



PORT COLBORNE

# City of Port Colborne Greenhouse Gas Emissions Reduction Plan

Prepared: February 12, 2020

## Executive Summary/Abstract

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Climate change is the long-term change in temperature and weather patterns, which results in rising temperatures, forecast unpredictability, extreme weather events and natural disasters such as floods, and droughts. In Niagara, climate change projections indicate a warmer, wetter future with more extreme weather events. The climate change we are seeing now is based on GHG emissions from the 1980s, which means the consequences of today's GHG emissions will not be seen for at least 25-50 years. According to [Canada's Changing Climate Report \(2019\)](#), Canada is warming at twice the global rate due to local conditions. Canada's loss of snow and sea ice is reducing reflectivity of the surface, which increases the absorption of solar radiation, causing larger surface warming than other regions.

Recognizing the impacts of climate change and the role that the City can play in decreasing GHG emissions, the City of Port Colborne's Greenhouse Gas Emissions Reduction Plan commits to leading by example in its own corporate operations; adopting and demonstrating sustainable, energy conserving, climate change mitigation practices that are communicated and encouraged throughout the community. The City's corporate operation sectors include buildings, fleet, streetlights, and solid waste. The energy and emissions associated with these sectors are tracked in the corporate inventory. The City's GHG emissions inventory is based on operations from 2017, with the total being 1730 tonnes of eCO<sub>2</sub>. An overall emissions reduction target of 10% by 2030 has been set, which is based on reductions from building retrofits, employee energy training, waste diversion program, energy efficiency standard commitment for new-builds, and the application of a climate lens policy. Specific objectives have been developed under focus areas for facilities, fleet, staff, and solid waste.

Monitoring of the GGRP and its objectives will be carried out by City energy staff and the City's energy conservation committee (ECC). The status of emissions data and corresponding objectives will be compiled, analyzed, and reported to council as a supplementary component of the *Energy Consumption and Greenhouse Gas Emissions Report*. At least once every five (5) years the Plan will be reviewed and objectives will be updated to account for changes in usage, technology and availability of alternative energy sources.

## Terminology

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A **greenhouse gas (GHG)** is a gas that absorbs and emits radiant energy within the Earth's atmosphere. The amount of GHG's in the Earth's atmosphere has been related directly to the overall increase in the Earth's temperature.

The primary greenhouse gases in Earth's atmosphere are **carbon dioxide (CO<sub>2</sub>)**, **methane (CH<sub>4</sub>)**, and **nitrous oxide (N<sub>2</sub>O)**. When discussing emissions the focus tends to be on CO<sub>2</sub>, which is generally because it is the easiest to understand. All GHGs have a **global warming potential**

factor (**GWP**) – this means that the gases can all be expressed in terms of CO<sub>2</sub> and we consider this **equivalent CO<sub>2</sub> (eCO<sub>2</sub>)**. The quantity of eCO<sub>2</sub> is generally expressed in tonnes, as a frame of reference, the volume of 1 tonne of eCO<sub>2</sub> at standard temperature and pressure would fill a two-storey, three-bedroom house.

A common unit used to express energy is a **gigajoule (GJ)**. This unit allows comparisons to be made between different sources of energy consumption.

The **Partners for Climate Protection (PCP)** program was designed to guide Canadian municipalities in taking action against climate change, through the reduction of GHG emissions.

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# 1. Introduction

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Natural Resources Canada has identified climate change as one of the defining challenges of the 21<sup>st</sup> century. It is a global problem, and tackling it requires action at all levels of government. Scientific evidence shows that the primary cause of the Earth's changing climate is due to the surge in GHG emissions from human activity. In response to this challenge, countries and cities around the world are setting targets and developing local plans to reduce their GHG emissions.

The City of Port Colborne (City) reports annually, to the province, on GHG emissions produced from City owned facilities that are heated and/or cooled. This, as well as creating and updating an Energy conservation and demand management (ECDM) plan for the City, is a provincial requirement of which the City has met. Both the annual GHG reports and the ECDM have established a starting point for the City to monitor energy trends and the associated GHG emissions. Previously, the City has not committed to a GHG emissions reduction target, or outlined specific actions to reduce GHG emissions. While the ECDM efforts to reduce energy consumption within the facilities will correspondingly reduce GHG emissions, more specific objectives are required to reduce GHG emissions and the City's contribution to climate change.

The City recognizes the importance of local governments in the fight against climate change, and has developed this plan to present a comprehensive strategy and action plan for reducing GHG emissions from the City's corporate operations. The various initiatives proposed in this plan (and their underlying actions) have been reviewed and verified by necessary staff.

The cornerstone of this GHG emissions reduction plan is the corporate GHG emissions inventory, which forms the baseline against which future emissions reduction goals can be measured. The baseline inventory also helps to inform decisions on which areas to reduce and by how much: contributing to an overall reduction target. The inventory considers both direct and indirect emissions. An example of a source of direct emissions would be gasoline used to fuel City vehicles, which releases emissions at the same time it is combusted. An indirect source of emissions would be a power plant that generates electricity for the grid in Ontario, from which City facilities draw electricity. Since the emissions are not produced in the same location or at the same time as the energy is consumed, it is an indirect source.

Council has been very supportive of mitigation initiatives that will reduce Port Colborne's GHG emissions. For example, in the past, they have directed staff to investigate the feasibility of installing a renewable passive energy generation system, which would assist in reducing GHG emissions in the Engineering and Operations Centre. This ongoing commitment, coupled with the GHG reductions plan, would ensure that reductions strategies are being integrated into the broader organization and lead to targets being met.

## 2. Principles, Approaches, & Framework

The City's GHG emissions reduction plan focuses on the City's corporate emissions output. The baseline emissions are calculated from energy associated with City buildings, vehicles and machinery (fleet), streetlights, and solid waste.



Figure 1: GGR Plan Framework

### 2.1. Vision Statement

To carry out the strategic and proactive pursuit of responsible emissions reduction on a local level, which contribute to the federal governments' international commitments. Bearing in mind that one of the main considerations when establishing infrastructure is climate, it can be expected that rapid change in climate will have a crippling impact on existing infrastructure. By taking action, the City has the opportunity to save money in municipal operations, lower energy costs for residents and businesses and increase investment in the local economy. Therefore, the City's GHG emissions reduction actions also contribute to the long-term environmental, economic, and social wellbeing of the residents, businesses and visitors of the City of Port Colborne.

### 2.2. Commitment

The City of Port Colborne aims to lead the community by example in terms of GHG emissions reductions, and demonstrate to residents and businesses how GHG emissions reductions can

be implemented locally, as well as the benefits such actions can bring to the community. Therefore, the City commits to the following:

- i. Allocation of the resources necessary to develop and implement a strategic GHG emissions reduction plan, aimed at reducing GHG emissions and the related environmental impacts, while increasing efficiency
- ii. Promotion of responsible GHG emissions/energy management throughout the City, implementing economically viable emissions reduction projects, organizational measures, and renewable energy initiatives where possible
- iii. Compliance with legislated environmental requirements and standards (i.e. annual Greenhouse Gas Report)
- iv. Continual improvement of the Plan and its projects and initiatives

*The vision and subsequent commitments of the Plan outline the approach towards improving emissions output within City facilities and act as a foundation for the remainder of the Plan.*

### 2.3. Management and Leadership

The development and implementation of the Plan is the responsibility of the City's Climate Change Coordinator and the Energy Conservation Committee.

#### 2.3.1. Energy Conservation Committee

The Energy Conservation Committee (ECC), chaired by the Environmental Compliance Supervisor, acts as the City's steering committee, responsible for the review and implementation of this Plan. The ECC is comprised of City Staff representatives from various departments within the City in addition to an appointed member of Council ([Appendix A](#)). Members are committed to the continual improvement of the City's GHG emissions reduction and energy conservation efforts, while ensuring the success of the Plan. The Committee meets regularly to discuss energy related issues, economic considerations of initiatives, regulatory requirements, and incorporation of proposed initiatives into current policies and operational standards and to evaluate the effectiveness of the conservation and reduction efforts against the goals and objectives of this Plan.

## 3. Description of Reporting Inclusions

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To estimate GHG emissions from corporate operations, the City applies the *PCP Protocol: Canadian Supplement to the International Emissions Analysis* for the Quantification and Reporting of Greenhouse Gas Emissions Inventories ([the PCP Protocol](#)). The PCP Protocol

identifies a number of GHG emissions sources that should be included in a municipal government's corporate GHG Inventory:

**Buildings Emissions:** Includes GHG emissions generated from electricity and natural gas used at City owned and leased facilities where the City pays utility costs.

**Fleet Emissions:** Includes emissions from all vehicles and machinery operated by City departments.

**Streetlights Emissions:** Includes greenhouse gas emissions from electricity used to power streetlights, traffic lights and signals, and miscellaneous outdoor lighting throughout the City.

**Landfill Emissions:** Includes emissions from solid waste collected at City facilities and public receptacles, which are landfilled.

**Water and Wastewater Treatment:** Emissions from water and water treatment are not included in the City of Port Colborne's inventory given that responsibility for these operations resides with the Niagara Region. Based on the structure of water and wastewater treatment, this sector does not meet the protocol's definition of "operational control" for a municipality, and is therefore excluded from the GHG inventory. The Niagara Region has reported energy and emissions data for water and wastewater facilities in the annual Greenhouse Gas Report, as well as the 2019 - 2023 Energy Conservation and Demand Management Plan. This data can be found on the [Niagara Region website](#).

**Land use:** Land use related emissions are not included in the baseline GHG inventory as they are generally only included in community level plans to attribute emissions to agriculture, and as this Plan only applies to corporate GHG emissions.

**Renewable Electricity:** At this time all of the electricity purchased by the City comes from Ontario's Electricity Grid. Ontario's Electricity System is one of the lowest GHG emitting systems in North America. While there are no current renewable energy systems within the City of Port Colborne, the City commits to explore the viability of implementing and developing renewable energy systems in City facilities.

## 4. Baseline Inventory of Corporate Energy and GHG Emissions

Tables 1 and 2 breakdown the emissions and energy inventory, displaying the amount of energy from each sector and source, respectively, as well as the emissions. Here energy is expressed in gigajoule (GJ) of energy use, and eCO<sub>2</sub> is expressed in metric tonnes.



**Table 1: Energy Costs and eCO2 Emissions by Sector**

Sector	Energy (GJ)	Total eCO <sub>2</sub> (t)
<b>Buildings</b>	40,593	1,164
<b>Vehicle Fleet</b>	6,579	469
<b>Streetlights</b>	1,872	10
<b>Corporate Waste</b>	-	87
<b>Total</b>	<b>49,044</b>	<b>1730</b>

**Table 2: Energy Costs and eCO2 Emission by Source**

Energy Type	Total Use	Energy (GJ)	Total eCO <sub>2</sub> (t)
<b>Electricity (kWh)</b>	5,739,720	20,663	115
<b>Natural Gas (m<sup>3</sup>)</b>	557,380	21,755	1,059
<b>Diesel (L)</b>	116,648	4,468	321
<b>Gasoline (L)</b>	60,339	2,112	148
<b>Waste</b>	-	-	87
<b>Total</b>		<b>49,044</b>	<b>1,730</b>

#### 4.1. Current Energy Consumption

Overall the City's energy consumption has increased from 2011 to 2017, with the largest increase in 2013 (attributed to the introduction of the Vale Health and Wellness Centre). As demonstrated in Figure 2, the City's buildings (facilities) sector is responsible for the majority of the City's overall energy consumption, while vehicles and streetlights make up a much smaller proportion of the City's overall energy consumption. Additionally, Figure 2 displays energy consumption broken down by energy source, which exhibits that the City has similar demands for electricity and natural gas, and quite different demands for diesel and gasoline.

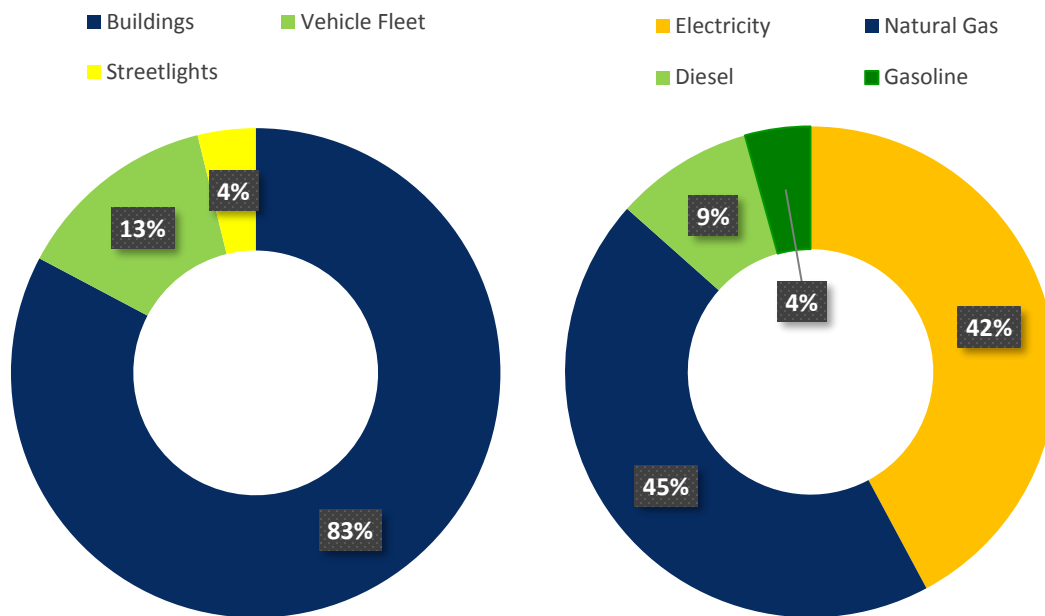
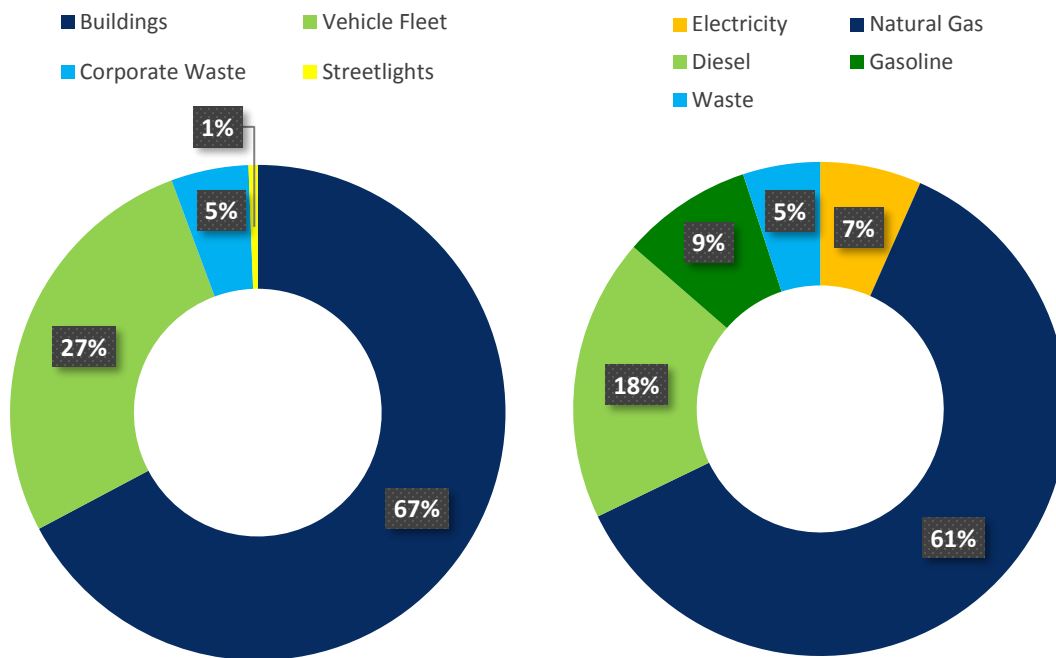


Figure 2: Breakdown of corporate energy consumption by sector and energy source

#### 4.2. Current Emissions Output

Emissions quantities are determined by energy usage and associated emissions factors; therefore, understanding the City’s energy demand and consumption trends is essential for analyzing emissions data. By knowing the emissions associated with different energy sources combined with the City’s energy demand, staff can develop more accurate emissions reduction targets and objective.

In comparing Figure 2 to Figure 3, it is evident that emissions are not directly proportional to energy consumption. The emissions from the vehicle fleet (Figure 3) account for 27% of the City’s GHG emissions inventory, while the fleet only accounts for 13% of the City’s energy consumption (Figure 2). An additional difference in the emissions inventory is the presence of solid waste. Solid waste has no energy value in the inventory because collection is outsourced, and therefore only the emissions from the breakdown of solid waste was calculated.



**Figure 3: Breakdown of emission output by sector and output by energy source**

Looking at emissions based on source is helpful to understand how the sources of energy impact the City’s emissions, as seen in Figure 3 above. This also demonstrates where the greatest potential is for emissions reduction. Considering that buildings are the largest sector it can be assumed that this is a sector where the most reductions can be made. Looking at emissions by source gives a more detailed analysis: natural gas reductions at City facilities will have the most impact on the emissions inventory. The City’s waste emissions are higher than most corporate inventories (proportionally); however, this inventory includes waste collected from public receptacles as well.

## 5. Objectives

In order to better categorize and manage the objectives of the City, focus areas have been generated based on the goals and overall vision. These focus areas include:

- Facilities
- Fleet
- Staff
- Solid Waste

The objectives for the Plan have been designed to provide direction on how to achieve the quantitative goals and Plan vision. Recognizing potential resource constraints, consideration has been given to the need for the City to build and enhance internal capacity in order to develop the

necessary resources to implement the Plan. As the City progresses in its emissions reduction and energy practices, it is expected that the objectives will evolve as well.

The objectives, detailed in [Appendices B-E](#), contain information regarding the focus area, initiative commitment, required actions, measure of success, personnel required, as well as timelines. The initiatives in this plan consist of programs, processes, and/or projects which are explained in table 5 below.

**Table 3: Description of Initiative Categories**

Initiative Category	Definition	Example
Program	Longer term objectives with broad applications	Awareness Programs
Process	Shorter term objectives with more specific applications	Facility energy tracking
Project	Specific actions (generally capital projects) to improve efficiencies	Retrofits and upgrades to building envelopes

## 6. Quantitative Goals

In 2014, the Province of Ontario eliminated coal-fired electricity generation from the grid, and ramped up funding for the construction of renewable energy projects. In 2003, 25% of electricity was from coal-fired generation, and by 2017 31% of electricity was from renewable sources. This has resulted in significant GHG emission reductions which has directly benefitted the City's GHG emissions inventory. As illustrated in Table 4 below, the total annual GHG emissions for City facilities has decreased significantly, even though the total energy consumption has slightly increased. This verifies that the reduction in GHG was an indirect result of the Provincial changes to the electricity generation system rather than a result of City activities.

**Table 4: Facility Emissions Change & Estimated GHG Inventory Change**

Facilities			Estimated GHG Emissions Inventory Change (pre 2017)	
Year	GHG tonnes/year	GJ	Assumed 2013 inventory based on facility sum	2017 inventory sum
2013	1,355	34,548		
2014	1,261	34,743		
2015	1,209	33,828	2,015	1,730
2016	1,014	33,864		
2017	1,070	36,939		
<b>Overall Change</b>	<b>(-)21%</b>	<b>7%</b>		<b>(-)14% change in the inventory</b>

The estimated 2013 GHG emissions inventory is based on the assumption that the only difference in emissions is due to the facilities sector. Considering the changes to the City's fleet and

streetlights this is likely a conservative assumption as there is no accurate data from 2013 to calculate the impacts of these changes. The estimated 2013 inventory demonstrates that the City’s overall GHG emissions have decreased at least 14% as of 2017. As mentioned previously, this reduction can mainly be attributed to the phasing out of coal by the Province.

City staff have chosen 2017 as the baseline inventory year, this decision was made for a number of reasons, mainly because it is the most accurate representation of the City’s current activities, with the most complete data. City staff also feel that using this baseline will mean more accurate tracking of the impact of GHG emission reduction initiatives undertaken by the City, rather than reductions from changes made on the provincial level. Thus, while many PCP municipalities in Ontario have set reduction targets of 20-30% for 2030, with a baseline inventory year prior to 2015 (meaning that coal generated power would still be included in their GHG baseline), the City of Port Colborne is aiming for a 10% reduction in corporate emissions by 2030. Although on the surface this may seem like a low target for the City to undertake, City energy staff are confident that, with the aforementioned details considered, this is realistic and ambitious target.

The 10% goal is based on a combination of initiatives summarized below:

**Table 5: Quantitative Goal Breakdown**

<b>Lower Targets (1.5 – 2.5% each)</b>
Building retrofits
Employee energy training
Waste diversion program
Energy efficiency standard commitment for new-builds
<b>Higher targets (3 – 4% each)</b>
Application of a Green procurement policy/ climate lens

## 7. Energy Use Management

Port Colborne has been proactive in improving the energy conservation and efficiency of its facilities. Table 2 below is an outline of energy related projects that have already been implemented, and/or budgeted for in City facilities. As many of these projects were carried out or began in 2018-2019, the impact of these measures has yet to be analyzed and accounted for in energy data. Future energy reports and Plans will highlight the effectiveness of various conservation projects and their impact on overall consumption (the year 2020 will be the first to be compared to the original emissions inventory).

**Table 6: Emission/Energy Related Projects**

Project	Facility	Year
HVAC Replacement	Museum- Heritage & Resource Centre	2019
	Museum- Complex	2019
Window Replacement	City Hall	2019-2021
	Roselawn Centre- Kitchen	2019
Timed Lighting	Lion's Field	2019
Lighting Retrofit: T8 to LED	City Hall	2018
	Vale	2019
	Roselawn	2018
	Marina	2018
	Museum	2018
	Fire Hall	2018

One of the most significant initiatives to be undertaken by the City during this Plan, is the implementation of a climate lens. A climate lens is the consideration of greenhouse gas mitigation and adaptation requirements in all decision making (City of Victoria). A climate lens is intended to incent behavioral change and consideration of climate impacts into the planning of infrastructure projects with a view to reaching the City’s emissions reduction target.

While the focus of this funded project is to reduce GHG emissions, it will incorporate the goals from the City’s Energy Conservation and Demand Management (ECDM) Plan, which is focused on reducing energy consumption for the City’s facilities and increasing energy efficiency.

## 8. Monitoring

The implementation of the Greenhouse Gas Emissions Reduction Plan will allow for strategic and centralized monitoring of emissions output and energy consumption. As part of the plan, a monitoring system will be developed to provide continuous information to key staff members. The overall inventory will be updated in an excel spreadsheet on an annual basis, with the results reported to council. Emissions factors for each source of GHG will need to be updated to match the monitoring year. Continual monitoring will contribute to informed decision-making and the development of stronger objectives in future Plans.

The City has committed to review and evaluate the Plan, revising and updating it as necessary. The progress towards identified goals and objectives will be evaluated and new objectives will evolve as the capacity for emission and energy management within the City grows. The review and evaluation process is ongoing and will provide critical feedback that contributes to the

commitment to continuous improvement in emission and energy management of Port Colborne's activities.

### 8.1. Reporting

The development of reports based on progress monitoring will deliver key information to various stakeholders:

Reports regarding progress of the Greenhouse Gas Reduction Plan, including conservation measures, and changes in the processes and implementation of programs, will be developed by the Energy Conservation Committee and delivered to key identified audiences within the City. Suggested audiences include the Mayor and Council, Directors, and the Senior Management Team.

Emissions data will be compiled and analyzed annually with a status report presented to council in conjunction with the *Energy Consumption and Greenhouse Gas Emissions Report*. At least once every five (5) years the Plan will be reviewed and objectives will be updated to account for changes in usage, technology and availability of alternative energy sources.

## Appendix A: Energy Conservation Committee

<b>Departments with Representatives</b>
<b>Community &amp; Economic Development (2)</b>
<b>Engineering and Operations Centre</b>
<b>Fire &amp; Emergency Services</b>
<b>Museum</b>
<b>Library</b>
<b>Facilities</b>
<b>An appointed member of Council is also a part of the ECC.</b>
<b>Environmental Compliance Supervisor, Darlene Suddard is the chair of this committee</b>



## Appendix B: Outlined Facility Focused Objectives

Objective	#	Action	Measure of Success	Personnel	Years		
					1	2-5	5-10
<b>The City commits to lower utility demands for activities and facilities</b>	1	Systematically upgrade lighting to the highest efficiency option to meet a particular need.	Continue to update inventory to track current and proposed energy conservation measures.	Facilities Staff	X	X	
	2	Where appropriate, upgrade ventilation to demand responsive technologies.	Demand response technologies are included in annual energy analysis.	Facilities Staff		X	X
<b>The City manages its energy in a way that reduces the burden on ratepayers, while maintaining a high level of service for residents, businesses, and a healthy work environment.</b>	3	Develop processes to provide departmental managers with information on the energy bills for their departments to review.	Record of utility bill analysis and critique (maybe a quarterly survey).	Energy Staff	X		
	4	Continually communicate with Hydro to ensure proper bill adjustments for single rate facilities.	Attempt to offset energy use start time, as to lower peak demand (possibly an intern project)	Energy Staff	X	X	X
<b>City staff members have the training and information they require to effectively and efficiently manage their energy use and emissions within their areas of responsibilities.</b>	5	Install automated system for monitoring lighting and temperature with an alert system for out-of-ordinary events.	Trial project for at least one major City Facility	Facilities Staff			X

Objective	#	Action	Measure of Success	Personnel	Years		
					1	2-5	5-10
The City monitors initiatives in other municipalities and other organizations that are designed to reduce energy use and emissions and assesses the applicability of these initiatives to the City.	6	Benchmark energy use and targets against other similar municipalities.	In yearly update the City references the performance of our facilities in comparison to those of other municipalities.	Energy Staff		X	
City ensure that it monitors and tracks energy use and GHG emissions to be able to measure progress against targets.	7	Install sub-meters on major systems in largest energy using buildings to provide real time information to operations staff.	Yearly update of GHG inventory.	Facilities Staff			X
	8	Investigate diurnal and seasonal patterns of energy use to take advantage of load shifting opportunities and reduce use of electricity during peak times when it is expensive and more carbon intensive	Yearly update of GHG inventory.	Energy Staff		X	
City has operating policies and procedures that ensure its energy-using equipment is maintained and operated to reduce energy use and emissions.	9	Adopt new building construction standards for corporate facilities that will support the goal of 10% GHG reduction.	Included in the City's Climate Lens	Energy Staff			X
	10	Develop a standard for major renovations that fits the City's energy and GHG reduction goals.	Included in the City's Climate Lens	Energy Staff	X		

## Appendix C: Outlined Fleet Focused Objectives

Objective	#	Action	Measure of Success	Personnel	Years		
					1	2-5	5-10
<b>The City commits to lower fuel demands for all fleet related activities</b>	1	Deploy cost-effective idle-reducing technologies, possibly including: LED lights, auxiliary batteries, automatic shut-off devices	Record of technology trial, and its impact on emissions.	Fleet Manager Energy Staff	X	X	X
	2	Develop a plan for implementing electric vehicle charging facilities to address near and longer-term plans for electrification of transportation	Report to council on EV charging plans	Planning Energy Staff	X	X	
	3	Investigate phasing out purchases of gasoline light duty vehicles	Results of investigation included in the yearly council update	Fleet Manager Energy Staff		X	X
	4	When new ice resurfacing machines are purchased, choose electric models	Results of investigation included in the yearly council update				X
<b>The City is constantly evaluating innovative ways of increasing energy efficiency, and reducing GHG emissions.</b>	5	Test out all-electric vehicles in applications where they make sense	Results of investigation included in the yearly council update	Fleet Manager	X	X	X

Objective	#	Action	Measure of Success	Personnel	Years		
					1	2-5	5-10
<b>New equipment is chosen with a consideration of its energy use, emissions, and life-cycle cost.</b>	6	When purchasing new vehicles and other equipment consider purchasing 'best in class' options, taking into account life cycle costs and carbon intensity as per green procurement policy.	Policy is included in the City's Climate Lens	Fleet Manager Energy Staff	X	X	X
	7	Develop criteria for right sizing new vehicles	Policy is included in the City's Climate Lens	Fleet Manager Energy Staff	X		
<b>The City has reached its preferred state by preparing a series of targets and milestones updated regularly along the way.</b>	8	Fleet and facility energy analysis	GHG inventory is updated on a yearly basis.	Energy Staff		X	
<b>City ensure that it monitors and tracks energy use and GHG emissions to be able to measure progress against targets.</b>	9	Ensure that data systems for fleets are capturing relevant data on distance travelled, fuel use, fuel and vehicle type, driver, etc. and that staff have knowledge in how to extract and analyze data	GHG inventory updated, and the implementation of driver training	Fleet Manager Energy Staff	X		
	10	Survey staff compliance with anti-idling	Surveys completed as needed	Energy Staff		X	

Objective	#	Action	Measure of Success	Personnel	Years		
					1	2-5	5-10
<b>City has operating policies and procedures that ensure its energy-using equipment is maintained and operated to reduce energy use and emissions.</b>	11	Prepare/update of the Corporate Fleet Strategy addressing changes in needs, technologies and updates or creation of associated city policies, including vehicle maintenance, travelling with loads, duty cycles etc.	Strategy is endorsed by council	directors		X	
	12	Eliminate underutilized or excess vehicles. (Excess availability of vehicles tends to lead to increased use.)	GHG inventory is updated to reflect this action	Fleet Manager Energy Staff		X	X
	13	Accelerate replacement of oldest, least-efficient vehicles	Trend of vehicle replacement is tracked in the five-year review of this plan.	Fleet Manager Energy Staff		X	
	14	Substitute communications technology for transportation, such as virtual meetings or work from home policies (while also encouraging carpools)	Track internal distance traveled for meetings.	Energy Staff			X

## Appendix D: Outlined Staff Focused Objectives

Objective	#	Action	Measure of Success	Personnel	Years		
					1	2-5	5-10
<b>The City commits to lower GHG output for activities</b>	1	Consider starting a bike sharing program for staff members to get around facilities.	Include viability results in the annual update.	Energy Staff		X	
<b>The City manages its energy in a way that reduces the burden on ratepayers, while maintaining a high level of service for residents, businesses, and a healthy work environment.</b>	2	Provide regular information on energy usage and costs to facility and vehicle operators	Include the annual GHG inventory update in Internal newsletter.	Energy Staff	X		
<b>City staff members have the training and information they require to effectively and efficiently manage their energy use and emissions within their areas of responsibilities.</b>	3	Develop a plan for communicating about the City's energy reduction programs and initiatives to all staff	Staff training for new and existing staff	Energy Staff	X		
	4	Conduct an assessment of training needs of city staff as well as building operators	Record staff feedback acquired in preliminary training survey.	Energy Staff	X		
	5	Develop an ongoing energy training and awareness plan for all levels of staff that may include workshops, lunch and learns, building systems training, utility billing training and city energy policy training.	Staff training for new and existing staff	Energy Staff	X	X	X
	6	Staff with energy management and building operations responsibilities attend conferences and trade shows for information sharing	In yearly GRP update – reference which conferences were attended	Energy Staff Facilities Staff	X	X	X

Objective	#	Action	Measure of Success	Personnel	Years		
					1	2-5	5-10
	7	Develop resources to guide facility operators to make better (energy) choices.	Existence of a Climate Lens metric system specific to the City	Energy Staff	X		
	8	Work with operators to identify specific steps to achieve facility or vehicle type specific targets	Record staff feedback acquired in preliminary training survey.	Energy Staff		X	
	9	Develop bi-annual training program on efficient driving, awareness of environmental issues, anti-idling policy and practices, and potential cost savings for staff using Corporate vehicles	Staff training for new and existing staff	HS Energy Staff		X	
<b>City collaborates with others both inside and outside the corporation, such as technology firms, to enhance knowledge of how to use and manage operation systems.</b>	10	Continued meetings for the City's internal ECC, to monitor progress towards targets, and to ensure that targets for individual areas are collectively meeting overall corporate targets	Meeting minutes	Energy Staff	X	X	X
	11	Consider energy and emissions impacts when other corporate plans and policies are being proposed.	Incorporated into the City's Climate Lens	Energy Staff	X	X	X
	12	Participate in multi-municipality groups e.g. energy managers, fleet managers, etc.	Record of group meetings	Energy Staff	X	X	X

Objective	#	Action	Measure of Success	Personnel	Years		
					1	2-5	5-10
<b>The City monitors initiatives in other municipalities and other organizations that are designed to reduce energy use and emissions and assesses the applicability of these initiatives to the City.</b>	13	Sponsor a series of lunch and learns on energy related initiatives with special guests from other jurisdictions, organizations and vendors.	Record of group meetings	Energy Staff		X	X
	14	Identify and adopt industry best practices (e.g. ORFA).	Incorporated into the City's Climate Lens	Energy Staff	X		
<b>The City is constantly evaluating innovative ways of increasing energy efficiency, using renewable energy, and reducing GHG emissions.</b>	15	Establish corporate standards for service provision and energy-saving equipment (e.g. light switches, ranges of acceptable temperatures).	Incorporated into the City's Climate Lens	Energy Staff		X	
	16	Develop interdepartmental and possibly inter-municipality competitions on reducing energy use.	Communicated in internal newsletter	Energy Staff		X	
	17	Monitor changes in technology, costs, performance and availability of alternative lower carbon fuels, including biodiesel, CNG, renewable diesel, and hydrogen for heavy duty vehicles	Include in the annual GGRP update to council	Energy Staff		X	X
<b>New equipment is chosen with a consideration of its energy use, emissions, and life-cycle cost.</b>	18	Investigate establishing a reserve account to reinvest energy savings, possibly funded by an internal carbon shadow price	In yearly GRP update – reference options	Energy Staff		X	



Objective	#	Action	Measure of Success	Personnel	Years		
					1	2-5	5-10
	19	**Develop a clear and well-publicized process for funding smaller projects from the energy reserve	In yearly GRP update – reference how this was used	Energy Staff		X	X
	20	Adopt the federal shadow price for carbon for the purposes of decision-making and assessing projects	Incorporated into the City’s Climate Lens	Energy Staff	X	X	X
	21	Set annual targets for each sector to meet the overall efficiency targets	Evaluated in the annual GRP update to council	Energy Staff	X	X	X
	22	Consider grading the City on energy use in a yearly review to solidify implementation by developing report card for each sector	Evaluated in the annual GRP update to council	Energy Staff		X	
	23	Ensure operators have tools needed to achieve goals	Record staff feedback acquired in training survey.	Energy Staff	X	X	X
	24	Re-affirm/update targets as required to reflect progress	GRP targets are reassessed after five-years time	Energy Staff	X	X	X
	25	Evaluate the need for additional ECC members to meet the City's energy goals	Staff training for new and existing staff	Energy Staff	X		
<b>Council and senior management have knowledge of energy use and emissions from City operations, and ensure sufficient resources are allocated for plan implementation.</b>	26	Develop energy KPIs (key performance indicators) to be integrated into the Business Leadership Team dashboards	Incorporated into the City’s Climate Lens	Energy Staff	X	X	X

Objective	#	Action	Measure of Success	Personnel	Years		
					1	2-5	5-10
<b>The City leverages its expenditures on energy efficiency, renewables, and emission reduction opportunities by taking advantage of incentives offered by utilities and other levels of government</b>	27	Monitor new sources of funding and incentives related to energy efficiency or GHG reduction initiatives	Discussed at ECC meetings	Energy Staff ECC Members	X	X	X
<b>City ensure that it monitors and tracks energy use and GHG emissions to be able to measure progress against targets</b>	28	Consider certifying to ISO 50001 Energy Management Systems	Included in the annual GRP update to council	Energy Staff		X	
	29	Confirm protocols for on-going monitoring and valuation of energy saving initiatives	Included in the annual GRP update to council	Energy Staff		X	

## Appendix E: Outlined Waste Focused Objectives

Potential Impact	Action Items	Implementation Plan	Department Lead(s)	Years		
				1	2-5	5-10
<b>This supports our goal of going paperless, reducing our paper usage where possible.</b>	The printers automatically default to two-sided printing, reducing the number of sheets printed.	To begin implementation at city hall in 2020, and if successful, to look at expanding to other facilities.	IT	X		
<b>This has the potential to reduce our Corporate Waste by diverting items to other waste streams.</b>	Ensuring Proper Bins in City Facilities: As new construction or retrofits occur at City facilities, that provision be made for sufficient facilities for the collection, handling and storage of source separated wastes, specifically for the three streams currently being collected.		Energy Staff Facilities Staff Community Services			
<b>This has the potential to reduce our Corporate Waste by diverting items to other waste streams.</b>	At existing City facilities, ensure that the collection containers for the source separation program be located conveniently and properly sized, with adequate labeling and signage in order to encourage greater participation in diversion programs.	In 2020, new recycling and organics collection containers will be in place in certain public receptacle areas.	Energy Staff Facilities Staff Community Services	X		
<b>This has the potential to reduce our Corporate Waste by diverting the items to other waste streams.</b>	To promote awareness of and encourage participation in the source separation program and ensure its continuing success, information should be provided to those who will use the program in the form of communication through signage,	This will require the proper bins in place first to be launched.	Energy Staff Facilities Staff Community Services			

Potential Impact	Action Items	Implementation Plan	Department Lead(s)	Years		
				1	2-5	5-10
	labels, information on the corporate intranet or other reminders and motivational tools.					
<b>To reduce the amount of waste by creating more awareness of how to divert waste.</b>	Conduct waste audits and utilize the information to update the City's GHG inventory for 2021	All completed waste reduction work plans must include all reasonable actions that can be taken to reduce, reuse and recycle waste. These actions must be identified in a step-wise process that follows the 3Rs Hierarchy*	Energy Staff		X	
<p><b>3Rs Hierarchy*</b></p> <p><i>First – <b>Reduce</b> waste by developing actions that will stop waste from being produced in the first place.</i></p> <p><i>Next – <b>Reuse</b> any waste at your establishment or donate to others.</i></p> <p><i>Lastly – <b>Recycle</b> any waste materials through a recycling company.</i></p> <p><i>Investigate expanding textile recycling bins in public facilities</i></p>						