City of Peterborough

To:	**Members of the General Committee**
From:	**Jasbir Raina, Commissioner of Infrastructure and Planning Services**
Date:	**September 12, 2022**
Subject:	**Corporate Sector GHG Emissions Progress Report, Report IPSIM22-024**

Purpose

A report to provide Council with a progress update on Corporate Sector Greenhouse gas emissions.

Recommendation

That Council approve the recommendation outlined in Report IPSIM22-024, dated September 12, 2022, of the Commissioner of Infrastructure and Planning Services as follows:

That the report be received for information.

Budget and Financial Implications

There are no budgetary or financial implications associated with the recommendation.

Background

Corporate GHG Reduction Targets

In 2019, Council ratified a Climate Emergency Declaration "for the purpose of naming, framing, and deepening our commitment to protecting our community, its economy, and its ecosystems from climate change." The declaration superseded the 30 percent greenhouse gas (GHG) emission reduction target by 2031 endorsed in the 2016 Climate Change Action Plan with a 45 percent goal by 2030. The Climate Emergency Declaration also introduced a science-based net-zero target by 2050, aligning with international mitigation goals to keep global heating below 1.5ºC by mid-century.

In June 2021, staff submitted Report IPSIM21-018 to Council describing GHG emission trends from the 2011 base year to 2018. The inaugural report to Council revealed that the Corporation had reduced emissions by 18 percent from 2011 levels, with significant declines recorded in the Waste, Buildings, Wastewater Treatment, and Streetlights Sectors. Concurrently, Fleet Sector emissions rose from 2011 to 2018.

This report is intended to provide an update for 2019 and 2020 Corporate Sector GHG emission trends with respect to the 2011 base year and 2018 update levels.

Inventory Boundaries

Corporate GHG emissions that stem from municipal operations are considered Corporate Sector emissions. These emissions result from the day-to-day operations of the municipality to deliver services to the community. The City of Peterborough has control over Corporate Sector GHG emissions and can directly mitigate emission sources through municipal decision-making and planning. This report excludes Community Sector GHG emissions derived from buildings, vehicles, and industrial processes owned and operated by residents and businesses in the community for which the municipality does not have direct control over mitigation.

The Corporate Sector is comprised of fleet vehicles, waste management, facilities, wastewater pumping stations and treatment plant, streetlighting, and non-street lighting assets.

Activity data was collected using EnergyCAP utility bill aggregating software for facilities' electricity and natural gas consumption for both reporting years. Annual fleet fuel and landfill waste records were gathered directly from corporate divisions to assess fuel usage and waste generated methane emissions.

Greenhouse gas emissions were calculated using 2019 and 2020 emission factors published in Canada's National Inventory Report for both years. Emission factors for electricity and natural gas were used to calculate facility GHG emissions. Fleet gasoline and diesel used emission factors for vehicle engine class types from the Federation of Canadian Municipalities' (FCM) Partners for Climate Protection (PCP) GHG calculating tool. Waste emissions were calculated using the PCP tool and followed an equity distribution ratio of 60:40 split between the City and County for GHG emissions generated from the shared Bensfort Road landfill in proportion to the waste generated by the City and County, respectively.

Corporate GHG emissions are represented as metric tons of carbon dioxide equivalent (tCO_2e).

Recalculations of 2018 Corporate Sectors

The 2018 Corporate Sector GHG emission inventory was adjusted (Table 1) due to new information being made available since the publishing of Report IPSIM21-018. Improvements to the Fleet Sector GHG emissions resulted from more accurate estimates available for vehicle engine types, allowing for the recalibration of fleet emissions. This adjustment applied to:

- Light-duty gasoline cars and trucks
- Heavy-duty clear and coloured diesel trucks

An adjustment in the Building Sector inventory included a broader scope of investigation that expanded the number of facilities being eligible for evaluation. The added buildings are noted as being heated, cooled, or occupied by staff. The additional buildings assessed in 2018 include:

- Bensfort Road Buildings
- Del Crary Park Marina Building
- King Street Garage
- Museum Storage Building
- 249 Simcoe Street Building

Lastly, the inclusion of the Other Lighting Sector category captures lighting at 32 parks, 3 sports fields, and 4 surface parking lots that were not previously reported in 2018.

Table 1. Corrected 2018 Corporate Sector GHG Emissions

Sector	2018 GHG (tCO_2e)	Corrected 2018 GHG (tCO_2e)
Waste	7,232	7,232
Fleet	7,234	7,128
Buildings	3,260	3,331
Wastewater Treatment	512	512
Streetlights	169	169
Other Lighting	-	15
Total	**18,407**	**18,387**

All adjustments made to previously reported numbers are performed in accordance with methodologies outlined in the *GHG Protocol for Cities*.

Corporate Sector GHG Emissions Inventory Update

An updated corporate evaluation to track GHG emission reduction progress was completed using data from 2019 and 2020. The GHG emissions from the 2011 baseline year are presented with the recalibrated 2018 inventory along with the 2019 and 2020 inventories (Table 2).

Two new facilities (Harper Road Buildings and Airport Reservoir Pump Building) were added to the inventory in 2019 as their data was recently made available in EnergyCAP.

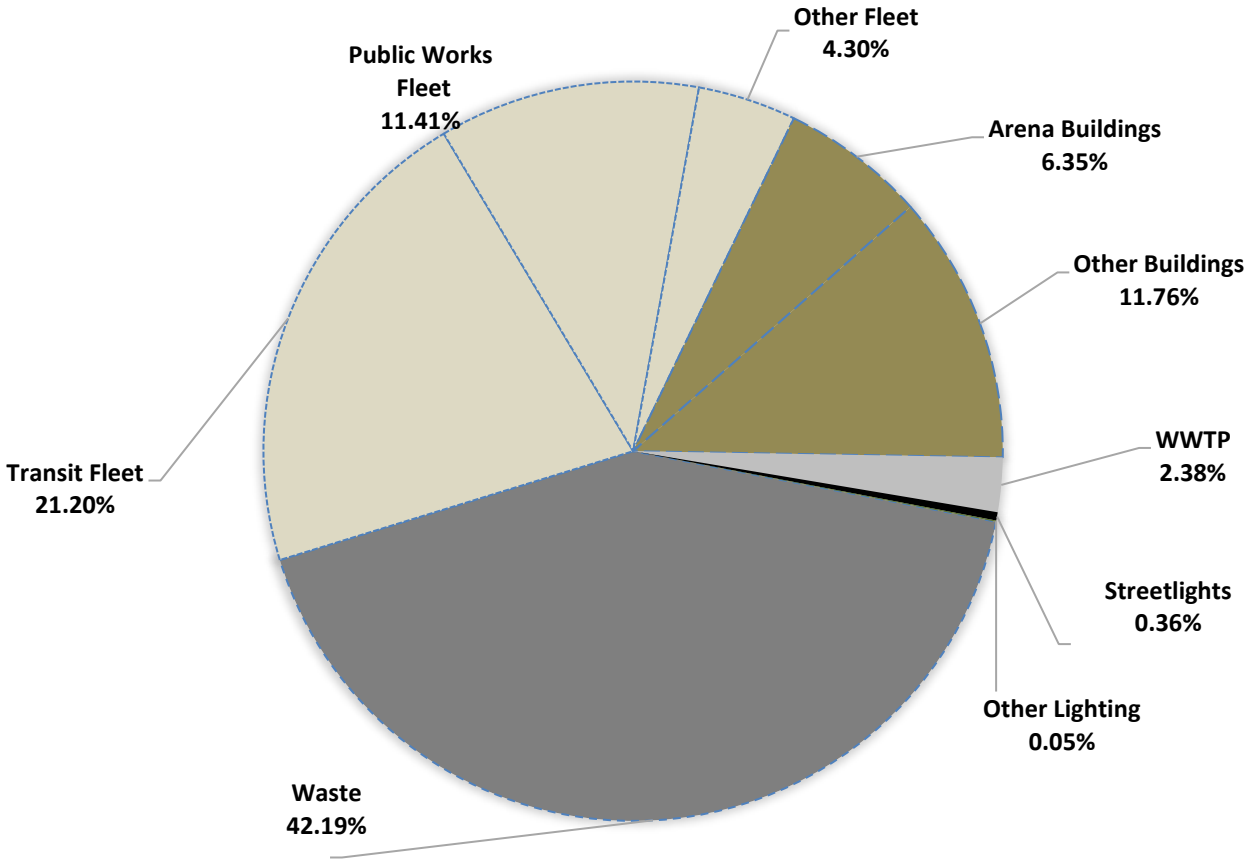
Table 2. Corporate Sector GHG Emissions (2011-2020)

Sector	2011 GHG (tCO_2e)	2018 GHG (tCO_2e)	2019 GHG (tCO_2e)	2020 GHG (tCO_2e)	% Change (2011 to 2020)	% Change (2018 to 2020)
Waste	10,223	7,232	7,620	7,470	-27%	+3%
Fleet	5,905	7,128	6,704	6,535	+11%	-8%
Buildings	4,747	3,331	3,349	3,206	-32%	-4%
Wastewater Treatment	1,085	512	526	421	-61%	-18%
Streetlights	531	169	86	64	-88%	-62%
Other Lighting	-	15	15	9	-	-40%
Total	**22,491**	**18,387**	**18,300**	***17,705**	-21%	-4%

*The impact of the COVID-19 pandemic on City services and operations is the main factor for the reduction from 2019 GHG emission levels.

The proportion of each Corporate Sector correlated to GHG emissions is represented in Figure 1. The Fleet Sector is sub-divided into three sub-categories (Transit, Public Works, and Other Fleet Vehicles) and the Building Sector (Arenas and Other Buildings) to showcase the size each sub-category has on total Corporate emissions.

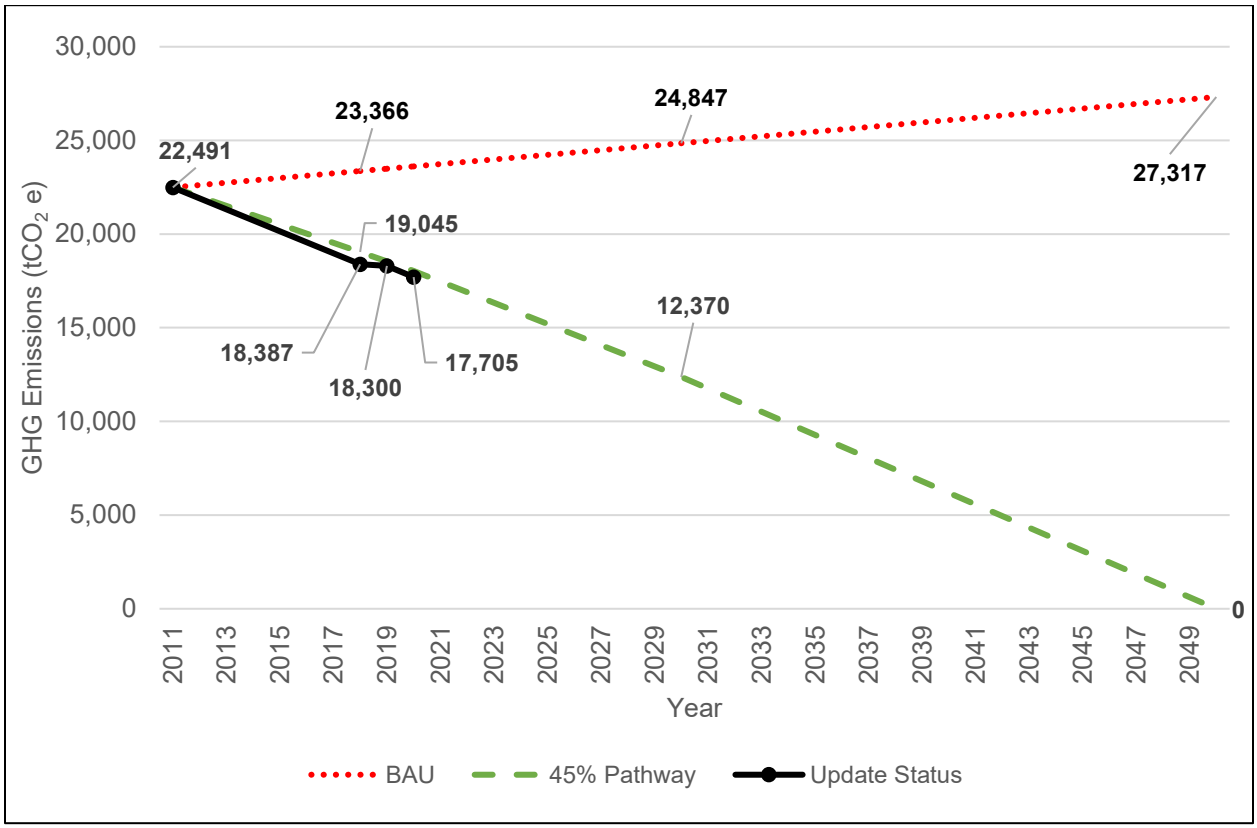
Figure 1. Proportion of Corporate GHG Emissions Sectors with Sub-categories in 2020



The Ontario electricity grid emission factor decreased slightly in 2020 from 2019, which aided assets that use electricity with an imbued lower concentration of GHG emissions associated with electricity consumption. The Wastewater Treatment Plant and Streetlight Sectors both benefitted in reduced annual GHG emissions because of the reduced emission factor. The Building Sector also benefited; however, the GHG emissions reductions from this sector mainly resulted from significantly lower electricity usage due to the COVID-19 pandemic altering workplace staffing levels.

Evaluating annual corporate progress to the Business-as-Usual (BAU) and 45% Reduction Pathways is shown in Figure 2. The BAU Pathway represents a 2.5 percent yearly growth in GHG emissions from the 2011 base year to 2050. The 45% Reduction Pathway stipulated by the Climate Emergency Declaration targets 2030 to reach the interim mitigation goal and net-zero by 2050. The interim targets for both Pathways are included for the years 2011, 2018, 2030, and 2050.

Figure 2. Corporate GHG Emissions Update as Compared to the Business-as-Usual and 45% Reduction Pathways



Impact of the COVID-19 Pandemic on Corporate Sector Emissions

From 2011 to 2020, the annual Corporate Sector GHG emissions decreased by 4,786 tCO_2e or 21 percent. However, the decline from 2019 to 2020 of 595 tCO_2e or 3 percent, is likely due to the onset of the COVID-19 pandemic (March 16, 2020) that disrupted City services and operations through the remainder of 2020. Impacts to services include the following:

- Multiple facilities were closed to the public and only scheduled appointments for some city services were carried out by front-line staff
- Increased bus frequency to lower passenger capacity while on route
- Cancellation of Trent and Fleming express bus routes due to both campuses shutting down due to the pandemic
- Closure of sports fields due to health restriction guidelines resulted in field lighting being turned off

The impact of COVID-19 is directly reflected in facility and fleet fuel consumption patterns in 2020. Regarding facilities, many buildings were still occupied by front-line workers who were required to provide city services to residents in person. These buildings remained heated and cooled despite reduced facility staffing levels because of work-from-home policies for non-front-line staff. This resulted in the Building Sector

increasing natural gas use by 2 percent from 2019 levels. Conversely, electricity consumption declined by 8 percent or 1 million kWh from 2019 levels, likely attributed to office lights and electronics being turned off due to fewer staff working in facilities. In 2020, the Building Sector combined for a reduction of 143 tCO_2e from 2019 levels.

The Fleet Sector, specifically Transit, was affected by pandemic restrictions on service levels. Transit fuel consumption lessened by 14 percent or over 200,000 L of diesel and gasoline for public transit vehicles. Even though more buses were added to enable lower passenger capacity levels across the network, the cancellation of the Trent and Fleming express bus routes significantly reduced the overall kilometres travelled of transit vehicles by 217,000 km or 8 percent in 2020 from 2019 levels. Alternatively, the non-transit fleet continued to provide city services throughout 2020, which did not correspond with a deviation in fuel consumption patterns from previous years. Overall, the Fleet Sector reduced GHG emissions by 169 tCO_2e from 2019 levels.

Finally, the Other Lighting Sector was impacted due to public health guidelines curtailing matches at sports fields to limit the spread of COVID-19. Sports field lighting was turned off for the duration of 2020, which resulted in a reduction of almost 100,000 kWh or approximately 50 percent from 2019 levels. However, restrictions did not affect park and parking lot lighting which remained relatively unchanged from 2019 levels. The Other Lighting Sector lowered GHG emissions by 6 tCO_2e from 2019 levels.

Achieving Corporate Sector GHG Emissions Targets by 2030

To achieve the 45% Reduction Pathway goal to reach 12,370 tCO_2e by 2030, annual GHG emissions would need to decline by 534 tCO_2e per year starting in 2021. A GHG emission projection to approximate where sectoral emissions can be abated is presented in Table 3. The projection included estimated grid electricity emission factors to determine the anticipated GHG emissions of electricity in 2030. In addition, natural gas, gasoline, and diesel emission factors were held at 2020 values due to all three fossil fuels having had consistent emission factors over the past decade, which are not expected to change significantly by 2030.

Table 3. Approximated GHG Emission Reduction Required by Corporate Sectors to Achieve 2030 Target

Sector	2011 GHG (tCO_2e)	2030 Estimated GHG Reduction Required (tCO_2e)	% Change
Waste	10,223	5,359	-48%
Fleet	5,905	3,020	-49%
Buildings	4,747	3,000	-37%
Wastewater Treatment	1,085	783	-47%
Streetlights	531	195	-28%
Other Lighting	-	13	-
Total	**22,491**	**12,370**	**-45%**

Fleet, Buildings, and Other Lighting were identified as Corporate Sectors best positioned to introduce new mitigation actions to reach the 45 percent goal. Moreover, the Fleet and Buildings Sectors are recognized as the primary opportunities that will reduce emissions more than targeting Other Lighting sector sources for conversion to LED. Where feasible, the opportunity to convert fleet vehicles to electric or hybrid electric vehicles can curb emissions that align with the 45% Reduction Pathway. The scheduled installation of electric vehicle charging stations at facilities where light-duty fleet vehicles are parked will support the transition. The Alternative Transit Fuel Study's recommendations will direct the path forward for how buses reduce emissions in the following decade.

Regarding facilities, an application to FCM for funding to complete energy audits with budgeted decarbonization pathways for nine of the most energy-intensive buildings through the Community Buildings Retrofit (CBR) program will strongly support that sector in meeting its targets. Also, continually targeting facility renovations to limit operational GHG emissions will be essential in the near term until a CBR decarbonization action plan is completed. The construction of the Net-Zero Carbon Fire Station No. 2 will assist with curbing Building Sector emissions; however, the introduction of the Morrow Park Arena will likely offset the mitigation benefit of the fire station once completed by 2024.

Alternatively, Waste, Wastewater Treatment, and Streetlights are not expected to reduce more than already committed through climate action projects. The establishment of the Source Separated Organics program slated for operations in 2023 is anticipated to curtail emissions by 4,864 tCO_2e through the diversion of organic matter out of the landfill, limiting the production of climate-accelerating methane gas. Streetlights have already achieved a 54 percent decrease or 3,090,000 kWh in energy reduction after converting sodium-halide luminaires to LED fixtures in 2019. Wastewater Treatment will seek to improve energy reduction opportunities with existing capital upgrades planned for this decade. Upcoming Wastewater Servicing Master Planning will incorporate GHG reduction pathways for capacity expansion required beyond 2030.

Summary

In 2020, Corporate Sector GHG emissions declined by 21 percent from 2011 levels and the Corporation is on track to meet the 45 percent reduction goal by 2030, however, the impact of the COVID-19 pandemic on City services and operations enabled a deeper reduction in 2020 than otherwise would have been expected and this is anticipated to rebound as City services begin to normalize. Key initiatives are being planned to support the Fleet and Buildings Sectors that will aid in further lowering GHG emissions and put the municipality on the pathway to reaching 45 percent reduction in 2030 and net-zero by 2050.

Submitted by,

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