MANAGEMENT REPORT

Date: November 27, 2024
To: Infrastructure, Transportation and Safety Sub-committee
From: Sadaf Ghalib, Climate Change Program Manager
Report Number: ITS24-021
Attachments: None

Title: Annual Corporate Greenhouse Gas Emissions – 2023

Objective: To report annually on the City of Stratford's Corporate Greenhouse Gas (GHG) emissions inventory for the year-ending December 31, 2023, and progress toward meeting corporate GHG emission reduction targets.

Background: On October 23, 2023, City Council endorsed the Corporate Energy and Emissions Plan (CEEP), which provides guidance on how the City can accelerate efforts toward decarbonization, operationalize actions to support energy efficiency and achieve the required emission reduction targets to align with provincial and federal objectives.

Staff continue to implement recommendations from CEEP, track and monitor efforts within each department, and document progress toward achieving overarching sustainability goals.

Analysis: Compared to the 2017 baseline year, the City's total GHG emissions for 2023 decreased by approximately 12% (equal to 610.16 tonnes of carbon dioxide equivalent, or tCO_2e). However, annual emissions rose by 7.52% between 2022 and 2023. Total corporate GHG emissions in 2023 were approximately 4,466.24 tCO_2e (being "tonnes of carbon dioxide equivalent.")

The main factors influencing this increase include the steep rise in the GHG intensity of Ontario's electricity grid, expansion of fleet for corporate service delivery, enhanced infrastructure to cater to a growing population, as well as the availability of more accurate data from historical reporting. There may also be impacts on annual variations changes in overall outdoor temperatures, that also influence GHG emission outcomes from year to year by causing fluctuations in energy consumption to accommodate thermal comfort. Such variations cannot be determined or predicted for future years.

Measured GHG emissions are noted for each asset class below (Table 1) and overall corporate GHG emissions are depicted graphically in Figure 1.

Table 1 Corporate GHG Emissions by Sector (2023)

Asset Class	Energy Type(s) in Use	Usage	2023 GHG Emissions (tCO_2e)
Buildings (including Municipal Airport)	Electricity Natural Gas	5,297,587 kWh 898,974 cu. m.	201.31 tCO_2e 1,726.93 tCO_2e
Fleet (including Stratford Police Services)	Gasoline Diesel Propane	220,682.44 Litres 215,149.93 Litres 11,022 Litres	1,842.28 tCO_2e - -
Outdoor Lighting	Electricity	110,000 kWh (est.)	380 tCO_2e
Solid Waste	Not applicable	299.99 tonnes	191 tCO_2e
Water & Wastewater	Electricity	3,281,900 kWh	124.71 tCO_2e

Corporate Energy and Emissions Plan (CEEP) Implementation

Notable projects and initiatives from CEEP are summarized below.

- Continued to provide inter-departmental support to staff and ensured that a strategic climate lens informed planning and decision making.
- Monitored the implementation of CEEP recommendations for corporate assets.
- Piloted the inclusion of climate considerations in the annual budget process to quantify energy and emissions impacts of city-wide initiatives including but not limited to projects, plans and procurement components. This evaluation tool helped staff assess climate impacts for initiatives at conception and is intended to continue to support decision making for staff as well as Council.
- Supported inter departmental initiatives including building energy audits for facilities, the determination of more assets to be included, evaluation of street light inventory, assistance on EV charging station initiatives, technical guidance on grant funding applications for fleet transition to hybrid and electric buses, periodic reporting to funding organizations for secured grants.

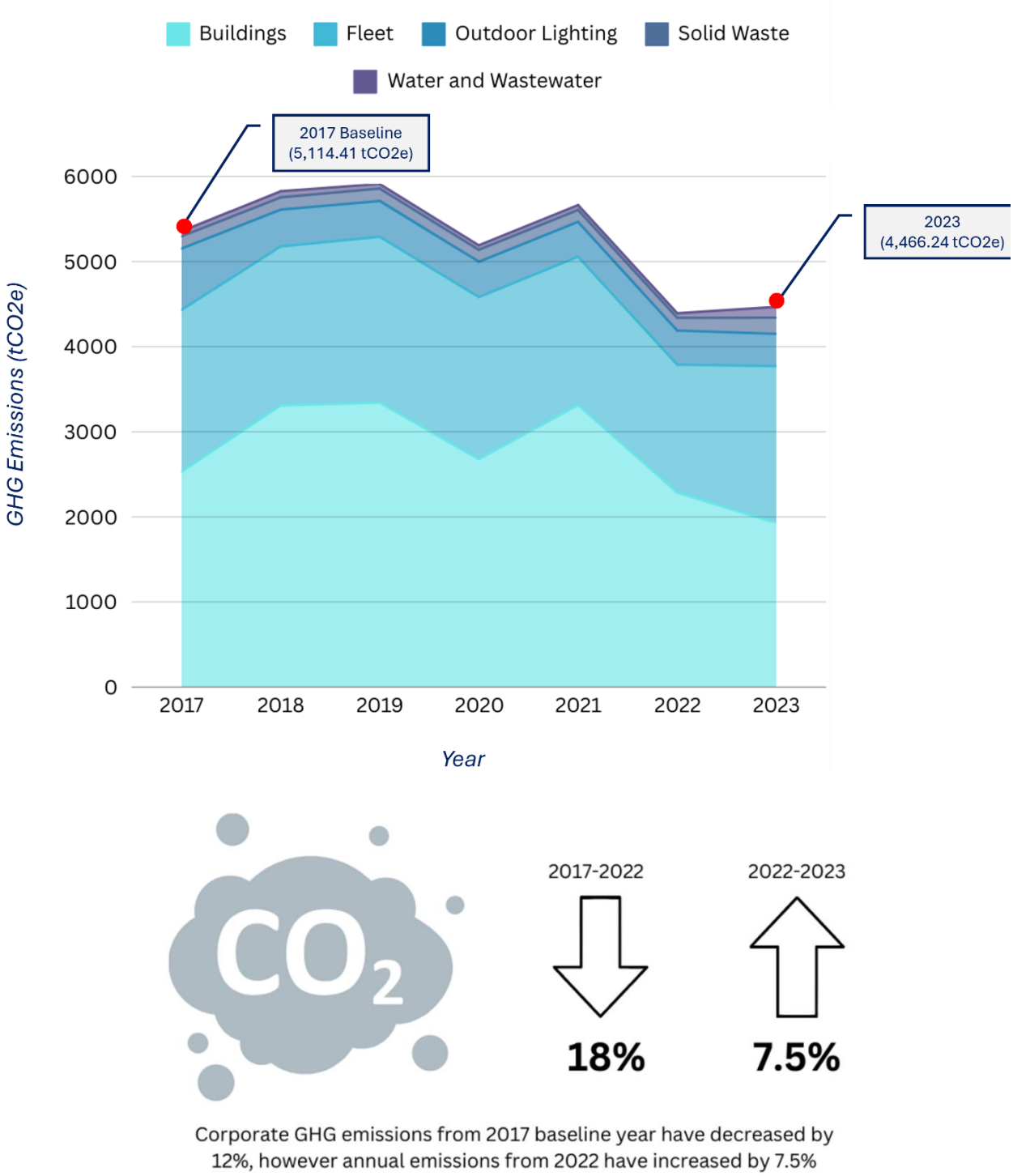

Figure 1 Corporate GHG Emissions (2023)

Energy and Emissions Share

Consistent to previous years, a predominant share of energy usage and emissions is driven by facilities and fleet. Figure 2 highlights the percentage breakdown of the share of emissions by corporate assets.

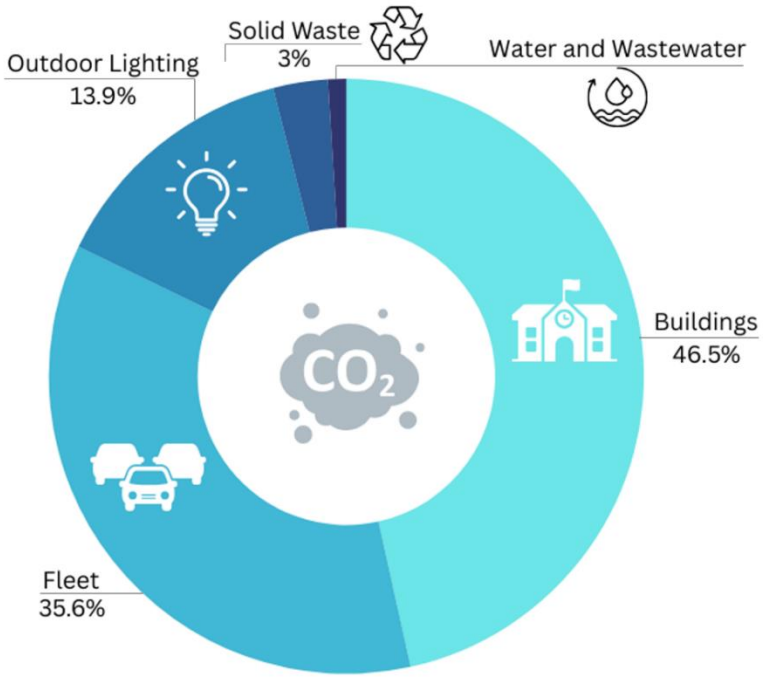

Figure 2 Corporate Assets- Energy and Emissions Share

Overview of Initiatives from Corporate Asset Classes

A high-level overview of initiatives for each asset class is provided below.

Building Asset Class

Through strategic investments in building retrofits such as efficient mechanical system replacements, envelope improvements and lighting upgrades, corporate buildings attained emission reduction of approximately 7.67% over the past year along with significant operating cost savings. This translates to a decrease in approximately 160 tCO_2e of emissions.

Some initiatives undertaken for buildings are noted as follows.

- Basic energy audits (ASHRAE Level 1) performed on the sixteen City facilities, which consisted of a walkthrough the facility, analysis of utility usage over the course of 2023, and identification of low cost retrofit measures to consider in planning for the 10-year capital budget cycle.
- Conducted benchmarking for four buildings to understand and analyse energy performance: Rotary Complex, Burnside Agriplex, Dufferin Lions Arena and

William Allman Memorial Arena. It was observed that over a period from January 2022 – March 2023, these facilities collectively achieved electricity as well as cost savings. Some identified projects that can result in energy and cost savings, such as phased retrofits are being built into the 10-year capital budget.

- Seven facilities have been approved for funding to undergo feasibility studies from Federation of Canadian Municipalities (FCM): Burnside Agriplex, City Hall, City Hall Annex, Dufferin Arena, Police Station, Rotary Complex, and William Allman Memorial Arena.
- Reduced facility energy use by 14.3% at the Dufferin Arena through phased retrofit upgrades including boiler, hot water tank replacements, and LED lighting installations. This included electricity demand reduction of 30.3% and GHG emission reduction of 4.71 tCO_2e along with significant utility cost savings.
- Planned retrofits for the corporate portfolio are anticipated to contribute toward energy efficiency efforts.

Fleet Asset Class

Ongoing procurement of low carbon options as a replacement for ageing conventional internal combustion engine (ICE) vehicles and equipment that have been added to the City's inventory over the past year have resulted in fuel cost savings of up to 30%.

Table 2 Corporate Fleet and Equipment

Fuel type	Number of units (fleet & equipment)	Percentage breakdown
Gasoline	64	40.51%
Diesel	58	38.41%
Propane	7	4.64%
Hybrid	24	15.19%
Electric	5	3.31%

While there is a slight reduction in emissions due to the replacement of ageing fleet to hybrid options and electric equipment, the overall fleet inventory has increased due to the addition of several light duty vehicles for staff who previously utilized personal vehicles for official purposes. The expanded inventory has also resulted in an increase in fleet emissions, although this spike in emissions is not anticipated to be consistent each year and will not serve as a suitable indicator to determine annual trends.

Some initiatives undertaken for fleet are noted as follows.

- Stratford Police Services (SPS) continues to replace ageing fleet with low carbon options. Out of an inventory comprising 32 vehicles, 20 are gasoline and 12 are hybrid vehicles. Overall, SPS has completed 37.5% of their fleet transition to hybrids and continues to replace vehicles to low carbon options at the end of their service life.
- Through funding from the federal government's Zero Emission Transit Fund (ZETF), the City commissioned a bus electrification feasibility study to plan for

replacement of transit fleet of 15 diesel-powered buses with electric buses and hybrid options as the current buses age out of service.

Outdoor Lighting

There were no LED conversions conducted for outdoor lighting in 2023. Overall, 76% of total streetlights (5,777 units) have been converted to LED. Remaining lights include high-pressure sodium (1,382 units), fluorescent lamps (2 units), incandescent and metal halide lamps (2 units).

Water and Wastewater

The annual energy consumption for 2023 has been noted as 3,281,900 kWh, marking a 28% increase from the annual consumption in 2022. Energy consumption and associated costs at the Water Pollution Control Plant facility have been consistently increasing over the years, which is primarily due to increased infrastructure needs of the growing community leading to increased flow, as well as variable precipitation patterns and snow melt in the region.

- The average demand at the facility in 2023 was 486.9 kW, representing an 11% increase from the average demand recorded in 2022 (439 kW). The maximum energy demand from 2020 to 2023 was highest in July 2023 where demand reached 638 kW.
- In 2023, the annual total cost has been verified at $401,578.07, reflecting a 14% increase compared to the annual cost in 2022. The energy cost was the highest during July 2023, reaching record highest cost of $46,296.40
- Ontario Clean Water Agency (OCWA) continues to monitor the facility and provide recommendations for potential energy saving programs and initiatives.

Municipal Solid Waste

For the GHG emissions inventory, the emissions are determined from the total waste landfilled in a year. In 2023, overall, the city disposed 29,999.28 tonnes of waste to the landfill, which is significantly higher than the amount of waste generated and disposed to landfill in 2022 (19,267.76 tonnes).

While an accurate number cannot be determined for corporate-generated waste, it is estimated that 1% of the total waste can be considered as being generated at municipal facilities, or approximately 299.99 tonnes. This estimate includes waste collection from downtown waste receptacles, parks and other public buildings.

While managing waste generated at all municipal facilities, parks, public spaces and during events can be a challenging metric to track, efforts are underway to increase awareness around waste generation and reduction.

- In 2023, staff implemented a green bin program for City Hall and City Hall Annex to divert kitchen waste and other organic materials from the landfill site. This initiative is planned to be expanded to other facilities.
- Downtown Stratford Business Improvement Area (BIA) and Destination Stratford, the Public Works department have recently collaborated to provide green bins at Market Square, with scheduled bi-weekly pick ups.
- Three dog waste containers have been installed in the parks system to collect and divert animal waste from the landfill. In a three-month period of 2023, 700 kg of waste was collected and sent to a facility that produces energy from waste. It was suggested that the energy produced within this quarter itself was sufficient to power an entire home for approximately 6 months.

Infrastructure Upgrades

While infrastructure upgrades like installing EV charging stations involve upfront costs, they are expected to support the transition to electric vehicles and meet the community's future infrastructure needs as more drivers switch from conventional cars to plug-in hybrids and EVs.

Staff continue to track usage for the current inventory and explore opportunities for grants and funding. Below are excerpts from the 13-month usage of EV stations in municipal parking lots.

Table 3 EV Charging Station Session Details (13-months)

Time Period	Aug 1, 2023 to Aug 31, 2024
Energy deployed	37.60 MWh
Cost incurred (based on hydro cost of 0.18c per kWh)	$6,768
GHG savings (see note below)	39,030 $kgCO_2e$ or 39 tCO_2e
Gasoline savings	18,041.34 Litres

At the time of writing this report, the City's EV station deployment helped avoid an estimated 86,932 $kgCO_2e$ (carbon emissions or 87 tCO_2e), which is equivalent to planting 2,229 trees and letting them grow for 10 years.

Notable efforts from 2023 are noted below.

- Through funding provided by Natural Resources Canada (NRCan) and the Zero Emission Vehicle Infrastructure Program (ZEVIP), the City is finalizing the installation of 6 new dual port Level 2 EV charging stations and 1 Level 3 charging station at municipal parking lots.
- Staff submitted applications for the province's Electric Vehicle ChargeON program and NRCan's new ZEVIP intake to further install 4 L3 charging stations at the Rotary Complex.

- Staff continues to collaborate with Festival Hydro Inc. and analyze the feasibility of drawing power from the electric grid to serve future demand.

Climate Lens Across Corporate Initiatives

The Climate Action Division continues to provide guidance and support across the organization to ensure that the climate lens application is a priority when updating existing or developing municipal frameworks and planning instruments. Projects such as the 2024 – 2027 Strategic Priorities, Community Climate Action Plan (CCAP), and the Transportation Master Plan (TMP), have incorporated this lens during development; several other ongoing initiatives including the Official Plan Review (OPR) also continue to apply this approach.

Financial Implications:

Not applicable:
There are no financial implications to be reported because of this informational report.

Alignment with Strategic Priorities:

Enhance our Infrastructure
This report aligns with this strategic priority as its recommendations promote energy efficient buildings, sustainable transportation options and infrastructure, support the energy transition for the City and community, that is anticipated to significantly drive emission reduction and support sustainable growth.

Alignment with One Planet Principles:

Equity and Local Economy
Creating safe, equitable places to live and work which support local prosperity and international fair trade.

Sustainable Water
Using water efficiently, protecting local water resources and reducing flooding and drought.

Travel and Transport
Reducing the need to travel, encouraging walking, cycling and low carbon transport.

Material and Products
Using materials from sustainable sources and promoting products which help people reduce consumption.

Zero Waste
Reducing consumption, reusing and recycling to achieve zero waste and zero pollution.

Zero Carbon Energy
Making buildings and manufacturing energy efficient and supplying all energy with renewables.

Staff Recommendation: THAT the report titled, "Annual Corporate Greenhouse Gas Emissions – 2023" (ITS24-021), be received for information.

Prepared by:	Sadaf Ghalib, Climate Change Program Manager
Recommended by:	Taylor Crinklaw, Director of Infrastructure Services
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