TOWN OF GRIMSBY

Town of Grimsby - Corporate Greenhouse Gas Emissions Management Plan

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TREE HOUSE ENERGY SERVICES

Acknowledgments

The writing of this management plan engaged the Town of Grimsby's staff to provide institutional history with associated data and subject matter expertise. Tree House Energy Services would like to thank plan contributors:

Jillian Booth, Parks and Open Space Coordinator
Mike Graybiel, Manager Parks and Facilities
Thomas Hodgson, Manager of Operations and Compliance, Public Works
Sarah Sweeney, Director of Community Services

Special thanks to Jillian who acted as the primary contact.

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Executive Summary

The Town of Grimsby is located between the south shores of Lake Ontario and the Niagara Escarpment with a growing population of over 28,883. The Town provides a number of municipal services to its community including public works and recreation that produce greenhouse gas (GHG) emissions. To track and reduce corporate emissions the Town has created a greenhouse gas inventory including facilities, fleet, waste, and street lighting. emissions were categorized by sector and scope to better understand operational control. This report will analyze greenhouse gas (GHG) emissions across municipal operations and outline strategic measures to achieve a 30% reduction by 2035 relative to a 2023 base year. The emissions inventory indicates that Facilities produce 66% of the total corporate emissions, Transportation produces 26%, Waste produces 6% and Street Lighting produces 2%. Thus, sectors that offer the highest reduction potential are Facilities and Transportation that emit 692 and 274 tonnes of CO_{2e} (carbon dioxide equivalent) respectively. Waste and street lighting contribute 62 and 26 t CO_{2e}, respectively, and are also considered in the reduction strategies. With the reporting of this inventory and setting a 30% target, the Town has complied with Milestones 1 and 2 of the PCP program. Regarding the target, it is recommended that measures are monitored and completed to ensure scheduled reductions are being met or that reductions are adjusted on an annual or bi-annual basis to meet the 10 year target of 30% reduction.

For facilities, it is recommended to implement near or net-zero emission strategies for key buildings, including Town Hall, Library/Art Gallery, and the Operations Centre that could utilize electrification and renewable technologies. Over the next decade, its recommended the Town fleet be transitioned to electric vehicles, utilizing telematics technology and fuel-efficient driving techniques to track fuel consumption more granularly, optimize fuel efficiency, and reduce idling. There is also an opportunity to integrate adaptive dimming into street lighting to reduce electricity and the associated emissions and operational costs. As waste management is under the control of the Region, it's recommended to continue to support the Niagara Region's Waste Management Strategic Plan to achieve a 50% waste diversion target by 2030.

As a next step, it's recommended that these reduction strategies are further developed into an action plan that is (Milestone 3 of the PCP program) integrated into the Town's Asset Management Plans as well as a third party external funding plan. Ensuring plan implementation is integrated into municipal planning processes to secure internal and external funding along with the establishment of monitoring frameworks are keys to target achievement by 2035.

1 Overview

The Town of Grimsby is located between the south shores of Lake Ontario and the Niagara Escarpment. With a population of over 28,883, Grimsby is a growing municipality in the Niagara Region. The Town provides a number of municipal services and amenities to its community including public works and recreation that also produce greenhouse gas (GHG) emissions. In an effort to reduce the Town's corporate emissions, Grimsby has elected to participate in the Partners in Climate Protection (PCP) Program, a five-step Milestone framework that guides municipalities in setting reduction targets.

This Corporate Greenhouse Gas Emissions Management Plan builds on the Energy Conservation and Demand Management (CDM) Plan that the Town completed in 2024 to meet O. Reg. 25/23 which requires municipalities to report their energy use and GHG emissions. This Plan will also help promote transparency, accountability, immediate and ambitious action in relation to achieving targets, that support reaching net-zero emissions in Canada by 2050 as outlined in the federal government's Net Zero Pathways Accountability Act. The purpose of this Act requires the setting of national targets for the reduction of greenhouse gas emissions based on the best scientific information available. The Town's participation in the PCP program also aligns with their Official Plan under Policy Direction Report 4 which proposes: "Promoting energy efficient and sustainable building through the development process" and "Requiring and incentivizing developments to follow green building standards or implementing electric vehicle charging stations.".

This Plan will report on Milestone 1: creating a GHG emission inventory including a forecast based in part on population growth; and Milestone 2: setting an emission reduction target for the Town of Grimsby.

1.1 About ICLEI and PCP

The Partners for Climate Protection (PCP) program, funded by ICLEI—Local Governments for Sustainability (ICLEI Canada) and the Federation of Canadian Municipalities (FCM), supports municipalities in taking climate action. The program consists of a five-step Milestone Framework that guides members through the process of reducing corporate and/or community emissions.

1.2 Milestone Framework and PCP Protocol

The PCP protocol was developed to act as the Canadian Supplement to the International Emissions Analysis Protocol (IEAP) to support municipal practitioners working through the milestones of the PCP program. It is essential to completing the **first PCP milestone, a GHG emissions inventory**, and important when aligning milestones two through five. The PCP

Protocol is technical in nature, containing many complex formulas and calculations. Ideal users will have some technical background in engineering, math and science and should be comfortable learning new methodological concepts. The PCP Protocol aligns with the online PCP Milestone Tool, making it easy for users to record and analyze the GHG inventory results.

The Partners for Climate Protection five-step milestone framework includes:

1. Baseline emissions inventory and forecast;
2. Set an emission reduction target;
3. Develop action plan;
4. Implement plan; and
5. Monitor progress and report results.

The GHG inventory will be categorized into sectors of municipal operations including Facilities, Transportation, Waste, and Street lighting. The emissions of these four sectors will be quantified using the PCP Protocol as part of the information needed to fulfill to the requirements of the first milestone. Once Milestone 1 has been completed and sectorial emission estimates are established, Milestone 2 can be completed by setting a reduction target that aligns with the opportunities identified to have emission reduction potential.

1.3 PCP Protocol and Ontario Regulation

The PCP references Ontario Regulation 507/18 which has been revised to Regulation 25/23, Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans. This Regulation requires reporting from the broader public sector on their facility operations. This reporting—typically called a CDM Plan--includes emissions for buildings and facilities: "A summary of annual greenhouse gas emissions for each of the public agency's prescribed operations, which shall be included in the summary of the public agency's annual energy consumption required under paragraph 1 of subsection 25.35.2 (3) of the Act."

2 Milestone 1: Corporate GHG Emission Inventory

2.1 Introduction

Milestone 1 of the PCP Framework focuses on creating a baseline emissions inventory to help track and anticipate emissions, energy use and spending. There are principles established by the World Resources (WRI) Institute that guide the accounting for a GHG

inventory. These principles are published in WRI's "The Greenhouse Gas Protocol" and this Protocol is referenced by the IEAP[1].

GHG Accounting and Reporting Principles:

Relevance: Ensure the GHG inventory appropriately reflects the GHG emissions of the company and serves the decision-making needs of users – both internal and external to the company.

Completeness: Account for and report on all GHG emission sources and activities within the chosen inventory boundary. Disclose and justify any specific exclusions.

Consistency: Use consistent methodologies to allow for meaningful comparisons of emissions over time. Transparently document any changes to the data, inventory boundary, methods, or any other relevant factors in the time series.

Transparency: Address all relevant issues in a factual and coherent manner, based on a clear audit trail. Disclose any relevant assumptions and make appropriate references to the accounting and calculation methodologies and data sources used.

Accuracy: Ensure that the quantification of GHG emissions is systematically neither over nor under actual emissions, as far as can be judged, and that uncertainties are reduced as far as practicable. Achieve sufficient accuracy to enable users to make decisions with reasonable assurance as to the integrity of the reported information.

These principles were used in conjunction with the PCP Protocol to underpin the methodology for Milestone 1 that is described in the following section.

2.2 Methodology

2.2.1 Geographical and Sectorial Boundaries

The first milestone in the PCP program focuses on creating a GHG inventory that includes the sources and activities that produce emissions within a geographical boundary. The sources and activities are the Town's operations categorized by their sectorial boundaries. For example, maintenance vehicles used by the Public Works department fall under the

[1] The IEAP states: "…the emissions inventory requirements do not differ significantly from those presented in the GHG Protocol Initiative Corporate Accounting and Reporting Standard (The GHG Protocol") developed by the World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD)…"

Transportation category for emissions. 2023 is used as the base year for the inventory as this was the most recent year of complete data for all sectors.

Sectorial Categories for Municipalities:

- Facilities
- Transportation
- Waste
- Street Lighting.

The PCP Protocol states that "…within the context of the PCP program, the boundary of the corporate inventory is determined using an approach known as operational control, which requires the local government to report 100 per cent of the emissions from operations over which it has control."

The Protocol defines this control by one of the following characteristics:

- The local government wholly owns the operation, facility or source; or
- The local government has full authority to implement operational and health, safety and environmental policies (including both GHG- and non-GHG-related policies). In most cases, holding an operator's license is an indication of an organization's authority to implement operational and HSE policies

The aforementioned sectorial emissions: Facilities, Transportation, Waste, and Street Lighting—with the exception of waste--fall under the definition of operational control for the Town. To determine whether to report the GHG emissions from a contracted service, local governments are encouraged to follow the guidelines outlined in the International Local Government GHG Emissions Analysis Protocol (IEAP).

According to the IEAP, local governments must report the GHG emissions from a contracted service in cases where:

i. The service provided by the contractor is a service that is traditionally provided by local government;
ii. Emissions from the contracted service were reported in an earlier local government GHG inventory; and/or
iii. Emissions generated by the contractor are a source over which the local government exerts significant influence.

2.2.2 Sectorial Analysis

2.2.2.1 Facilities

The Ontario Regulation 25/23, Broader Public Sector: Energy Reporting and Conservation and Demand Management Plans, requires reporting from the broader public sector and their operations including emissions for buildings and facilities. The Town of Grimsby has published their 2019-2024 Energy Conservation and Demand Management Plan, which was used for the 2023 Facility emissions in the GHG inventory. The sources of these emissions can be classified by fuel type: natural gas and electricity. Emissions are calculated by Energy Star's Portfolio Manager that uses Ontario specific emission factors from Canada's National Inventory Report (NIR)[2] for both natural gas (1,945 g CO_{2e}/m^3) and the electricity grid (35 g CO_{2e}/kWh). The NIR is listed by the year published, however, the data within the report runs 2 years after its publication date (3 years for electricity emissions). For example, NIR 2025 includes reporting years up to and including 2023 for gas and 2022 for electricity. See Appendix A – GHG Inventory by Sector for a table of the facility emissions.

Refrigerants used in air conditioning systems, including those that contain chlorofluorocarbons (CFCs) and hydrofluorocarbons (HFCs), are greenhouse gases when released into the environment. The facility air conditioning systems that utilize these refrigerants have not been included because that would require the quantity of refrigerant used in new, existing, and retired equipment. While this analysis is possible, the aforementioned data is not likely available.

2.2.2.2 Transportation

The GHG emissions for the Transportation sector are comprised from Town owned and operated on-road service vehicles (also called rolling stock or fleet vehicles) and light to heavy duty equipment (i.e. tractors, backhoes, etc.). The data collected by the Public Works Department included the vehicle #, vehicle duty class, fuel type, year and name of manufacturer, and the odometer readings from January 1st, 2022, and December 31st, 2023.[3] Based on the provided data, the fuel economy for on-road vehicles was estimated[4] using emission factors that were determined by mapping the manufacture year of each vehicle to the emission regulations for that years model. A different approach was used to estimate the fuel economy of light and heavy-duty equipment by using manufacturers data and/or

[2] https://publications.gc.ca/collections/collection_2024/eccc/En81-4-2022-3-eng.pdf
[3] The form (provided by Tree House Energy Service) included fields for Vehicle Duty Class, Fuel Type, Manufacturer, Year of Manufacture, Odometer January 1, 2022, and Odometer December 31, 2023.
[4] Vehicle data provided on the form was mapped to Light Duty, Light Duty Truck and Heavy Duty Truck fuel economy rates from the PCP.

operating hours (L/hour). The populated form for both on and off-road vehicles is provided in Appendix A – GHG Inventory by Sector.

For plug-in electric or battery electric vehicles, it was assumed the vehicle charger is connected to municipal building, thus grid emissions are accounted for in the facilities sector.

2.2.2.3 Street Lighting

To estimate the emissions from the Town's Street Lighting, consumption data was obtained from Grimsby Power for the base year of 2023. Additional data was also downloaded from the Ontario Energy Board's website.[5] The data was filtered for "Grimsby" and "Street Lighting Connections" which provided aggregate consumption (as well as demand) figures. The consumption figure for 2023 was multiplied by the grid emissions factor—the same factor that was used for facilities.

2.2.2.4 Waste

The GHG emissions from the waste sector are mainly from methane (CH_4) and nitrous oxide (CO_2). When solid waste is landfilled, its organic components (e.g. paper, food and yard waste, etc.) are decomposed by bacteria in an anaerobic (oxygen poor) environment generating CH_4 and CO_2 emissions. The CO_2 emissions associated with the decomposition of the organic waste are considered to be of biogenic origin and are excluded from the GHG inventory.

Landfill emissions are unique in that the disposed solid waste generates emissions over many years. When solid waste is incinerated, both its organic and non-organic (e.g. plastic, metal, etc.) components generate CH_4, N_2O, and CO_2 emissions when combusted. The CO_2 emissions released from the combustion of the organic waste are considered to be of biogenic origin and are excluded from the GHG inventory. However, the non-biogenic CO_2 emissions associated with combustion of non-organic waste must be accounted for.

The Town has a number of waste bins located throughout their properties. An audit of these bins was conducted on August 27, 2024, as this was the day before waste collection and would provide the most representative collection sample. Staff at the waste bin sites were requested to provide the volume of waste or bags collected each week. The PCP Protocol provides a formula to estimate solid waste, based on the size of garbage bins used, average fullness, and frequency of pickup. The formula below was used for each garbage bin:

[5] https://www.oeb.ca/open-data/electricity-reporting-record-keeping-requirements-rrr-section-2154-demand-and-revenue

$M = B \bullet F \bullet P \bullet 0.178 \bullet 12$

Description Value

M = Annual quantity of solid waste generated at a building or facility (t) - Computed

B = Garbage bin capacity (m3) - User input

F = How full the bin is at pickup (%) - User input

P = Frequency of pickup (times/month) - User input

The emissions calculation depends on if the landfill captures gas. Grimsby's waste is handled by the Niagara Region and is hauled to a site that does not capture landfill gas which means this gas is being released to the atmosphere by the landfill.[6] In this scenario, the PCP Protocol uses a Methane Commitment Model that:

1. Determines the quantity (mass) of solid waste landfilled during the inventory year
2. Determines the composition of the waste stream (defaults provided).
3. Calculates the degradable organic carbon (DOC) content of the waste stream (formula provided).
4. Calculates the methane generation potential of the landfilled waste (formula provided).
5. Calculates emissions of $CO2_e$ using the information determined in steps 1-4.

Photos of the waste bins and their contents are in Appendix B - Waste Audit.

2.2.3. Limitations and Exclusions

The GHG emission inventory should be considered as an approximation as it requires access to data that is not likely available in many corporations. For these reasons, standards for developing these GHG inventories typically outline a minimum reporting threshold based on a set of common and generally well-understood activities, such as energy consumption in buildings, on-road transportation and generation of solid waste. As access to data and quantification methodologies improve over time, minimum reporting requirements will likely expand to include more complex emission sources previously considered to be optional. This process of continual improvement can be seen in the recent Global Protocol for Community-Scale GHG Emissions (GPC), which challenges local governments to expand the scope of their GHG reporting to include additional community emission sources, such as industrial processes and off-road transportation (see Relationship to Global Protocol for Community-Scale GHG Emissions). In the case that data may not be available, that source

[6] https://www.niagararegion.ca/projects/waste-management-strategic-plan/pdf/current-state-report.pdf

or activity should be excluded and identified as a limitation. An assessment of sectorial boundaries and exclusions are outlined on a sector-by-sector basis.

2.2.4 Business-As-Usual (BAU) Forecast

Having a forecast allows the Town to project future corporate emissions based on assumptions regarding population, economic growth, fuel mix, and technological change. The 10-year BAU forecast was completed using the PCP tool which projects emissions based on population growth percentage; a percentage of 1.20% compounded annually (2016-2041) was used from Niagara 2041's "How We Grow" document.[7]

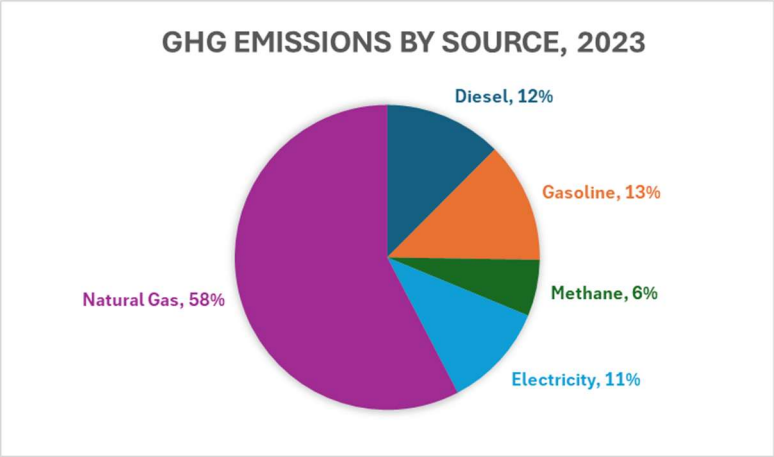
2.3 Corporate Emissions

The table and chart below show the estimated emissions from each source (fuel type)

Table 1 - GHG Emissions by Source (tCO_{2e}), 2023

Fuel Type	GHG emissions (tCO2e)	Percent of Total Source Emissions
Diesel	131	12%
Gasoline	135	13%
Methane	63	6%
Electricity	117	11%
Natural Gas	608	58%
Total	**1,054**	**100%**

Figure 1 – GHG Emissions by Source, 2023



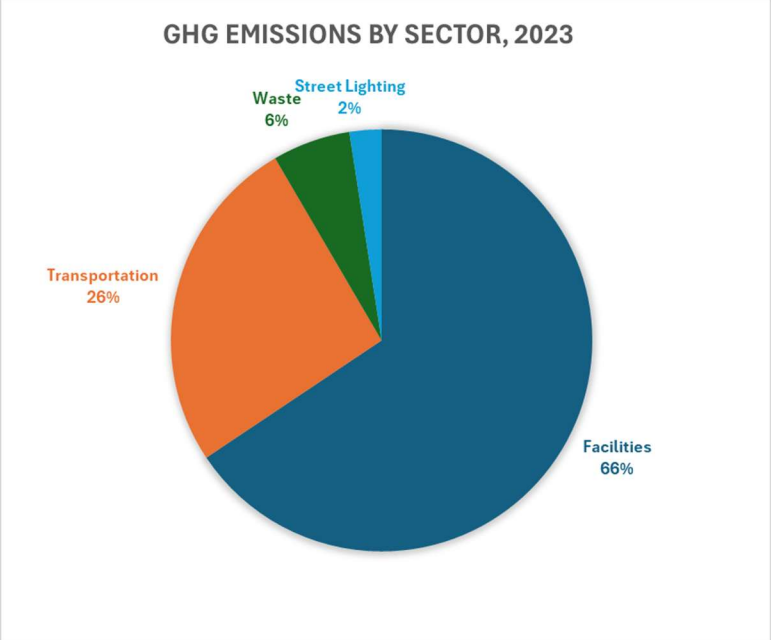
[7] https://www.niagararegion.ca/2041/pdf/mcr-pic3-boards.pdf

The table and chart below show the estimated emissions from each sector. The Facilities sector has the highest potential for reduction at 692 CO_{2e} tonnes per year; Transportation has the second most at 274 tonnes per year; Waste and Street Lighting are at 62 CO_{2e} and 26 CO_{2e} respectively. Thus, the Facilities and Transportation sectors will be the focus for target setting and reduction strategies (Milestone 3).

Table 2 - GHG Emissions by Sector (tCO2e), 2023

Sector	GHG emissions (tCO2e)	Percent of Total Corporate Emissions
Facilities	692	66%
Transportation	274	26%
Waste	63	6%
Street Lighting	26	2%
Total	**1,054**	**100%**

Figure 2 - GHG Emissions by Sector, 2023



2.4 Baseline and Forecast Emissions

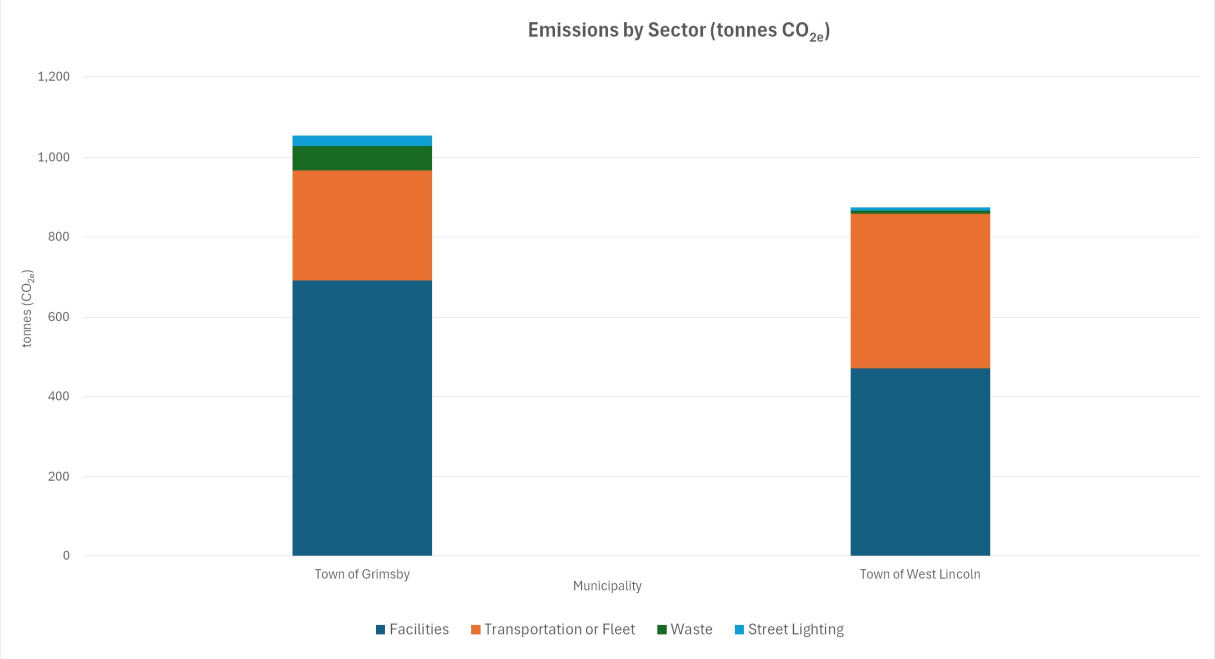
Based on the 1.20% percentage for all sectors as calculated by the PCP program, the Town's emissions are forecasted to be 1218 tCO_{2e} by 2035.

2.5 Benchmarking Emissions

The charts below benchmark another nearby municipal GHG inventory with the Town's inventory. Note that the Town of Grimsby's inventory uses 2023 data, and the Town of West Lincoln's uses 2019 data which is their most current publicly available inventory.

Table 3 - Benchmarking Charts: Emissions by Sector, tonnes CO_{2e}

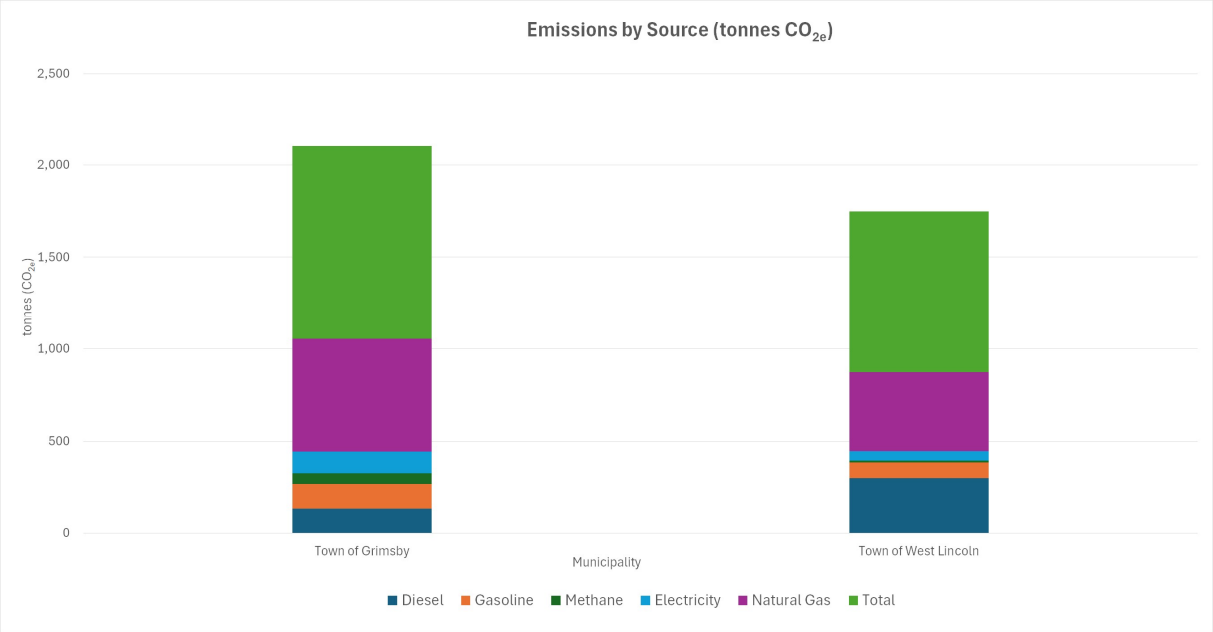
	Facilities	Transportation or Fleet	Waste	Street Lighting	Total
Town of Grimsby	692	274	63	26	1,054
Town of West Lincoln	470	388	8	8	874



While the Town of Grimsby's corporate emissions are about 20% more West Lincoln's corporate emissions, it serves population of 28,883 which is almost twice than West Lincoln's population of 14,500.

Table 4 – Benchmarking Charts: Emissions by Source, tonnes CO_{2e}

	Diesel	Gasoline	Methane	Electricity	Natural Gas	Total
Town of Grimsby	131	135	63	117	608	1,054
Town of West Lincoln	298	90	8	53	425	874



3 Milestone 2: Reduction Targets

Target setting for emissions is based on a 10-year "Business-As-Usual (BAU) Forecast" which projects future emissions using factors like future building projects/expansions, changes in standards (i.e. streetlights), population growth, and current practices. This forecast can be aligned with the Town's Asset Management Plans to account for the additional capacity required in terms of budget and resources

3.1 Target Setting

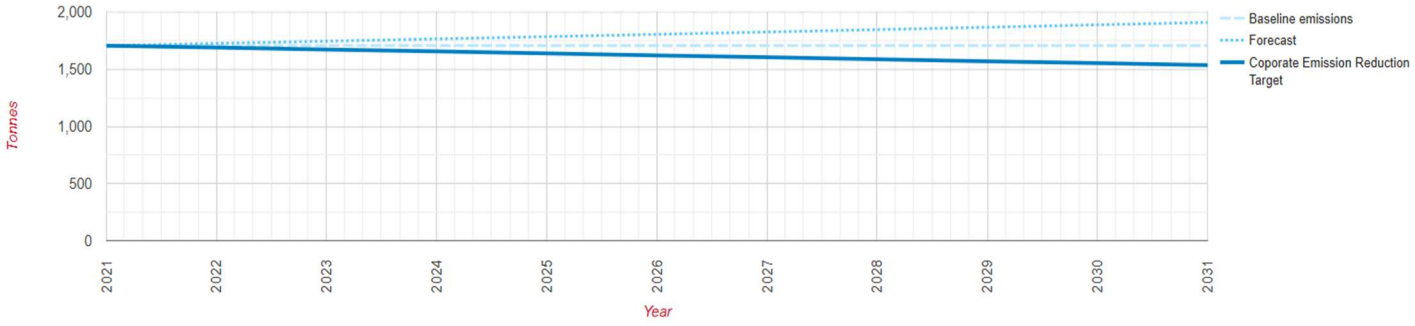
The Town of Grimsby is aiming to achieve a 30% reduction in its GHG emissions from the 2023 baseline by 2035. This target does not include the changes that are currently being made to the Peach King Centre, that percentage reduction will have to be relatively considered. A 30% emissions reduction was set based on an analysis of sectorial emissions which is discussed in more detail in the next section. This target aligns with the reduction targets set by other government agencies while considering the Town's limited resources, capacity and funding.

The following list identifies the reduction targets set by other government agencies:

- Canada's commitment to achieve net-zero emissions by 2050.
- Ontario's reduction target of 30% below 1990 levels by 2030
- Niagara Region's goal of net-zero corporate greenhouse emissions by 2050.

Baseline emissions, the 2035 forecast, and the 30% reduction target are charted below to illustrate the yearly changes.

Figure 3 – Baseline Emissions with 2035 Forecast and 50% Target Reduction, (tCO2e)



3.2 Target Summary

A summary table of estimated emission reductions is presented for each sector based on 2023 emissions from assets identified in Facilities, Transportation and Street Lighting. For Waste, the estimated reduction is based on the Region meeting a 30% target as also stated in this section.

For the following table, four facilities were targeted for emissions reductions based on the recommendations of the CDM Plan (referenced in Section 1.1 – Overview). The emissions for these four facilities are individually stated in the table. The emissions for the other three sectors are listed as a total.

Figure 4 - Table of Sectorial Emission Reduction Targets

Facilities	2023 Emission Baseline (tCO_{2e})	Emission Target (tCO_{2e})	Percent Reduction
Town Hall	103	93	
Library and Art Gallery	63	57	
Operations Centre	46	12	
Peach King Centre	196	49	
Subtotal for Above Facilities	408	210	30%
Total for all Facilities	692		
Transportation	274	82	30%
Waste	63	19	30%
Street Lighting	4	1	30%
Totals	1,054	312	30%

4 Emission Reduction Strategies

In general, emission reduction strategies can be categorized into conservation or capital measures. An example of a conservation measure--which tend to be lower cost--would be fuel efficient driving techniques for fleet vehicles. A capital measure could be a retrofit of a building with electric heat pumps to replace natural gas rooftop units.

To help identify where the Town has direct control over reductions and where collaboration with regional entities is required, the reduction strategies have been categorized based on the scope of emissions; Scope 1 (direct emissions from municipal facilities and fleet vehicles), Scope 2 (indirect emissions from purchased electricity), and Scope 3 (other indirect emissions, such as those from waste management).

4.1 Scope 1 - Fossil Fuel Emissions: Management Strategies

Scope 1 includes GHG emissions generated directly by sources owned or operated by the corporation. Within the context of a municipal operations inventory, the most common sources of scope 1 emissions are the combustion of natural gas or fuel oil at municipal facilities, use of gasoline or diesel fuel in municipal fleet vehicles, and methane generation at municipally owned landfill sites. Thus, on and off-road fleet vehicles (with the exception of electric vehicles) and facilities that burn fossil fuel (typically for heating) fall into Scope 1 emissions.

4.1.1 Facilities

As recommended in the CDM Plan, a cost and benefit study would provide a road map for implementation of emission reduction strategies. As well as energy cost recovery pending investigation of FCM funding under the Community Buildings Retrofit stream for facilities including Town Hall, Library/Art Gallery and Public Works Operations. Examples of retrofit measures that could be implemented at these facilities include but are not limited to electric heat pumps to decarbonize heating systems and renewable technology such as solar PV to mitigate electricity use. Since the Peach King Centre is under construction, it's suggested to be included using a longer implementation horizon.

Example Costs from Projects and Studies

The cost per tonne CO_{2e} to reduce emissions can vary significantly depending on the project building, its typology and on the retrofit measures that are implemented. See table below for examples.

Table 5 - Example Costs from Projects and Studies

Location	Project Name	Project Details	Total Cost	GHG Emission Reduction (tonnes CO_{2e})	$/tonnes CO_{2e}
City of Markham	Mount Joy Community Centre - Roadmap to Net Zero	Retrofit of the Mount Joy Community Centre, a sports and recreation facility in Markham, ON. This project includes low-cost operational changes, building envelope improvements, replacing equipment that has reached the end of its usable life, and maximizing energy efficiency through the addition of heat recovery systems. The upgrades will help to reduce fuel consumption by 75.7% and greenhouse gas emissions by 130 tonnes annually.	3,259,500	130	25,073
City of Brampton	Susan Fennel Sportsplex	Retofit of the Susan Fennel Sportsplex in Brampton, ON The project includes: LED retrofits; lighting controls; ground source heat loop; replacement of ice rink refrigeration plants; solar thermal system for pool heating; roof-top solar panels (Photovoltaic system); heating, ventilation, and air conditioning (HVAC) upgrades; artificial intelligence (JCI Open Blue Technology);	25,700,000	1,100	23,364
Town of Oakville	Oakville Trafalgar Community Centre	With an installation of more than 1,300 solar panels, the project is expected to generate at least 660 megawatt-hours per year. These improvements are expected to reduce the facility's energy consumption by an estimated 43 per cent and greenhouse gas emissions by 19.9 tonnes annually.	1,600,000	19.9	80,402
City of Brampton	City Hall - West Tower	The study includes a measure to retrofit the building's HVAC systems with central ground-source heat pumps	15,656,000	175.5	89,208
Town of Grimsby	Peach King Centre	The primary strategies of the design are the use of a high-performance envelope, controlled and thoughtful use of glazing, shading strategies, low carbon material selection, integrated energy efficient mechanical and electrical building systems, using electrical fed equipment rather than natural gas (fossil fuel) along with a geothermal field, responding to solar orientation and a photovoltaic	57,274,789	327	175,152

In the above tabled community centres, project costs (except for Peach King which was a study) can range from about $25,000[8] to $89,200[9] per tonne CO_{2e}. For City Halls[10], the study tabled above indicated about $23,400 per tonne CO_{2e}.

4.1.2 Transportation

Emission reduction strategies that are recommended for implementation within the Town's Transportation sector include fuel efficient driving techniques and transitioning the Town's

[8] https://www.canada.ca/en/housing-infrastructure-communities/news/2024/02/backgrounder-federal-government-and-the-city-of-markham-invest-in-improvements-to-community-and-recreation-centres.html

[9] https://www.brampton.ca/EN/residents/Recreation/Revitalized/Pages/Recreation-Revitalized-Susan-Fennell-Sportsplex-Zero-Net-Carbon-Retrofit-.aspx

[10] See page 65, City Hall West Tower Central Ground Source heat pumps https://www.brampton.ca/EN/residents/GrowGreen/Documents/2024-2029_Brampton_CECDM_Plan.pdf#:~:text=As%20part%20of%20the%202019%20CDM%2C%20the,zero%20retrofit%20studies%20for%20the%20following%20facili%2D&text=%E2%80%93%20City%20Hall%20West%20Tower.

fleet from gasoline to electric vehicles. Driving techniques could also include the utilization of telematics technology on Town vehicles to provide tracking data to drivers with the following potential benefits:

1. Improved vehicle utilization;
2. Better fuel efficiency; and
3. Reduced idling

The emission reductions for these techniques can vary depending on the current operation of the vehicle however they generally lowered emissions, improved safety, and decreased operational costs. Typically, when these techniques are implemented, they can reduce fuel consumption by up to 25%.[11] It is also recommended that the Town start to track fuel volumes more granularly using digital tools instead of manual data entry to more accurately measure transportation emissions over a defined time interval such as monthly or annually.

It was determined from the fleet data provided that 22 gasoline powered vehicles have model years of 2016 or older. These light duty vehicles are typically near the end of their useful life between 10 to 13 years based on a Canadian Vehicle Survey by NRCan where a majority of light duty vehicles were reported to be 13 years in age or less.[12] The same study evaluated the annual average kilometres travelled throughout the vehicle's lifespan, pickup trucks and cars reported to have travelled an average annual distance of 16,500 and 14,500 km respectively. While this report was released in 2009, it has been assumed that current trends are similar. Thus, the gasoline powered vehicles with model years of 2016 or older could be considered for replacement with electric vehicles that do not emit GHG except indirectly through the electrical grid when their batteries are being recharged. To achieve this, a number of new electric vehicle (EV) chargers will need to be installed where Town vehicles are normally parked. Typically, EV charging stations are dual wand, thus one station could serve two vehicles. There is an opportunity for some capital cost savings, if the chargers are added when decarbonizing the Operations Centre. It is recommended that this potential savings be investigated in the proposed Net Zero Study. The Town currently has a battery electric vehicle used as a light duty vehicle which costed about $47,000 (HST excluded) with maintenance costa to date being about $1250.00 (labour excluded) that could provide a benchmark for future budgets once adjusted for current costs of electric vehicles.

[11] https://natural-resources.canada.ca/energy-efficiency/transportation-energy-efficiency/personal-vehicles/fuel-efficient-driving-techniques

[12] Figure 25 — Number of light vehicles by vehicle age, 2005 and 2009, https://oee.rncan.gc.ca/publications/statistics/cvs/2009/pdf/cvs09.pdf

4.2 Scope 2 – Electricity Grid Emissions: Management Strategies

Scope 2 exclusively refers to 'indirect' sources of emissions associated with the purchase of grid electricity or district energy. Unlike stationary fuel combustion, which generates GHG emissions directly at the point of energy consumption, emissions associated with the use of grid electricity are produced off-site at a location owned or controlled by another entity. For this reason, the use of grid electricity is always reported as an indirect (Scope 2) source of emissions, regardless of where the generation occurs. Electricity consumption by the Town's facilities falls into Scope 2 emissions.

4.2.1 Street Lighting

Although, the lowest emitter within the Town's inventory, Street Lighting is a unique opportunity in that reduction technologies may be simpler to scale and rollout because of the homogenous nature of this asset when compared to other sectorial assets. These reductions are dependent on grid emission factors that will likely change as proposed electricity generation plants are brought online.

It is recommended to add adaptive dimming capabilities to the Town's street lighting to reduce energy consumption and the associated emissions while meeting safety and accessibility requirements. This approach has been used by the City of Ottawa, who have been converting their street lighting to LED with adaptive lighting controls since 2016: "Ottawa's LED streetlight project, with its adaptive dimming and networked lighting control system, has decreased the City's carbon dioxide emissions by a remarkable 1,261 metric tonnes every year, and translates into a cumulative 66 per cent reduction in energy consumption; equivalent to 113,600,000 kWh and $5 million in annual savings".[13]

4.2.2 Facilities

As referenced in 4.1.1. one example of reducing emissions from the combustion of natural gas is an electric heat pump retrofit. Thus, electricity use would increase and there would be associated emissions from the province's electricity grid. These grid emissions can be reduced with carbon offsets. A typical definition of a carbon offset according to the Government of Canada is a credit representing the reduction, avoidance, or removal of one metric tonne of carbon dioxide (CO_2) or an equivalent amount of other greenhouse gases (GHGs) from the atmosphere, which is used to compensate for emissions made elsewhere.

[13] https://hydroottawa.com/en/blog/lighting-our-city-energy-efficiency

4.3 Scope 3 – Indirect Emissions: Management Strategies

Scope 3 is applied to all other "indirect" sources of GHG emissions that can be linked to an organization's operations but are owned or controlled by another organization. Sources of scope 3 emissions at the local government level include but are not limited to emissions from employee commuting and staff business travel, upstream and embodied emissions associated with the production of purchased fuel or products, and emissions from contracted services. The Niagara Region is responsible for waste management for the Town and thus, these emissions would fall under Scope 3 for the Town since the source, which is the Niagara Road 12 Landfill, is controlled by the Region. The Region published a Waste Management Strategic Plan in 2024, and their Plan targets are referenced in the next section. Another example of Scope 3 emissions would be water and wastewater which is also managed and controlled by the Region.

4.3.1 Waste

Emissions from the Waste sector are primarily from methane produced by landfill waste; Methane is estimated to have a global warming potential (GWP) of 27 to 30 over 100 years relative to carbon dioxide. The Methane emitted today lasts approximately a decade, a lot less time than CO_2. However, CH_4 also absorbs much more energy than CO_2. The net effect of the shorter lifetime and higher energy absorption is reflected in the GWP.

It is recommended that the Town continues to support the Region and their goal of net-zero GHG emissions by 2050. One of the main drivers of this goal is the *2016 Waste Free Ontario Act* and its Strategy. The strategy focuses on achieving net-zero waste and greenhouse gas emissions from the waste sector; with interim targets of 30 per cent diversion by 2020; 50 per cent diversion by 2030; and 80 per cent diversion by 2050. Thus, it has been assumed that the Region will likely plan for 50 per cent waste diversion by 2030 to align with the provincial Act and this will "trickle down" to the Town regarding their 2035 planned reduction target.

5 Next Steps

5.1 Recommendations for Future Action Plan

The emission reduction strategies described in the previous section provide a pathway for a 30% GHG emission reduction by 2035. The strategies need to be developed further into an action plan that details costs, benefits, and outlines an implementation plan with completion milestones. This plan needs to be integrated into the Town's Asset Management Plans to ensure that the associated costs are included in the capital and operating budgets. Integration into these budgets should include the net fuel and energy costs required, as the primary mechanism to reduce emissions is the electrification of facilities and transportation.

5.2 Tracking, Monitoring, Analysis and Reporting

To ensure the action plan stays updated, it is recommended that a tool is utilized for tracking, monitoring, analysis and reporting of the plan. This tool could start in the form of a custom spreadsheet developed based on the current information systems used for the Town's Asset Management Plans to ensure ease of integration. A cloud-based dashboard could also be developed to provide rolled up reports using data mined from this tool. It is recommended that reporting is completed at regular intervals so that measures are monitored and completed to ensure scheduled reductions are being met or that reductions on an annual or bi-annual basis are adjusted accordingly to meet the 10 year target of 30% reduction.

5.3 Implementation Costs

Implementation costs can be incremental in nature due to replacement and/or upgrade budgets that may already exist in Asset Management Plans. The capital costs of reduction strategies, especially in the Facilities and Transportation sectors, are significant; thus, it is recommended that third party funding be investigated to subsidize these costs. Apart from these "hard costs", there also will be "soft costs" in terms of external advisory services, internal staff resourcing and the aforementioned project tool. As a next step, a scoping and decisioning making session with Town staff is recommended to determine what strategies to implement to ensure the 30% target can be realistically met over 10 years.