savings and GHG emission reductions					
Sanitary Sewer	Nonquon River Water Pollution Control Plant	1730 Scugog Line 8	Scugog	Blower process optimization strategy	$ -	2023 and onward	50,000 kWh	-	-	$ 6,000	-	1,500 kg CO2e
Sanitary Sewer	Uxbridge Brook Water Pollution Control Plant	127 Main St.	Uxbridge	LED Lighting Upgrade	$ 21,960	2022 and onward	27,000 kWh	-	-	$ 3,240	$3,952	810 kg CO2e
Sanitary Sewer	Various Locations	Various Locations	Various	Participation in the IESO's Energy Manager Program	Staff salariy/related expenses	2019 to 2022	Electricity savings per IESO's EEM Program Targets. Operational cost benefits from electricity saved. Incentives and savings may also be related to other CDM initiatives outlined herein					

Figure 20: Summary of Energy Efficiency Initiatives for 2019 to 2024 (YTD) Transit

Operational Area	Facility Name	Address	Municipality	Project Description	Total Est. Cost (Rounded)	Approx. In-Service Year	Electricity Savings (kWh)	Natural Gas Savings (m3)	Fuel Savings (L)	Estimated Operational Savings/Year	Incentive / Measure Value (if applicable)	Annual GHG Reductions (rounded)
Transit	Durham Region Transit (East) Maintenance Facility	710 Raleigh Ave.	Oshawa	Installation of additional lighting in parking lot	$ 47,100	2021 and onward	Anticipated electricity and related operational cost savings and GHG emission reductions					
Transit	Durham Region Transit East Maintenance Facility	710 Raleigh Ave.	Oshawa	Installation of eight (8) Level 2 electric vehicle chargers for corporate fleet usage	$ 160,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $40,000 (pending completion)	-
Transit	Durham Region Transit East Maintenance Facility	715 Farewell St.	Oshawa	Installation of four (4) Level 2 electric vehicle chargers for corporate fleet usage	$ 80,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $20,000 (pending completion)	-
Transit	Durham Region Transit East Maintenance Facility	710 Raleigh Ave.	Oshawa	Installation of six (6) fast chargers for corporate light/medium/heavy duty fleet usage and supporting transformer/facility upgrades to accommodate ten (10) additional single fast charger dispensers (minimum 90kW draw each)	Part of electric bus pilot initiative	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $300,000 (pending completion)	-
Transit	Durham Region Transit East Maintenance Facility	710 Raleigh Ave.	Oshawa	Installation of two (2) fast chargers for corporate light/medium/heavy duty fleet usage (minimum 50kW draw each)	$ 160,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $100,000 (pending completion)	-
Transit	Durham Region Transit East Maintenance Facility	715 Farewell St.	Oshawa	Installation of two (2) Level 2 electric vehicle chargers for public/corporate fleet usage	$ 40,000	2021 and onward	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				$10,000	-
Transit	Durham Region Transit Maintenance Facilities (3 locations)	Various Locations	Various	Undertaking of GHG Emission Reduction Pathways studies including baseline and modified energy models to outline pathway to net zero by 2045	$ 130,000	-	-	-	-	-	$16,000	-
Transit	Durham Region Transit West Maintenance Facility	110 Westney Rd.	Ajax	Installation of eight (8) fast chargers for corporate light/medium/heavy duty fleet usage (minimum 50kW draw each)	$ 640,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $400,000 (pending completion)	-
Transit	Durham Region Transit West Maintenance Facility	110 Westney Rd.	Ajax	Installation of four (4) Level 2 electric vehicle chargers for corporate fleet usage	$ 80,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $20,000 (pending completion)	-
Transit	Durham Region Transit West Maintenance Facility	110 Westney Rd.	Ajax	Installation of two (2) Level 2 electric vehicle chargers for corporate fleet usage	$ 40,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $10,000 (pending completion)	-
Transit	Durham Region Transit West Maintenance Facility	110 Westney Rd.	Ajax	Installation of two (2) Level 2 electric vehicle chargers for public/corporate fleet usage	$ 40,000	2022 and onward	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				$10,000	-
Transit	New DRT North Thornton Transit Maintenance Facility	2400 Thornton Rd. N	Oshawa	New facility construction	$ 600,000,000	Underway / planned	To be built following the Durham Standard where anticipated net energy and related GHG emission reductions expected versus alternative business-as-usual standard					

Figure 21: Summary of Energy Efficiency Initiatives for 2019 to 2024 (YTD) Water Supply

Operational Area	Facility Name	Address	Municipality	Project Description	Total Est. Cost (Rounded)	Approx. In-Service Year	Electricity Savings (kWh)	Natural Gas Savings (m3)	Fuel Savings (L)	Estimated Operational Savings/Year	Incentive / Measure Value (if applicable)	Annual GHG Reductions (rounded)
Water Supply	Ajax Water Supply Plant	75 Lake Driveway	Ajax	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2019	-	-	-	$0.534 million	-	-
Water Supply	Ajax Water Supply Plant	75 Lake Driveway	Ajax	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2020	-	-	-	$0.479 million	-	-
Water Supply	Ajax Water Supply Plant	75 Lake Driveway	Ajax	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2021	-	-	-	$0.28 million	-	-
Water Supply	Ajax Water Supply Plant	75 Lake Driveway	Ajax	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2022	-	-	-	$0.268 million	-	-
Water Supply	Ajax Water Supply Plant	75 Lake Driveway	Ajax	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2023	-	-	-	$0.377 million	-	-
Water Supply	Ajax Water Supply Plant	75 Lake Driveway	Ajax	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	Underway / planned	-	-	-	$109,000 (YTD Jan to Apr)	-	-
Water Supply	Ajax Water Supply Plant	75 Lake Driveway	Ajax	Convert 6 250W metal halide fixtures (these are off most of the time) and 30 400W metal halide fixtures (these are on 24/7/365) to 15 220W LED high bay lights with motion sensors in room	$ 9,000	2021 and onward	116,000 kWh	-	-	$ 13,920	-	3,480 kg CO2e
Water Supply	Ajax Water Supply Plant	75 Lake Driveway	Ajax	Improvements to cooling in the motor control centre (MCC) room	$ 321,400	Underway / planned	Anticipated electricity and related operational cost savings and GHG emission reductions					
Water Supply	Ajax Water Supply Plant	75 Lake Driveway	Ajax	Installation of four (4) Level 2 electric vehicle chargers for corporate fleet usage	$ 80,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $20,000 (pending completion)	-
Water Supply	Ajax Water Supply Plant	75 Lake Driveway	Ajax	Replace 22 (108W) 8 foot long fluorescent fixtures. There are four 4' 32W bulbs per fixture. 13 181W LED fixtures will be installed in place of the 22 fluorescent fixtures. The new LED lights will be controlled by motion sensor	$ 2,800	2021 and onward	19,500 kWh	-	-	$ 2,340	-	590 kg CO2e
Water Supply	Beaverton Water Supply Plant	133 Main St. W	Beaverton (Brock)	Installation of dehumidifier in basement	$ 140,100	2020 and onward	Anticipated electricity and related operational cost savings and GHG emission reductions					
Water Supply	Bowmanville Water Supply Plant	145 Port Darlington Rd.	Bowmanville (Clarington)	Installation of one (1) Level 2 electric vehicle charger for corporate fleet usage	$ 20,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $5,000 (pending completion)	-
Water Supply	Garrard Rd. Water Pumping Station	4600 Garrard Rd.	Whitby	Replacement of axial fan	$ 142,800	Underway / planned	Anticipated electricity and related operational cost savings and GHG emission reductions					
Water Supply	Grandview Rd. Water Pumping Station	Grandview St. S	Oshawa	HVAC system upgrades	$ 630,000	Underway / planned	Anticipated electricity and/or natural gas and related operational cost savings and GHG emission reductions					
Water Supply	Harwood Water Pumping Station	144 Rossland Rd E	Ajax	Replace 6 250W (input wattage 288W) wall packs with four 45W low bay LED fixtures on motion sensor	$ 500	2021 and onward	550 kWh	-	-	$ 66	-	17 kg CO2e
Water Supply	Oshawa Water Supply Plant	1540 Ritson Rd. S	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2019	-	-	-	$0.297 million	-	-
Water Supply	Oshawa Water Supply Plant	1540 Ritson Rd. S	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2020	-	-	-	$0.306 million	-	-

Figure 22: Summary of Energy Efficiency Initiatives for 2019 to 2024 (YTD) Water Supply continued

Operational Area	Facility Name	Address	Municipality	Project Description	Total Est. Cost (Rounded)	Approx. In-Service Year	Electricity Savings (kWh)	Natural Gas Savings (m3)	Fuel Savings (L)	Estimated Operational Savings/Year	Incentive / Measure Value (if applicable)	Annual GHG Reductions (rounded)
Water Supply	Oshawa Water Supply Plant	1540 Ritson Rd. S	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2021	-	-	-	$0.147 million	-	-
Water Supply	Oshawa Water Supply Plant	1540 Ritson Rd. S	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2022	-	-	-	$0.132 million	-	-
Water Supply	Oshawa Water Supply Plant	1540 Ritson Rd. S	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2023	-	-	-	$0.265 million	-	-
Water Supply	Oshawa Water Supply Plant	1540 Ritson Rd. S	Oshawa	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	Underway / planned	-	-	-	$100,000 (YTD Jan to Apr)	-	-
Water Supply	Oshawa Water Supply Plant	1540 Ritson Rd. S	Oshawa	HVAC system upgrade for chemical room	$ 247,800	Underway / planned	Anticipated electricity and/or natural gas and related operational cost savings and GHG emission reductions					
Water Supply	Oshawa Water Supply Plant	1540 Ritson Rd. S	Oshawa	Installation of three (3) Level 2 electric vehicle chargers for corporate fleet usage	$ 60,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $15,000 (pending completion)	-
Water Supply	Oshawa Water Supply Plant	1540 Ritson Rd. S	Oshawa	Replace 6 250W (288W with balast factor) high bay lamps with 6 220W LED lamps with motion sensors	$ 1,000	2022 and onward	13,200 kWh	-	-	$ 1,584	-	400 kg CO2e
Water Supply	Rosebank Rd. Water Pumping Station	30 Rosebank/Sheppard	Pickering	Replacement of dehumidifier	$ 304,600	Underway / planned	Anticipated electricity and related operational cost savings and GHG emission reductions					
Water Supply	Whitby Water Supply Plant	289 Water St.	Whitby	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2019	-	-	-	$0.344 million	-	-
Water Supply	Whitby Water Supply Plant	289 Water St.	Whitby	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2020	-	-	-	$0.339 million	-	-
Water Supply	Whitby Water Supply Plant	289 Water St.	Whitby	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2021	-	-	-	$0.185 million	-	-
Water Supply	Whitby Water Supply Plant	289 Water St.	Whitby	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2022	-	-	-	$0.142 million	-	-
Water Supply	Whitby Water Supply Plant	289 Water St.	Whitby	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	2023	-	-	-	$0.207 million	-	-
Water Supply	Whitby Water Supply Plant	289 Water St.	Whitby	Class A Account - Demand curtailment during system-wide peak events as part of the Industrial Conservation Initiative (ICI) program	$ -	Underway / planned	-	-	-	$54,000 (YTD Jan to Apr)	-	-
Water Supply	Whitby Water Supply Plant	289 Water St.	Whitby	Replace 21 400W (452W with ballast factor) high bay lamps with 12 220W LED high bay lamps	$ 2,000	2021 and onward	17,700 kWh	-	-	$ 2,124	-	530 kg CO2e
Water Supply	Whitby Water Supply Plant	289 Water St.	Whitby	Twelve 400W (458W input wattage) Metal-Halide lamps to be replaced with 197W LED lamps in low lift pump area	$ 2,460	2020 and onward	41,000 kWh	-	-	$ 4,920	-	1,230 kg CO2e

Figure 23: Summary of Energy Efficiency Initiatives for 2019 to 2024 (YTD) Works Dept

Operational Area	Facility Name	Address	Municipality	Project Description	Total Est. Cost (Rounded)	Approx. In-Service Year	Electricity Savings (kWh)	Natural Gas Savings (m3)	Fuel Savings (L)	Estimated Operational Savings/Year	Incentive / Measure Value (if applicable)	Annual GHG Reductions (rounded)
Works Depots	Ajax/Pickering Works Maintenance Depot	2020 Salem Rd.	Ajax	Installation of four (4) Level 2 electric vehicle chargers for corporate fleet usage	$ 17,200	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $20,000 (pending completion)	-
Works Depots	Orono Works Maintenance Depot	3480 Taunton Rd.	Orono (Clarington)	Installation of four (4) Level 2 electric vehicle chargers for corporate fleet usage	$ 19,975	2022 and onward	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				$20,000	-
Works Depots	Orono Works Maintenance Depot	3480 Taunton Rd.	Orono (Clarington)	Replacement of furnace in mechanics office	$ 29,993	2023	Anticipated electricity and/or natural gas and related operational cost savings and GHG emission reductions					
Works Depots	Oshawa/Whitby Works Maintenance Depot	825 Conlin Rd.	Whitby	Installation of four (4) Level 2 electric vehicle chargers for corporate fleet usage	$ 52,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $20,000 (pending completion)	-
Works Depots	Oshawa/Whitby Works Maintenance Depot	825 Conlin Rd.	Whitby	LED Lighting Upgrade	$ 20,000	2021 and onward	36,000 kWh	-	-	$ 4,320	$9,536	1,080 kg CO2e
Works Depots	Oshawa/Whitby Works Maintenance Depot	825 Conlin Rd.	Whitby	LED Lighting Upgrade	$ 29,400	2020 and onward	44,000 kWh	-	-	$ 5,280	$2,369	1,320 kg CO2e
Works Depots	Oshawa/Whitby Works Maintenance Depot	825 Conlin Rd.	Whitby	LED Lighting Upgrade	$ 29,400	2021 and onward	43,900 kWh	-	-	$ 5,268	$2,154	1,320 kg CO2e
Works Depots	Oshawa/Whitby Works Maintenance Depot	825 Conlin Rd.	Whitby	Replacement of furnace in fleet garage	$ 149,200	2022	Anticipated electricity and/or natural gas and related operational cost savings and GHG emission reductions					
Works Depots	Scugog Works Maintenance Depot	10 Goodwood Rd.	Scugog	Installation of four (4) Level 2 electric vehicle chargers for corporate fleet usage	$ 47,000	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $20,000 (pending completion)	-
Works Depots	Sunderland Works Maintenance Depot	S995 River St.	Brock	Installation of four (4) Level 2 electric vehicle chargers for corporate fleet usage	$ 22,500	Underway / planned	Net energy, operational and GHG benefits will be dependent on actual charging activity in comparison to status quo scenario				Up to $20,000 (pending completion)	-
Works Depots	Various Facilities	Various Locations	Various	Undertaking of GHG Emission Reduction Pathways studies including baseline and modified energy models to outline pathway to net zero by 2045	$ 200,000	Underway / planned	-	-	-	-	-	-

8. Appendix B

Figure 24: 2012 to 2023 Energy Usage Tables-by Operation Area

Total Energy Usage by Operational Area (2012 to 2023)

Electricity ('000 kWh)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Transit	1,558.5	1,906.6	2,103.6	1,972.5	2,012.3	2,222.7	2,724.4	2,628.6	2,709.5	2,352.6	2,407.4	2,283.3
Child Care	309.5	286.4	258.4	243.6	243.9	223.7	231.7	196.6	158.0	163.6	160.4	165.3
Long-Term Care	13,763.9	13,215.0	12,679.5	10,586.3	13,667.4	13,102.5	13,154.3	12,524.5	12,925.7	13,075.7	13,020.6	12,912.5
Local Housing MURBs	8,200.2	8,722.6	8,853.5	8,207.5	7,953.8	7,738.9	8,131.5	8,186.5	7,775.3	7,433.0	7,957.4	7,061.4
Paramedic Services	877.5	949.1	1,018.9	935.3	922.1	914.8	923.5	918.3	948.1	922.1	1,031.0	1,074.1
Regional HQ	8,289.0	7,938.4	7,798.5	7,649.1	7,634.2	7,409.8	7,431.2	7,514.6	6,583.5	6,328.8	6,307.9	6,273.1
Other Offices/Misc. Accounts	1,200.0	1,257.3	1,347.3	1,334.8	1,429.1	1,421.6	1,440.6	1,383.8	1,144.4	1,152.9	1,858.2	1,476.3
Police Services	5,167.3	5,221.4	6,127.5	6,000.6	7,584.2	7,145.8	7,315.5	7,254.2	7,066.5	6,899.0	7,097.2	6,732.7
Works Depots	1,257.7	1,231.3	1,216.5	1,146.3	1,133.3	1,182.1	1,146.4	1,122.9	1,112.6	1,144.9	1,159.9	1,133.1
Traffic Signals	1,107.9	1,262.0	1,424.8	1,215.9	1,309.7	1,330.4	1,308.7	1,328.4	1,343.5	1,357.8	1,438.9	1,406.3
Solid Waste Management	278.1	324.8	361.8	292.6	343.8	386.2	353.7	294.3	265.2	284.0	285.5	242.4
Water Supply	39,756.2	39,323.2	40,044.5	39,695.3	40,928.3	38,781.1	41,331.6	41,387.8	41,604.0	41,680.7	42,757.5	44,137.9
Sanitary Sewer less Duffin Creek WPCP	35,505.8	35,243.8	35,632.1	33,552.3	34,365.5	35,723.7	36,693.4	38,125.0	37,835.6	37,553.2	37,917.4	39,456.3
Duffin Creek WPCP (Durham and York Share)	61,212.8	60,535.0	65,430.8	62,814.3	59,385.3	57,866.0	61,969.3	62,326.9	63,347.0	63,532.8	65,556.7	71,049.3
Electricity Sub-Total	**178,484.3**	**177,416.8**	**184,297.5**	**175,646.4**	**178,912.9**	**175,449.2**	**184,155.7**	**185,192.4**	**184,818.9**	**183,881.1**	**188,956.0**	**195,404.0**
Sub-Total Gross Energy ('000 GJ)	**642.5**	**638.7**	**663.5**	**632.3**	**644.1**	**631.6**	**663.0**	**666.7**	**665.3**	**662.0**	**680.2**	**703.5**
Sub-Total Net Energy ('000 GJ)	**465.0**	**469.7**	**479.6**	**454.5**	**476.4**	**465.6**	**486.9**	**488.5**	**485.1**	**480.0**	**490.8**	**497.4**

Natural Gas ('000 m^3)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Transit	391.2	504.0	600.9	558.6	578.2	698.3	802.3	838.8	777.6	704.6	715.2	597.6
Child Care	32.8	38.7	43.3	38.9	33.5	36.3	39.1	41.6	43.4	34.1	33.3	30.2
Long-Term Care	1,939.5	2,119.6	2,057.4	1,655.1	1,789.9	1,759.2	1,933.1	1,925.3	1,956.7	2,021.1	2,007.9	2,118.2
Local Housing MURBs	547.7	631.7	653.4	630.6	567.3	563.5	611.3	608.2	568.8	503.9	498.6	502.0
Local Housing Family Units	750.0	763.3	755.7	761.9	679.5	718.2	700.6	750.6	683.3	651.2	705.1	654.2
Paramedic Services	127.8	145.6	180.3	143.8	150.2	154.2	179.0	168.5	166.2	148.6	178.2	152.3
Regional HQ	380.1	418.3	418.8	416.0	368.0	369.3	382.4	368.5	311.5	282.6	306.1	318.5
Other Offices/Misc. Accounts	64.3	73.9	86.3	75.5	69.3	85.8	72.0	39.8	53.3	143.4	175.6	187.4
Police Services	421.1	604.7	653.1	582.1	665.4	772.5	811.0	839.3	802.8	774.3	860.2	781.9
Works Depots	171.3	205.5	306.9	323.9	255.2	273.8	280.5	316.6	291.4	275.7	339.7	287.9
Water Supply	469.2	418.5	403.1	451.5	406.5	327.0	372.2	426.9	391.5	376.7	362.8	328.6
Sanitary Sewer less Duffin Creek WPCP	772.6	1,034.6	1,009.5	993.0	1,076.3	1,058.7	1,238.3	1,598.8	1,335.4	1,221.0	1,437.5	1,369.5
Duffin Creek WPCP (Durham and York Share)	4,587.1	3,403.7	3,171.6	1,901.8	2,119.1	2,226.8	3,730.8	3,202.1	2,349.4	2,913.2	2,831.3	3,504.2
Natural Gas Sub-Total	**10,654.8**	**10,362.3**	**10,340.3**	**8,532.8**	**8,758.6**	**9,043.5**	**11,152.7**	**11,124.9**	**9,731.4**	**10,050.4**	**10,451.5**	**10,832.4**
Sub-Total Gross Energy ('000 GJ)	**396.8**	**385.9**	**385.1**	**317.8**	**326.2**	**336.8**	**415.3**	**414.3**	**362.4**	**374.3**	**389.2**	**403.4**
Sub-Total Net Energy ('000 GJ)	**260.5**	**289.1**	**294.1**	**262.9**	**265.1**	**272.1**	**308.2**	**322.8**	**296.1**	**292.5**	**308.0**	**302.8**

Stationary Diesel ('000 L)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Transit	-	-	-	-	-	0.5	0.5	0.9	0.6	0.6	1.2	0.5
Long-Term Care	10.2	7.9	10.7	6.3	12.1	7.4	14.5	8.8	5.0	6.0	6.5	2.8
Paramedic Services	1.2	3.3	2.9	2.1	2.0	2.7	1.9	2.7	1.3	0.9	1.0	0.7
Regional HQ	12.4	14.6	4.2	-	13.3	3.9	6.1	1.0	-	-	17.6	14.5
Other Offices/Misc. Accounts	-	2.5	0.1	0.7	0.3	0.7	0.3	0.2	0.6	0.7	0.4	-
Police Services	0.6	1.7	2.7	-	2.7	-	7.8	1.6	3.3	6.1	2.5	2.3
Works Depots	-	-	-	-	-	-	0.4	-	0.2	0.6	0.6	0.5
Water Supply	71.7	76.6	96.6	80.4	70.9	68.1	65.7	70.3	86.0	65.9	92.5	77.3
Sanitary Sewer less Duffin Creek WPCP	50.5	84.3	40.9	46.6	52.9	45.6	51.6	55.1	40.0	51.3	64.3	43.6
Duffin Creek WPCP (Durham and York Share)	26.1	6.0	218.0	17.0	6.2	67.5	84.4	4.6	63.0	103.2	63.7	36.3
Stationary Diesel Sub-Total	**172.9**	**196.9**	**376.1**	**153.1**	**160.4**	**196.3**	**233.2**	**145.3**	**200.1**	**235.2**	**250.3**	**178.3**
Sub-Total Gross Energy ('000 GJ)	**6.7**	**7.6**	**14.5**	**5.9**	**6.2**	**7.6**	**9.0**	**5.6**	**7.7**	**9.1**	**9.7**	**6.9**
Sub-Total Net Energy ('000 GJ)	**5.8**	**7.4**	**7.7**	**5.4**	**6.0**	**5.5**	**6.3**	**5.5**	**5.8**	**5.8**	**7.7**	**5.7**

Furnace Oil ('000 L)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Other Offices/Misc. Accounts	7.2	13.3	11.5	11.2	9.7	6.2	9.3	11.4	5.8	3.6	8.1	8.3
Duffin Creek WPCP (Durham and York Share)	1,262.5	687.4	924.4	624.3	491.3	694.7	751.2	552.7	986.8	848.2	661.8	640.7
Furnace Oil Sub-Total	**1,269.7**	**700.7**	**935.9**	**635.5**	**501.0**	**700.9**	**760.5**	**564.0**	**992.6**	**851.8**	**669.9**	**649.0**
Sub-Total Gross Energy ('000 GJ)	**46.6**	**25.7**	**34.4**	**23.3**	**18.4**	**25.7**	**27.9**	**20.7**	**36.4**	**31.3**	**24.6**	**23.8**
Sub-Total Net Energy ('000 GJ)	**10.4**	**7.1**	**8.9**	**6.1**	**4.9**	**6.3**	**7.5**	**5.6**	**9.8**	**8.1**	**6.2**	**5.9**

Propane Fuel ('000 L)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Other Offices/Misc. Accounts	0.8	8.8	5.0	3.4	0.8	0.7	-	0.0	-	2.9	-	-
Police Services	15.8	14.4	0.2	-	-	-	-	-	-	-	-	-
Solid Waste Management	1.4	-	6.2	3.6	4.2	3.7	4.1	3.2	2.4	2.9	2.8	1.2
Propane Fuel Sub-Total	**18.0**	**23.2**	**11.5**	**7.0**	**5.0**	**4.4**	**4.1**	**3.3**	**2.4**	**5.8**	**2.8**	**1.2**
Sub-Total Energy ('000 GJ)	**0.5**	**0.6**	**0.3**	**0.2**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.1**	**0.0**

Fleet Gasoline ('000 L)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Transit	10.3	13.8	34.0	24.2	9.4	-	96.3	123.4	-	-	-	-
Paramedic Services	443.6	537.9	727.1	694.2	721.4	760.4	803.0	610.9	493.1	702.4	845.8	785.8
Police Services	1,705.2	1,682.3	1,805.1	1,626.9	1,704.5	1,612.0	1,660.6	1,620.5	1,777.8	1,653.0	1,521.2	1,543.7
Public Works	500.2	515.6	551.2	571.0	649.2	724.2	770.6	760.2	810.1	817.1	712.2	691.5
Fleet Gasoline Sub-Total	**2,659.2**	**2,749.6**	**3,117.3**	**2,916.2**	**3,084.4**	**3,096.7**	**3,330.5**	**3,115.0**	**3,081.0**	**3,172.5**	**3,079.2**	**3,021.0**
Sub-Total Energy ('000 GJ)	**92.2**	**95.3**	**108.0**	**101.1**	**106.9**	**107.3**	**115.4**	**108.0**	**106.8**	**110.0**	**106.7**	**104.7**

Fleet Diesel ('000 L)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Transit	6,036.6	6,999.4	7,381.2	7,185.9	7,209.9	7,217.8	7,425.3	7,259.6	5,421.4	5,418.5	5,860.2	6,499.2
Paramedic Services	148.0	83.6	20.6	1.3	0.8	0.3	0.2	0.2	0.1	-	-	-
Public Works	778.8	959.0	983.3	828.5	914.1	879.8	824.5	933.1	778.3	669.7	771.3	625.1
Fleet Diesel Sub-Total	**6,963.3**	**8,042.0**	**8,385.1**	**8,015.8**	**8,124.8**	**8,097.9**	**8,250.0**	**8,192.9**	**6,199.8**	**6,088.2**	**6,631.5**	**7,124.3**
Sub-Total Energy ('000 GJ)	**269.3**	**311.1**	**324.3**	**310.1**	**314.3**	**313.2**	**319.1**	**316.9**	**239.8**	**235.5**	**256.5**	**275.6**

Fleet Other ('000 L)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total Fleet	64.8	57.2	74.2	79.4	83.5	84.8	70.2	64.8	35.4	41.8	35.4	69.6
Fleet Other Sub-Total	**64.8**	**57.2**	**74.2**	**79.4**	**83.5**	**84.8**	**70.2**	**64.8**	**35.4**	**41.8**	**35.4**	**69.6**
Sub-Total Energy ('000 GJ)	**2.2**	**2.0**	**2.6**	**2.8**	**2.9**	**2.9**	**2.4**	**2.2**	**1.2**	**1.4**	**1.2**	**2.4**

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total Gross Energy ('000 GJ)	**1,456.9**	**1,466.9**	**1,532.7**	**1,393.4**	**1,419.1**	**1,425.3**	**1,552.3**	**1,534.5**	**1,419.8**	**1,423.7**	**1,468.3**	**1,520.3**
Total Net Energy ('000 GJ)	**1,105.9**	**1,182.2**	**1,225.6**	**1,142.9**	**1,176.6**	**1,173.1**	**1,246.0**	**1,249.5**	**1,144.7**	**1,133.4**	**1,177.1**	**1,194.5**

Figure 25: 2012 to 2023 Energy Usage Tables-by Operation Area continued

Total Energy Cost by Operational Area (2012 to 2023)

Electricity ($000s)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Transit	$ 183.0	$ 249.8	$ 273.9	$ 296.9	$ 340.6	$ 384.8	$ 449.2	$ 456.5	$ 438.6	$ 369.8	$ 362.6	$ 350.6
Child Care	$ 37.8	$ 39.9	$ 36.4	$ 39.7	$ 48.2	$ 37.1	$ 33.1	$ 28.4	$ 22.7	$ 24.5	$ 25.8	$ 27.6
Long-Term Care	$ 1,592.9	$ 1,716.3	$ 1,668.4	$ 1,643.3	$ 2,371.5	$ 1,970.1	$ 1,443.7	$ 1,513.7	$ 1,621.6	$ 1,633.2	$ 1,593.7	$ 1,675.7
Local Housing MURBs	$ 876.9	$ 999.5	$ 1,091.9	$ 1,124.4	$ 1,243.0	$ 1,002.1	$ 905.8	$ 955.9	$ 972.8	$ 899.1	$ 1,000.4	$ 954.3
Paramedic Services	$ 109.1	$ 130.0	$ 145.4	$ 152.6	$ 171.1	$ 152.6	$ 150.8	$ 150.4	$ 159.3	$ 144.5	$ 162.3	$ 175.7
Regional HQ	$ 963.1	$ 1,019.8	$ 1,008.7	$ 1,185.5	$ 1,327.9	$ 1,191.9	$ 1,053.6	$ 950.9	$ 892.8	$ 752.3	$ 792.2	$ 731.4
Other Offices/Misc. Accounts	$ 152.2	$ 177.0	$ 196.6	$ 226.7	$ 279.4	$ 252.1	$ 230.7	$ 222.0	$ 188.6	$ 177.4	$ 288.1	$ 228.8
Police Services	$ 620.3	$ 708.8	$ 858.9	$ 988.6	$ 1,408.7	$ 1,339.5	$ 1,279.6	$ 1,324.9	$ 1,318.0	$ 1,170.3	$ 1,180.9	$ 1,158.4
Works Depots	$ 160.6	$ 175.3	$ 184.3	$ 198.5	$ 221.9	$ 215.5	$ 202.6	$ 206.0	$ 209.8	$ 206.1	$ 209.4	$ 207.7
Traffic Signals	$ 153.7	$ 196.1	$ 239.0	$ 212.3	$ 271.2	$ 244.1	$ 219.4	$ 225.9	$ 235.7	$ 249.1	$ 273.9	$ 288.7
Solid Waste Management	$ 35.9	$ 49.1	$ 57.6	$ 54.0	$ 72.1	$ 70.6	$ 59.1	$ 59.1	$ 43.6	$ 46.6	$ 49.0	$ 43.6
Water Supply	$ 4,821.5	$ 5,304.4	$ 5,504.8	$ 6,286.7	$ 7,295.1	$ 6,144.5	$ 5,861.8	$ 5,953.3	$ 6,039.0	$ 5,676.7	$ 5,911.2	$ 6,066.9
Sanitary Sewer less Duffin Creek WPCP	$ 4,104.5	$ 4,539.7	$ 4,668.2	$ 5,172.7	$ 5,938.4	$ 5,341.7	$ 4,813.2	$ 4,900.2	$ 4,788.3	$ 4,709.7	$ 4,989.0	$ 5,035.8
Duffin Creek WPCP (Durham and York Share)	$ 6,442.5	$ 7,771.4	$ 8,591.6	$ 8,738.7	$ 8,026.5	$ 7,776.8	$ 6,867.7	$ 6,058.6	$ 6,350.8	$ 6,554.1	$ 7,344.0	$ 7,478.4
Gross Electricity Sub-Total	**$ 20,254.1**	**$ 23,077.2**	**$ 24,525.9**	**$ 26,320.6**	**$ 29,015.6**	**$ 26,123.5**	**$ 23,570.4**	**$ 23,005.5**	**$ 23,281.6**	**$ 22,613.4**	**$ 24,182.5**	**$ 24,423.8**

Natural Gas ($000s)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Transit	$ 101.6	$ 114.7	$ 148.9	$ 186.3	$ 188.3	$ 219.5	$ 250.0	$ 218.7	$ 204.3	$ 206.3	$ 336.7	$ 338.2
Child Care	$ 15.8	$ 15.3	$ 17.3	$ 19.1	$ 17.7	$ 18.5	$ 18.4	$ 17.0	$ 16.7	$ 15.3	$ 21.0	$ 22.6
Long-Term Care	$ 509.8	$ 446.8	$ 501.1	$ 581.5	$ 617.0	$ 599.3	$ 585.9	$ 494.6	$ 494.4	$ 566.2	$ 906.6	$ 1,104.3
Local Housing MURBs	$ 158.8	$ 188.1	$ 226.0	$ 234.5	$ 178.8	$ 191.9	$ 198.6	$ 192.9	$ 188.1	$ 190.0	$ 252.6	$ 273.7
Local Housing Family Units	$ 332.6	$ 486.6	$ 475.3	$ 472.8	$ 421.1	$ 455.2	$ 426.6	$ 449.6	$ 448.3	$ 423.0	$ 536.3	$ 589.0
Paramedic Services	$ 46.6	$ 45.0	$ 58.4	$ 62.8	$ 65.1	$ 64.5	$ 73.1	$ 60.3	$ 58.4	$ 59.7	$ 101.7	$ 110.5
Regional HQ	$ 96.1	$ 94.7	$ 109.3	$ 140.5	$ 120.0	$ 123.9	$ 113.7	$ 96.2	$ 82.7	$ 84.4	$ 151.8	$ 172.7
Other Offices/Misc. Accounts	$ 23.1	$ 21.9	$ 26.9	$ 30.8	$ 28.6	$ 33.0	$ 30.1	$ 15.8	$ 21.4	$ 55.8	$ 92.5	$ 114.9
Police Services	$ 126.7	$ 139.0	$ 168.8	$ 205.3	$ 239.7	$ 279.8	$ 266.4	$ 238.7	$ 224.5	$ 247.9	$ 416.2	$ 451.8
Works Depots	$ 56.2	$ 51.6	$ 79.6	$ 115.6	$ 97.3	$ 99.9	$ 99.7	$ 90.9	$ 83.0	$ 89.7	$ 165.2	$ 172.8
Water Supply	$ 135.3	$ 100.3	$ 110.1	$ 157.9	$ 146.1	$ 121.6	$ 128.8	$ 123.6	$ 111.8	$ 119.0	$ 180.1	$ 193.1
Sanitary Sewer less Duffin Creek WPCP	$ 238.2	$ 233.5	$ 269.1	$ 355.2	$ 375.2	$ 368.7	$ 389.2	$ 431.5	$ 365.8	$ 374.8	$ 687.6	$ 764.4
Duffin Creek WPCP (Durham and York Share)	$ 1,236.8	$ 701.0	$ 764.4	$ 672.5	$ 728.8	$ 763.2	$ 1,094.0	$ 812.2	$ 614.9	$ 829.2	$ 1,359.0	$ 1,859.0
Gross Natural Gas Sub-Total	**$ 3,077.6**	**$ 2,638.5**	**$ 2,955.1**	**$ 3,234.9**	**$ 3,223.7**	**$ 3,338.9**	**$ 3,674.6**	**$ 3,242.0**	**$ 2,914.4**	**$ 3,261.4**	**$ 5,207.4**	**$ 6,166.9**

Stationary Diesel ($000s)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Transit	$ -	$ -	$ -	$ -	$ -	$ 0.5	$ 0.5	$ 0.9	$ 0.4	$ 0.7	$ 1.5	$ 0.7
Long-Term Care	$ 10.6	$ 8.6	$ 11.2	$ 5.5	$ 8.5	$ 6.8	$ 15.0	$ 8.5	$ 4.3	$ 6.4	$ 11.1	$ 4.5
Paramedic Services	$ 1.3	$ 2.8	$ 3.0	$ 1.7	$ 1.4	$ 2.3	$ 2.1	$ 2.4	$ 1.1	$ 1.2	$ 2.0	$ 1.2
Regional HQ	$ 12.6	$ 12.6	$ 4.0	$ -	$ 8.7	$ 3.5	$ 5.9	$ 0.9	$ -	$ -	$ 32.0	$ 20.7
Other Offices/Misc. Accounts	$ -	$ 2.2	$ 0.1	$ 0.6	$ 0.2	$ 0.6	$ 0.3	$ 0.2	$ 0.4	$ 0.8	$ 0.6	$ -
Police Services	$ 0.6	$ 1.8	$ 2.6	$ -	$ 2.2	$ -	$ 7.7	$ 1.6	$ 2.6	$ 7.7	$ 4.5	$ 3.6
Works Depots	$ -	$ -	$ -	$ -	$ -	$ -	$ 0.4	$ -	$ 0.2	$ 0.6	$ 1.2	$ 0.7
Water Supply	$ 71.2	$ 70.9	$ 104.9	$ 67.1	$ 49.4	$ 58.8	$ 65.3	$ 66.5	$ 62.2	$ 65.5	$ 152.1	$ 114.5
Sanitary Sewer less Duffin Creek WPCP	$ 45.4	$ 79.6	$ 42.8	$ 38.0	$ 37.0	$ 37.7	$ 51.7	$ 49.3	$ 31.6	$ 51.8	$ 110.3	$ 64.4
Duffin Creek WPCP (Durham and York Share)	$ 23.4	$ 5.4	$ 223.2	$ 13.7	$ 4.5	$ 58.7	$ 72.4	$ 4.3	$ 59.1	$ 91.5	$ 99.2	$ 50.4
Gross Stationary Diesel Sub-Total	**$ 165.1**	**$ 184.0**	**$ 391.9**	**$ 126.6**	**$ 111.9**	**$ 168.8**	**$ 221.4**	**$ 134.5**	**$ 161.9**	**$ 226.2**	**$ 414.4**	**$ 260.6**

Furnace Oil ($000s)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Other Offices/Misc. Accounts	$ 7.3	$ 13.6	$ 12.1	$ 8.8	$ 6.1	$ 4.9	$ 8.7	$ 9.9	$ 4.4	$ 2.9	$ 12.6	$ 11.9
Duffin Creek WPCP (Durham and York Share)	$ 1,253.3	$ 688.3	$ 940.6	$ 471.0	$ 322.6	$ 554.1	$ 700.8	$ 471.9	$ 642.4	$ 817.2	$ 1,102.6	$ 893.3
Gross Furnace Oil Sub-Total	**$ 1,260.6**	**$ 701.9**	**$ 952.7**	**$ 479.8**	**$ 328.7**	**$ 559.0**	**$ 709.5**	**$ 481.8**	**$ 646.8**	**$ 820.1**	**$ 1,115.3**	**$ 905.2**

Propane Fuel ($000s)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Other Offices/Misc. Accounts	$ 0.5	$ 4.3	$ 3.2	$ 2.2	$ 0.5	$ 0.4	$ -	$ 0.0	$ -	$ 1.1	$ -	$ -
Police Services	$ 10.8	$ 9.9	$ 0.2	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Solid Waste Management	$ 0.9	$ -	$ 4.0	$ 2.3	$ 2.2	$ 2.1	$ 3.9	$ 2.2	$ 1.6	$ 1.3	$ 2.0	$ 0.8
Gross Propane Fuel Sub-Total	**$ 12.3**	**$ 14.2**	**$ 7.4**	**$ 4.5**	**$ 2.7**	**$ 2.5**	**$ 3.9**	**$ 2.2**	**$ 1.6**	**$ 2.4**	**$ 2.0**	**$ 0.8**

Fleet Fuels (Gasoline, Diesel and Other) ($000s)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Transit	$ 10,772.7	$ 8,652.4	$ 9,161.3	$ 7,262.1	$ 6,273.8	$ 7,432.9	$ 8,906.2	$ 8,315.0	$ 4,920.0	$ 6,183.8	$ 11,151.2	$ 10,882.5
Paramedic Services	$ 726.6	$ 767.1	$ 821.5	$ 685.7	$ 721.9	$ 844.7	$ 984.4	$ 716.0	$ 663.7	$ 1,003.5	$ 1,468.7	$ 1,240.4
Police Services	$ 1,948.3	$ 2,077.2	$ 2,192.2	$ 1,700.9	$ 1,537.1	$ 1,645.5	$ 1,796.5	$ 1,979.3	$ 1,764.5	$ 2,140.7	$ 2,546.7	$ 2,448.1
Public Works	$ 1,349.7	$ 1,688.2	$ 1,693.0	$ 1,401.0	$ 1,966.2	$ 1,761.4	$ 1,800.0	$ 1,789.2	$ 1,454.3	$ 1,759.8	$ 2,571.7	$ 2,032.0
Gross Fleet Fuels Sub-Total	**$ 14,797.3**	**$ 13,184.9**	**$ 13,868.0**	**$ 11,049.7**	**$ 10,499.0**	**$ 11,684.5**	**$ 13,487.0**	**$ 12,799.4**	**$ 8,802.5**	**$ 11,087.7**	**$ 17,738.4**	**$ 16,603.1**

Total Gross Cost ($000s)	**$ 39,567.0**	**$ 39,800.8**	**$ 42,701.0**	**$ 41,216.1**	**$ 43,181.6**	**$ 41,877.3**	**$ 41,666.8**	**$ 39,665.5**	**$ 35,808.8**	**$ 38,011.2**	**$ 48,660.1**	**$ 48,360.3**

Figure 26: 2012 to 2023 Energy Usage Tables-by Operation Area continued

Total Energy-Related Emissions by Operational Area (2012 to 2023)

Electricity (tonnes CO_2e)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Transit	171.4	146.8	88.4	84.8	80.5	42.2	81.7	76.2	75.9	70.6	72.2	68.5
Child Care	34.0	22.1	10.9	10.5	9.8	4.3	6.9	5.7	4.4	4.9	4.8	5.0
Long-Term Care	1,514.0	1,017.6	532.5	455.2	546.7	248.9	394.6	363.2	361.9	392.3	390.6	387.4
Local Housing MURBs	902.0	671.6	371.8	352.9	318.2	147.0	243.9	237.4	217.7	223.0	238.7	211.8
Paramedic Services	96.5	73.1	42.8	40.2	36.9	17.4	27.7	26.6	26.5	27.7	30.9	32.2
Regional HQ	911.8	611.3	327.5	328.9	305.4	140.8	222.9	217.9	184.3	189.9	189.2	188.2
Other Offices/Misc. Accounts	132.0	96.8	56.6	57.4	57.2	27.0	43.2	40.1	32.0	34.6	55.7	44.3
Police Services	568.4	402.0	257.4	258.0	303.4	135.8	219.5	210.4	197.9	207.0	212.9	202.0
Works Depots	138.3	94.8	51.1	49.3	45.3	22.5	34.4	32.6	31.2	34.3	34.8	34.0
Traffic Signals	121.9	97.2	59.8	52.3	52.4	25.3	39.3	38.5	37.6	40.7	43.2	42.2
Solid Waste Management	30.6	25.0	15.2	12.6	13.8	7.3	10.6	8.5	7.4	8.5	8.6	7.3
Water Supply	4,373.2	3,027.9	1,681.9	1,706.9	1,637.1	736.8	1,239.9	1,200.2	1,164.9	1,250.4	1,282.7	1,324.1
Sanitary Sewer less Duffin Creek WPCP	3,905.6	2,713.8	1,496.5	1,442.7	1,374.6	678.7	1,100.8	1,105.6	1,059.4	1,126.6	1,137.5	1,183.7
Duffin Creek WPCP (Durham and York Share)	6,733.4	4,661.2	2,748.1	2,701.0	2,375.4	1,099.5	1,859.1	1,807.5	1,773.7	1,906.0	1,966.7	2,131.5
Electricity Gross Emissions Sub-Total	**19,633.3**	**13,661.1**	**7,740.5**	**7,552.8**	**7,156.5**	**3,333.5**	**5,524.7**	**5,370.6**	**5,174.9**	**5,516.4**	**5,668.7**	**5,862.1**
Electricity Net Emissions Sub-Total	**14,207.8**	**10,045.4**	**5,594.9**	**5,429.0**	**5,293.7**	**2,457.5**	**4,057.3**	**3,935.1**	**3,773.0**	**3,999.9**	**4,089.7**	**4,145.1**

Natural Gas (tonnes CO_2e)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Transit	743.1	961.4	1,146.4	1,073.7	1,114.0	1,346.0	1,550.2	1,620.6	1,502.3	1,361.5	1,381.9	1,154.7
Child Care	62.4	73.8	82.6	74.8	64.6	69.9	75.6	80.5	83.9	65.9	64.3	58.3
Long-Term Care	3,683.9	4,043.0	3,925.0	3,181.2	3,448.3	3,391.3	3,735.1	3,719.9	3,780.6	3,905.0	3,879.5	4,092.7
Local Housing MURBs	1,040.4	1,204.9	1,246.5	1,212.1	1,093.0	1,086.3	1,181.1	1,175.1	1,099.0	973.7	963.4	970.0
Local Housing Family Units	1,424.5	1,456.0	1,441.6	1,464.4	1,309.1	1,384.5	1,353.7	1,450.3	1,320.3	1,258.1	1,362.3	1,264.0
Paramedic Services	242.8	277.8	344.0	276.4	289.4	297.2	345.8	325.6	321.2	287.1	344.3	294.3
Regional HQ	721.9	797.8	798.9	799.7	709.0	711.9	738.9	712.0	601.9	546.1	591.3	615.5
Other Offices/Misc. Accounts	122.1	141.0	164.7	145.1	133.5	165.5	139.1	76.9	103.0	277.2	339.3	362.0
Police Services	799.9	1,153.4	1,246.0	1,118.8	1,281.9	1,489.1	1,566.9	1,621.6	1,551.2	1,496.0	1,662.0	1,510.7
Works Depots	325.3	392.0	585.6	622.5	491.7	527.8	542.0	611.7	563.0	532.8	656.3	556.2
Water Supply	891.3	798.3	769.1	867.8	783.1	630.3	719.1	824.7	756.5	727.8	701.1	634.9
Sanitary Sewer less Duffin Creek WPCP	1,467.4	1,973.4	1,926.0	1,908.7	2,073.5	2,040.9	2,392.5	3,089.0	2,580.2	2,359.2	2,777.5	2,646.0
Duffin Creek WPCP (Durham and York Share)	8,712.6	6,492.4	6,050.7	3,655.4	4,082.5	4,292.6	7,208.4	6,186.8	4,539.3	5,628.6	5,470.4	6,770.5
Natural Gas Gross Emissions Sub-Total	**20,237.5**	**19,765.2**	**19,727.1**	**16,400.6**	**16,873.7**	**17,433.2**	**21,548.4**	**21,494.8**	**18,802.4**	**19,418.7**	**20,193.6**	**20,929.7**
Natural Gas Net Emissions Sub-Total	**13,285.4**	**14,808.2**	**15,068.5**	**13,568.1**	**13,715.5**	**14,086.5**	**15,992.6**	**16,746.9**	**15,365.2**	**15,177.1**	**15,978.0**	**15,708.9**

Stationary Diesel (tonnes CO_2e)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Transit	-	-	-	-	-	1.3	1.4	2.5	1.7	1.6	3.1	1.2
Long-Term Care	27.5	21.3	28.7	16.9	32.5	19.8	39.1	23.7	13.4	16.2	17.6	7.4
Paramedic Services	3.3	8.7	7.8	5.7	5.4	7.2	5.2	7.2	3.4	2.5	2.6	1.8
Regional HQ	33.4	39.3	11.2	-	35.7	10.5	16.3	2.7	-	-	47.4	38.9
Other Offices/Misc. Accounts	-	6.7	0.3	1.9	0.8	1.8	0.8	0.6	1.7	1.8	0.9	-
Police Services	1.7	4.6	7.3	-	7.4	-	21.0	4.3	8.9	16.5	6.6	6.2
Works Depots	-	-	-	-	-	-	1.0	-	0.6	1.5	1.7	1.4
Water Supply	192.9	206.1	259.8	216.2	190.7	183.2	176.6	189.1	231.3	177.2	248.8	207.8
Sanitary Sewer less Duffin Creek WPCP	135.9	226.9	109.9	125.4	142.2	122.6	138.8	148.3	107.7	137.8	172.9	117.2
Duffin Creek WPCP (Durham and York Share)	70.1	16.0	586.4	45.7	16.6	181.6	227.0	12.5	169.4	277.6	171.4	97.6
Stationary Diesel Gross Emissions Sub-Total	**464.9**	**529.6**	**1,011.5**	**411.7**	**431.3**	**528.0**	**627.3**	**390.8**	**538.1**	**632.6**	**673.1**	**479.7**
Stationary Diesel Net Emissions Sub-Total	**406.7**	**516.6**	**536.0**	**374.3**	**417.7**	**379.2**	**441.4**	**380.6**	**400.0**	**405.8**	**532.3**	**399.5**

Furnace Oil (tonnes CO_2e)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Other Offices/Misc. Accounts	19.9	36.7	31.8	30.8	26.8	17.1	25.6	31.5	16.1	9.9	22.4	23.1
Duffin Creek WPCP (Durham and York Share)	3,488.0	1,899.1	2,554.1	1,724.9	1,357.3	1,919.3	2,075.5	1,526.9	2,726.4	2,343.5	1,828.6	1,770.2
Furnace Oil Gross Emissions Sub-Total	**3,508.0**	**1,935.9**	**2,585.9**	**1,755.7**	**1,384.1**	**1,936.4**	**2,101.1**	**1,558.4**	**2,742.4**	**2,353.5**	**1,851.0**	**1,793.2**
Furnace Oil Net Emissions Sub-Total	**783.5**	**531.0**	**669.0**	**455.8**	**366.9**	**472.2**	**563.1**	**418.9**	**737.1**	**606.2**	**465.7**	**443.5**

Propane Fuel (tonnes CO_2e)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Other Offices/Misc. Accounts	1.2	13.7	7.8	5.3	1.3	1.1	-	0.0	-	4.4	-	-
Police Services	24.5	22.3	0.4	-	-	-	-	-	-	-	-	-
Solid Waste Management	2.1	-	9.7	5.5	6.5	5.7	6.3	5.0	3.8	4.5	4.4	1.9
Propane Fuel Gross Emissions Sub-Total	**27.9**	**36.0**	**17.9**	**10.8**	**7.8**	**6.8**	**6.3**	**5.0**	**3.8**	**9.0**	**4.4**	**1.9**

Fleet Gasoline (tonnes CO_2e)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Transit	25.1	33.8	83.4	59.3	23.0	-	236.3	302.7	-	-	-	-
Paramedic Services	1,088.3	1,319.6	1,783.6	1,702.9	1,769.6	1,865.5	1,969.8	1,498.7	1,209.6	1,723.0	2,074.8	1,927.6
Police Services	4,182.9	4,126.8	4,428.0	3,991.0	4,181.3	3,954.4	4,073.7	3,975.3	4,361.1	4,054.9	3,731.8	3,786.9
Public Works	1,227.0	1,264.9	1,352.1	1,400.7	1,592.6	1,776.6	1,890.3	1,864.9	1,987.3	2,004.5	1,747.1	1,696.4
Fleet Gasoline Gross Emissions Sub-Total	**6,523.4**	**6,745.1**	**7,647.2**	**7,153.8**	**7,566.4**	**7,596.5**	**8,170.1**	**7,641.5**	**7,558.0**	**7,782.5**	**7,553.6**	**7,410.9**

Fleet Diesel (tonnes CO_2e)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Transit	16,587.1	19,232.6	20,281.7	19,745.2	19,811.2	19,832.9	20,403.0	19,947.5	14,896.7	14,888.6	16,102.4	17,858.3
Paramedic Services	406.6	229.7	56.7	3.7	2.2	0.8	0.5	0.6	0.3	-	-	-
Public Works	2,139.9	2,635.0	2,701.9	2,276.6	2,511.7	2,417.5	2,265.4	2,563.9	2,138.5	1,840.1	2,119.3	1,717.5
Fleet Diesel Gross Emissions Sub-Total	**19,133.6**	**22,097.4**	**23,040.3**	**22,025.5**	**22,325.0**	**22,251.1**	**22,668.9**	**22,512.0**	**17,035.5**	**16,728.8**	**18,221.7**	**19,575.8**

Fleet Other (tonnes CO_2e)	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total Fleet	168.2	148.6	192.7	205.5	216.7	220.1	181.1	167.3	91.3	107.8	91.4	180.9
Fleet Other Gross Emissions Sub-Total	**168.2**	**148.6**	**192.7**	**205.5**	**216.7**	**220.1**	**181.1**	**167.3**	**91.3**	**107.8**	**91.4**	**180.9**

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Total Gross Emissions (tonnes CO_2e)	**69,696.7**	**64,918.8**	**61,963.1**	**55,516.5**	**55,961.5**	**53,305.7**	**60,827.9**	**59,140.5**	**51,946.4**	**52,549.2**	**54,257.4**	**56,234.1**
Total Net Emissions (tonnes CO_2e)	**54,536.4**	**54,928.2**	**52,766.4**	**49,222.8**	**49,909.7**	**47,470.0**	**52,080.8**	**51,807.4**	**44,964.0**	**44,817.0**	**46,936.9**	**47,866.4**

9. Appendix C

Figure 27: Energy Use Intensity (EUI) – Water Supply, by System, 2023 versus 2012 Baseline (GJ/ML Flow)

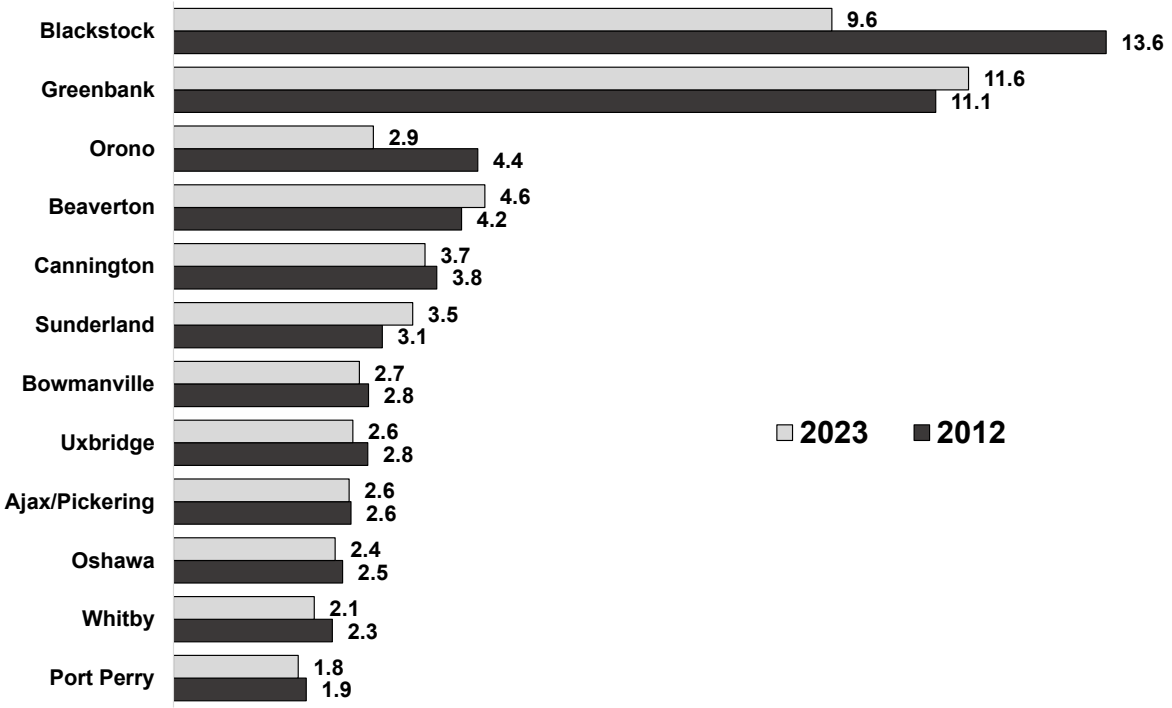


Figure 28: Energy Use Intensity (EUI) – Sanitary Sewerage, by System, 2023 versus 2012 Baseline (GJ/ML Flow)

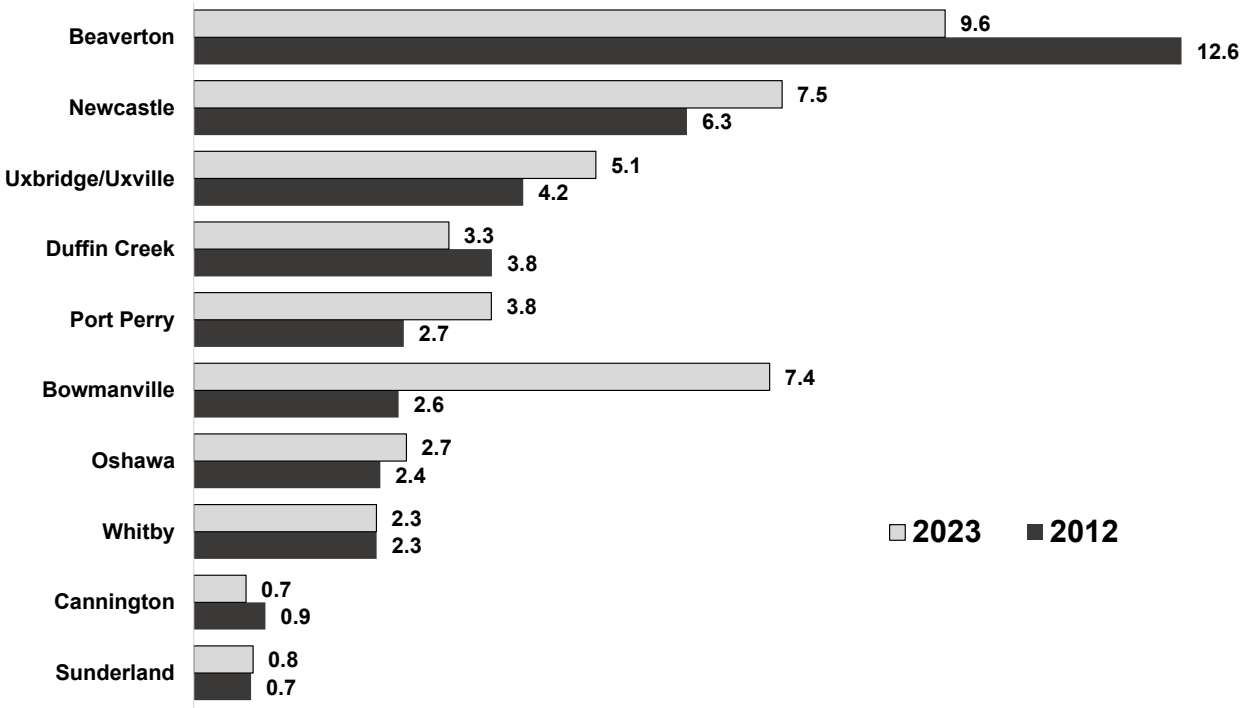


Figure 29: Nominal Energy Use Intensity (EUI) – Facilities, 2023 versus 2012 Baseline (GJ/ft^2)

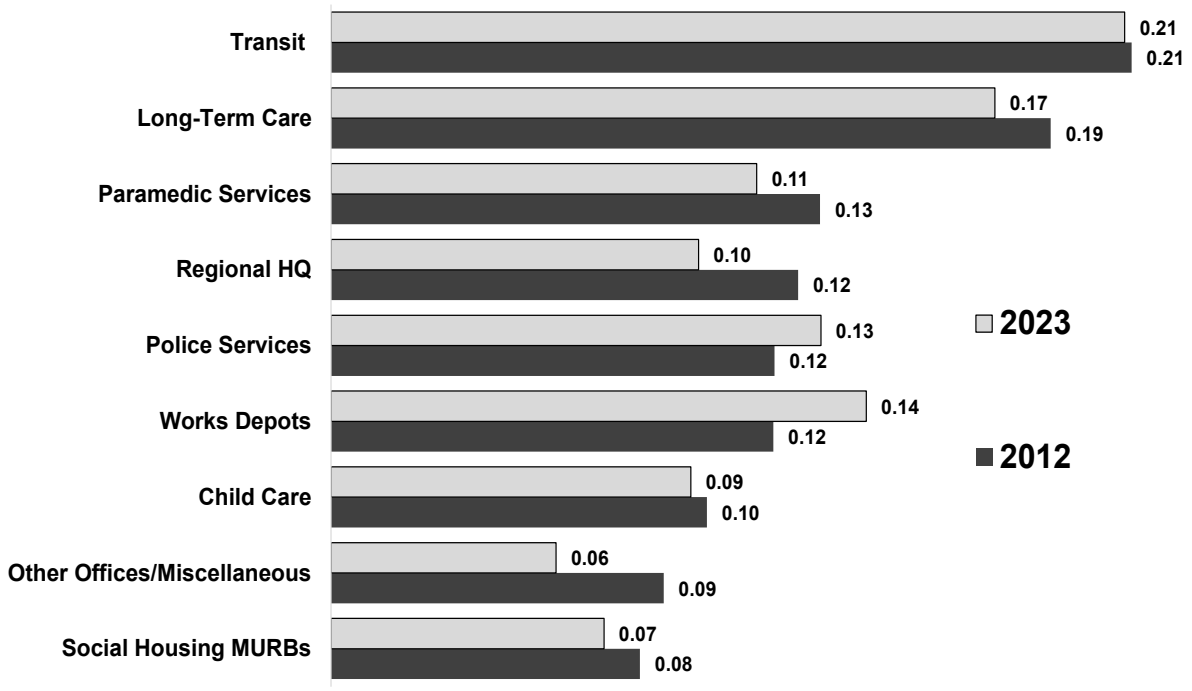


Figure 30: Normalized Energy Use Intensity (EUI) – Facilities, 2023 versus 2012 Baseline (GJ/Degree Day/'000 ft^2)