HAMILTON'S CLIMATE ACTION STRATEGY
Re-Charge. Adapt. Engage. Act.

# City of Hamilton's 2023 Sector-Based Emissions



Hamilton
Office of Climate Change Initiatives
Planning & Economic Development Department

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## LAND ACKNOWLEDGMENT

We acknowledge the City of Hamilton is situated upon the traditional territories of the Erie, Neutral, Huron-Wendat, Haudenosaunee, and Mississaugas. This land is covered by the Dish With One Spoon Wampum Belt Covenant, which was an agreement between the Haudenosaunee and Anishinaabek to share and care for the resources around the Great Lakes. We further acknowledge that this land is covered by the Between the Lakes Purchase, 1792, between the Crown and the Mississaugas of the Credit First Nations.

Today, the City of Hamilton is home to many Indigenous people from across Turtle Island (North America) and we recognize that we must do more to learn about the rich history of this land so that we can better understand our roles as residents, neighbours, partners, and caretakers.

# Glossary

| Term | Definition |
|---|---|
| Activity data | Activity data refers to the data associated with an activity that leads to Greenhouse (GHG) emissions. |
| Baseline | The reference year against which annual emissions reductions/increases are measured over time. |
| Carbon dioxide equivalent ($CO_2e$) | A unit that allows emissions of different GHG such as carbon dioxide ($CO_2$), methane ($CH_4$) and nitrous oxide ($N_2O$) to be expressed as a single unit of measurement. |
| Climate Change | A change in global or regional climate patterns, in particular a change apparent from the mid to late 20$^{th}$ century onwards and attributed largely to the increased levels of atmospheric carbon dioxide produced by the use of fossil fuels. |
| Community-wide GHG emissions | Community-wide emissions are an estimate of all GHG emissions that occur within Hamilton for the sectors of stationary energy (buildings), transportation, solid waste, wastewater, agriculture, industrial processes and product use. The estimate also includes emissions from certain activity that occur outside Hamilton, including emissions from the use of utility grids including electricity and natural gas. Community-wide emissions are currently estimated using the Global Protocol for Community-Scale Greenhouse Gas Emissions Inventory (GPC). |
| Corporate-wide GHG emissions | Corporate-wide emissions account for emissions generated only by local government activities. Corporate emissions are included (not in addition to) in community-wide emissions. |
| Emission factor | An emission factor is a measure of the mass of GHG emission relative to a unit of activity. |

| Term | Definition |
|---|---|
| Fossil fuel | Refers to non-renewable resources that were formed from biomass in the geological past (e.g., coal, natural gas, crude oil, bitumen), and any secondary product manufactured from those natural resources (e.g., pentanes, butane, propane, gasoline, diesel fuel). |
| Fossil (natural) gas | Fossil (natural) gas is a naturally occurring gas comprised primarily of methane and other hydrocarbons. It is used as a source of energy for heating, cooking and in the production of electricity. |
| Greenhouse gases (GHGs) | Compound gases that trap heat and emit longwave radiation in the atmosphere causing global warming, also called the greenhouse effect. The three GHGs measured in Hamilton are carbon dioxide ($CO_2$), methane ($CH_4$) and nitrous oxide ($N_2O$). |
| Global Warming Potential (GWP) | GWP measures how much a particular GHG contributes to global warming relative to carbon dioxide ($CO_2$), which has a GWP of 1. GWP Is used to convert tonnes of GHGs, like methane, to tonnes of carbon dioxide equivalent (CO2e) to express total emissions using a common unit. |
| High confidence data (HCD) | This is data or information from trusted sources and that has a high degree of accuracy. |
| Medium confidence data (MCD) | This is data or information from trusted sources, however the methodology is either based on national or provincial averages and may not indicate actual local conditions. |
| Low confidence data (LCD) | This is data or information whereby the methodology to collect is uncertain or based on national or provincial averages and may not indicate actual local conditions. |
| Net-zero | Occurs when the amount of GHGs released into the atmosphere is equivalent to the amount taken out of the atmosphere. |
| Sector-based emissions inventory | A sector-based emissions inventory measures GHGs attributed to emissions-generating activities taking place within the geographic boundary of the city, as well as some indirect emission from transmission of electricity into the city boundary during a given time (typically one year). |

# Disclaimer

The City of Hamilton makes every effort to ensure the accuracy and reliability of the information presented within this report. However, the City of Hamilton does not guarantee the completeness, timeliness, or accuracy of any information presented. All information is provided "as is" without warranty of any kind, either expressed or implied. The City of Hamilton accepts no responsibility or liability for any loss, damage, or inconvenience caused as a result of this information.

The values reported annually in Hamilton's sector-based emissions inventory report may not match those in previously published inventories. Updates to various datasets occur throughout each year including after the publication of past inventories. The values reported here are the most up-to-date as of the publication of this 2023 sector-based emissions inventory. Values may not add up to totals due to rounding.

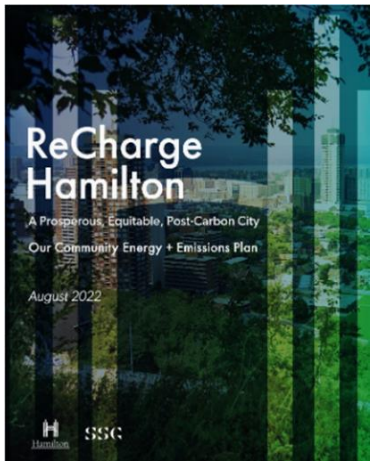
# 1.0 Background

## Hamilton's Commitment to Climate Action and Sustainability

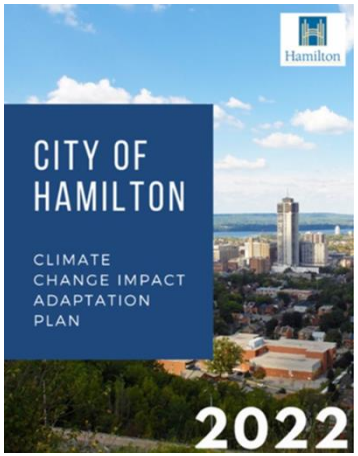
The City of Hamilton has a long-standing commitment to climate action and environmental sustainability. As one of the first municipalities to join the Federation of Canadian Municipalities' (FCM) Partners for Climate Protection (PCP) program, Hamilton has been actively tracking and reporting greenhouse gas (GHG) emissions since 2008. The City adheres to the Global Protocol for Community-Scale Greenhouse Gas Inventories, ensuring consistency and transparency in its reporting practices.

**Hamilton's Climate Action Strategy**:

Hamilton's Climate Action Strategy (HCAS) is the City's most ambitious strategy to address climate change. It includes two key plans with one focusing on climate mitigation and the reduction of GHG emission, and the other focusing on climate adaptation to protect Hamilton from the impacts of climate change. This includes:




**ReCharge Hamilton – Our Community Energy and Emissions Plan**




**Climate Change Impact Adaptation Plan**

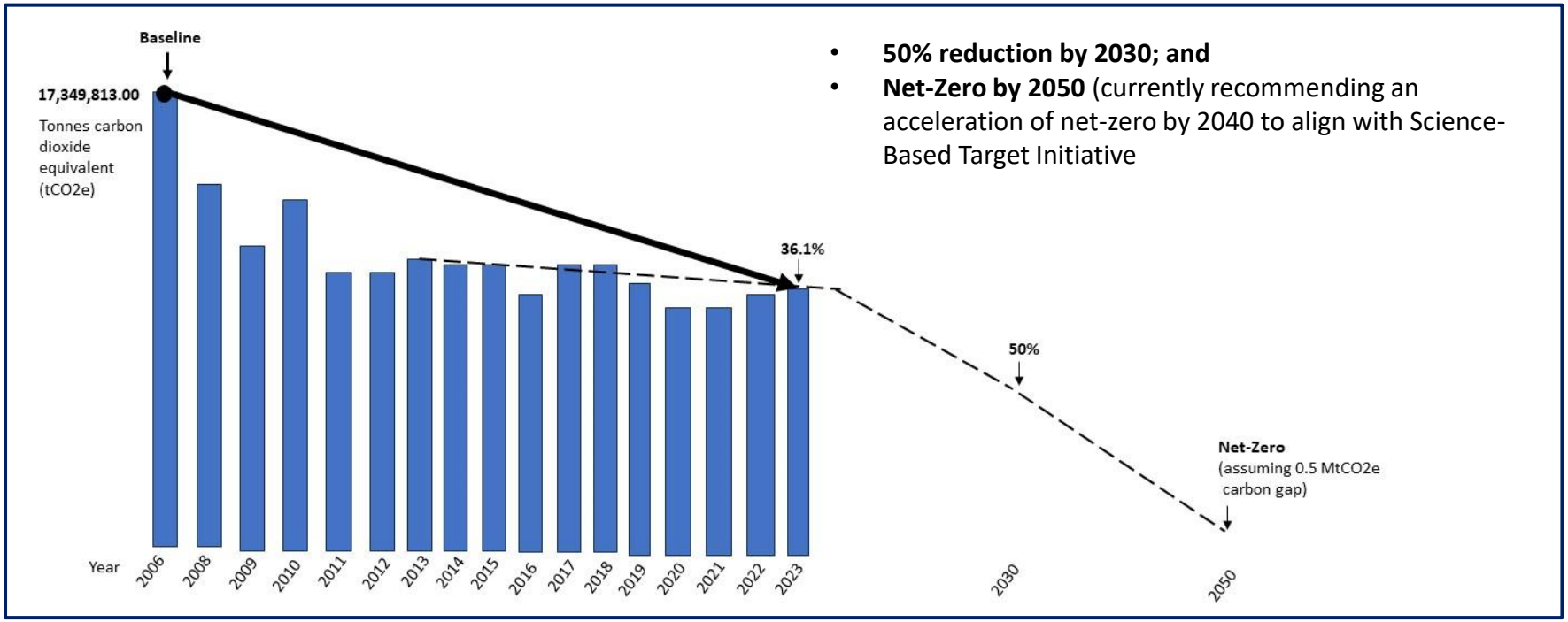
This report primarily focuses on community-wide GHG emissions. While it includes select data from the City's Corporate GHG emissions, a more detailed breakdown and analysis of corporate emissions can be found on the City's website: https://www.hamilton.ca/home-neighbourhood/environmental-stewardship/environmental-plans-strategies/office-energy

## ReCharge Hamilton – Our Community Energy and Emissions Plan

Hamilton's Community Energy and Emissions Plan (CEEP) includes a technical low-carbon scenario model that sets ambitious targets and corresponding actions in order to achieve a prosperous net-zero future by 2050 or sooner. The City of Hamilton also has an interim GHG reduction target of 50% by 2030 compared to the 2006 baseline.

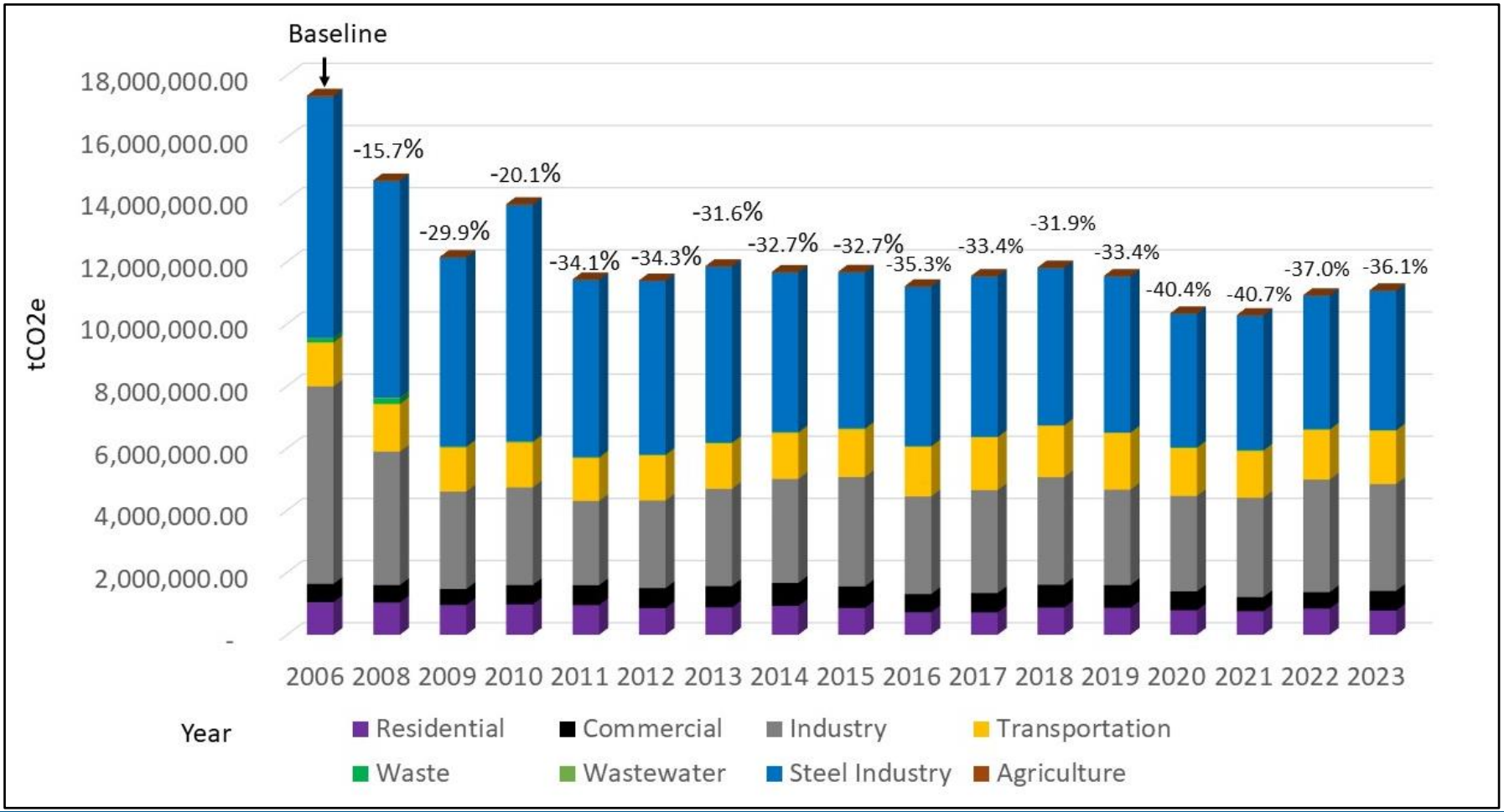
Below is a figure for illustrative purposes of Hamilton's community-wide GHG emissions inventory between 2006 and 2023. Due to the reliance of data and information from other levels of government, the City of Hamilton reports its community-wide GHG emissions two years in the past. Figure 1.0 below shows Hamilton's current community-wide GHG emissions trends, including the 50% GHG reduction target by 2030, and achieving net-zero by 2050. The low-carbon scenario model assumes there is a small 0.5 $MtCO_2e$ and therefore renewable energy credits and carbon offsets may be required to achieve net-zero.

Figure 1.0 Hamilton's Community-Wide GHG Emissions Inventory and GHG Reductions Targets



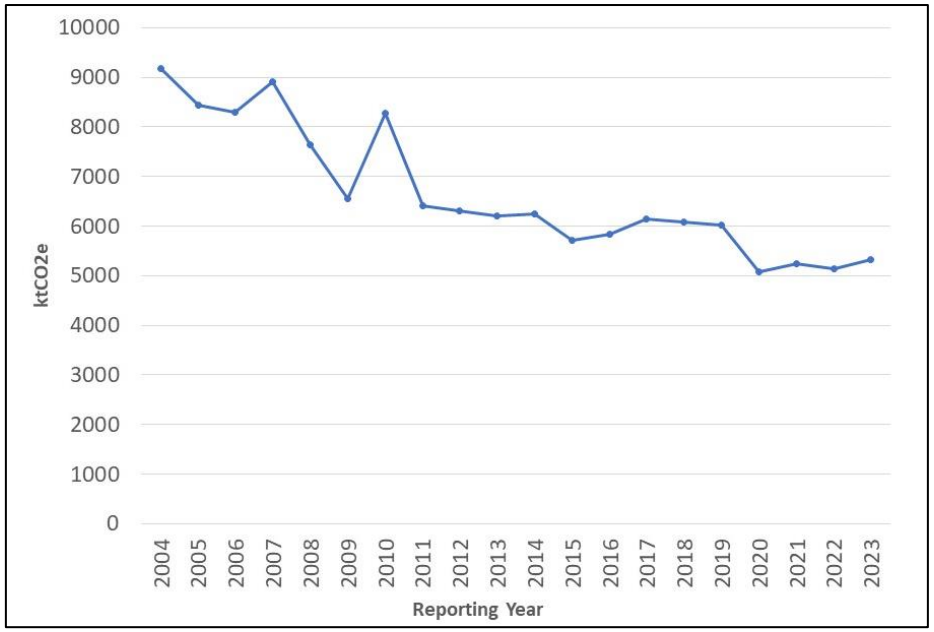
# 2.0 Hamilton's Sector-Based Community Emissions Inventory

Figure 2.0 Hamilton's Community-Wide GHG Emissions 2006-2023 by Sector



# 2.1 Industry

Figure 3.0 Hamilton Facilities Reporting GHGRP 2004-2023




(High Confidence Data)

**Data Sources:**
The two main sources of information collected to calculate industrial emissions in Hamilton are from:

- The Government of Canada's Greenhouse Gas Reporting Program (GHGRP). This includes a list of all the large emitters in Hamilton*; and
- The City of Hamilton requests utility consumption data from Alectra, Hydro-One and Enbridge. This information is aggregated into industrial**, commercial and residential.

**Summary:**

- Total emissions from large emitters reporting to the GHGRP have decreased from approximately 9.2 million tonnes of $CO_2e$ to 5.2 million tonnes of $CO_2e$.
- Total emission from large emitters reporting to the GHGRP have been increasing over the past three years and increased 3.5% between 2022 and 2023.

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*Note – Hamilton's community-wide GHG emissions inventory does not include all GHGRP industrial emissions. Natural Resource Canada's Comprehensive Energy Use Tables are used instead to estimate total emissions from all sources of fuel from industry.

**Note – The City acknowledges there may be a duplication of counting of fossil (natural) gas emissions from industrial utility data and GHGRP reported data. The City is currently in the process of getting a third-party audit and verification of its community-wide GHG inventory

# 2.1 Industry

Table 1.0 Government of Canada Greenhouse Gas Reporting for Hamilton Industrial Facilities

| Facility | GHG Emissions (*tCO2e) | | % Change 2023 vs 2022 | GHG Emissions Trend 2017 vs 2023 |
|---|---|---|---|---|
| | 2022 | 2023 | | |
| ArcelorMittal Dofasco – Main Plant | 3,960,611 | 4,168,284 | +5.2% | -15.2% |
| Carmeuse Lime | 434,050 | 426,286 | -1.8% | -9.7 % |
| Stelco Inc (Cleveland Cliffs) | 279,095 | 254,754 | -8.7% | +0.3% |
| Birla Carbon | 202,082 | 205,995 | +1.9% | -12.2% |
| Bunge Canada | 49,866 | 48,780 | -2.2% | -1.7% |
| RAIN Carbon | 30,080 | 29,230 | -2.8% | +1.9% |
| **Bartek Ingredients – Plant #2 | 30,037 | 26,645 | -11.3% | +4.8% |
| Baycoat | 29,303 | 32,247 | +10% | +25.4% |
| Darling Ingredients (Rothsay) | 23,416 | 22,060 | -5.8% | +2.1% |
| Max Aicher North America | 19,242 | 20,426 | +6.1% | +56.2% |
| Maple Leaf Foods – Heritage Plant | 16,243 | 15,216 | -6.3% | -16% |
| ArcelorMittal Long Products | 15,380 | 15,596 | +1.4% | -41.6% |
| ***Bimbo/ Canada Bread | 12,110 | 12,073 | -0.3% | -2.6% |
| NATT Tools Group | 11,103 | 9,252 | -16.7% | -44.4% |
| Air Liquide Canada | 10,548 | 10,436 | -1.1% | -11.1% |
| Mondelez Foods | 10,078 | 9,782 | -2.9% | -2.1% |
| Bartek Ingredients – Plant #1 | 8,694 | 9,344 | +7.5% | -21.5% |
| BIOX Canada Limited | 3,049 | 6,208 | +104% | -51.5% |
| GFL Stoney Creek Landfill | 1,394 | 1,377 | -1.2% | -97.4% |
| Totals | 5,146,381 | 5,323,991 | +0.03% | -13.4% |

**Summary:**

- 19 industrial facilities reported in 2023*
- 7 facilities reported increases in GHG emissions in 2023
- 14 facilities reported decreases in GHG emissions in 2023
- The largest emitters in Hamilton are:
  - ArcelorMittal Dofasco (78% of total emissions from large emitters)
  - Carmeuse Lime (8%)
  - Stelco Inc. (Cleveland Cliffs) (5%)
  - Birla Carbon (4%)

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*Note: Non-Industrial Large Emitters not included here and tracked elsewhere within buildings

(High Confidence Data)

# 2.2 Transportation

The City of Hamilton purchases fuel volumes sold across Hamilton from Kalibrate. This information is combined with Natural Resources Canada Comprehensive Energy Use Tables for Transportation Sector[1] to estimate fuel consumption for other transportation sub-sectors. This is combined with fuel emission factors from the National Inventory Report (NIR)[2] to estimate total emissions by each sub-sector including On-Road, Off Road, Freight/Rail, Aviation, and Waterborne Navigation

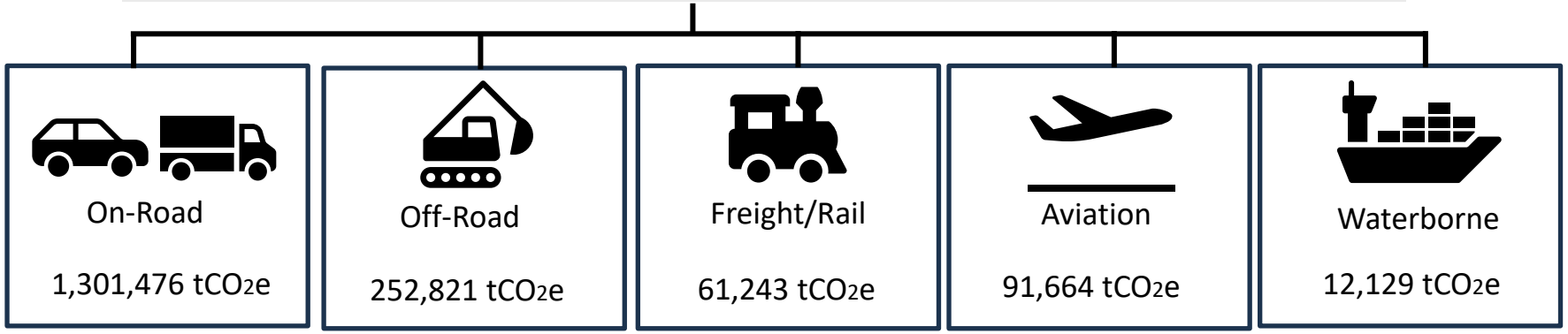
Table 2.0 Total Fuel Volumes Sold Across Hamilton

| Description | Gasoline (L) | Diesel (L) | Total |
|---|---|---|---|
| Fuel Volumes Sold Across Hamilton (Kalibrate) | 612,713,719 | 43,714,948 | 656,428,667 |

(High Confidence Data)

**Total Estimated Transportation GHG Emissions 2023: 1,719,333 tCO2e**

(Total Fuel Volumes x Percent of Transport Type) x Emission Factors = GHG Emissions by Transport Type




(Medium Confidence Data)

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[1] Natural Resources Canada (2025). Comprehensive Energy Use Database: Transportation Sector. Retrieved from: https://oee.nrcan.gc.ca/corporate/statistics/neud/dpa/menus/trends/comprehensive/trends_tran_on.cfm

[2] Government of Canada (2025): National inventory report: greenhouse gas sources and sinks in Canada. Retrieved from: https://publications.gc.ca/site/eng/9.506002/publication.html

# 2.3 Buildings

The City of Hamilton requests utility consumption data from Alectra, Hydro-One and Enbridge. This information is combined with Natural Resources Canada Comprehensive Energy Use Tables for Residential, Commercial, and Industrial Sector used to estimate fuel consumption for other building fuel sources. This is combined with fuel emission factors from the National Inventory Report (NIR) to estimate total emissions by each sub-sector of buildings including Residential, Commercial, Industrial.

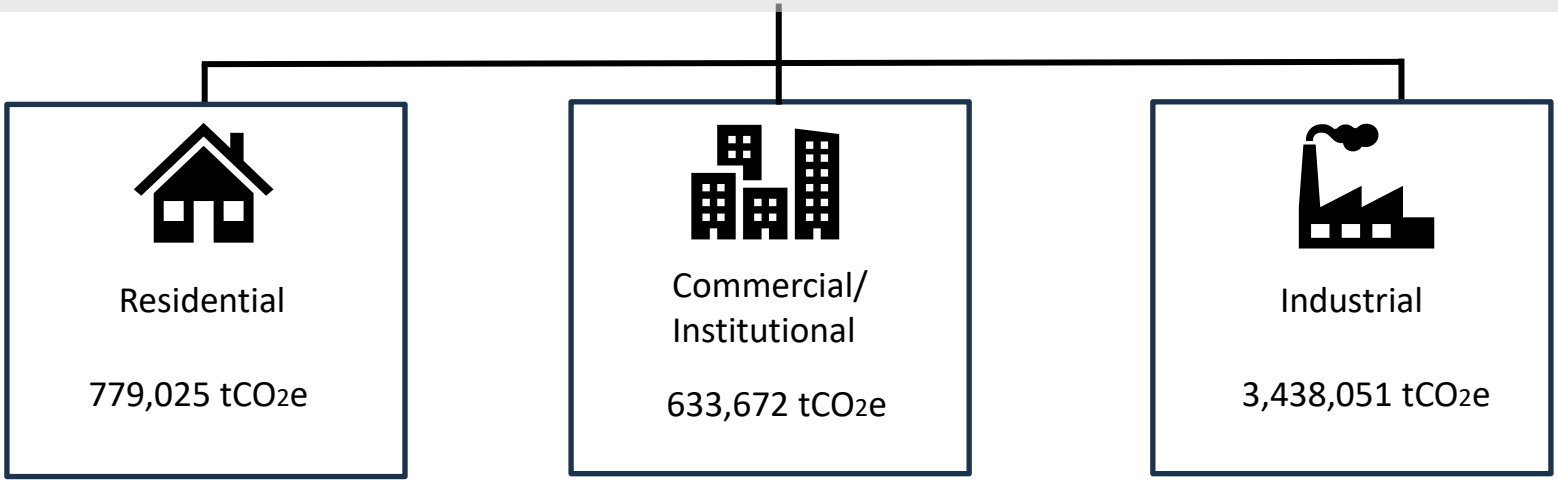
Table 3.0 Total Community-Wide Utility Consumption Data for Hamilton

| Description | Alectra (kWh) | Hydro-One (kWh) | Enbridge (m3) |
|---|---|---|---|
| Utility (Alectra, Hydro-One, Enbridge) Consumption Data City of Hamilton | 4,105,819,946 | 364,154,075 | 1,439,722,078 |

**Total Estimated Buildings GHG Emissions 2023: 4,850,747 tCO2e**

(High Confidence Data)

(Total utility consumption by building sector x Percent of fuel by building sector) x Emission factors = GHG Emissions by building sector

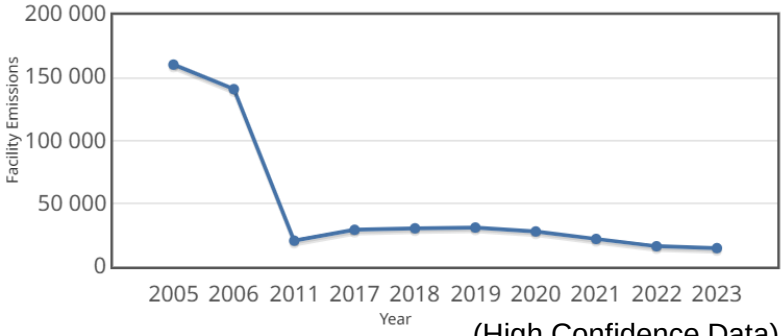



(Medium Confidence Data)

# 2.4 Solid Waste

## Glanbrook Landfill


Figure 4.0 Annual Reported Facility Emissions to GHGRP: Glanbrook Landfill (tCO2e)




(High Confidence Data)

**Total GHG Emissions Solid Waste 2023: 14,690 tCO2e**

**Data Sources:**

- The City of Hamilton's Waste Division within Public Works operates the City's Glanbrook Landfill. Compliant with Ontario Regulation 347: General – Waste Management the City reports annually to both the provincial and federal government related to GHG emissions through the Government of Canada's "Single Window" system.
- GHG emissions from the Glanbrook Landfill can be found on the Government of Canada's GHGRP database.[3]

**Summary:**

- GHG emissions since 2005 have been reduced approximately 91% from 160,552 tCO2e to 14,690 tCO2e in 2023.
- GHG emissions have been declining over the past three years and approximately 47% between 2020 and 2023.

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[3] Government of Canada (2025). Greenhouse Gas Reporting Program Facility Information: Glanbrook Landfill. Retrieved from: https://climate-change.canada.ca/facility-emissions/GHGRP-G10332-2023.html

# 2.5 Wastewater

## Woodward Wastewater Treatment Plan

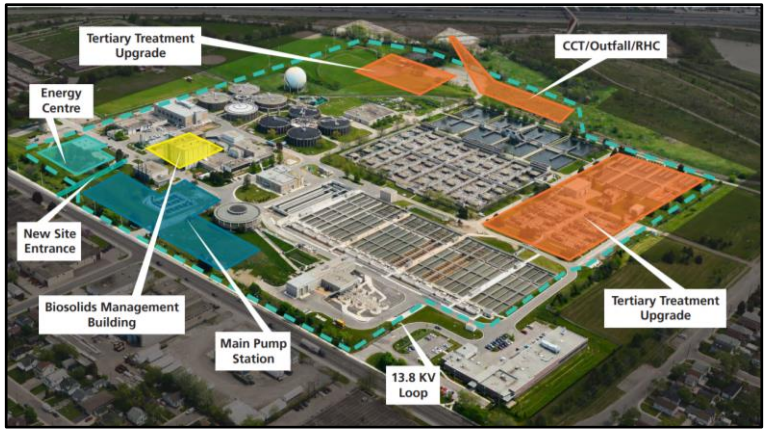
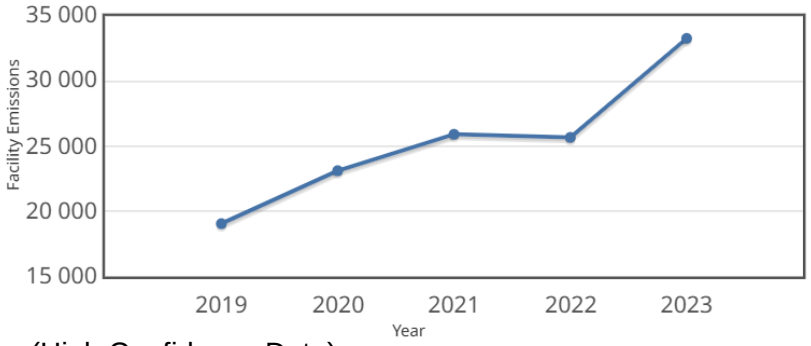



Figure 5.0 Annual Reported Facility Emissions: Woodward Wastewater Treatment Plant (tCO2e)




(High Confidence Data)

**Total GHG Emissions Wastewater 2023: 33,295 tCO2e**

**Data Sources:**

- In previous years the City of Hamilton would follow the Global Protocol for Community-Wide Greenhouse Gas Inventories to estimate process related emissions from the treatment of wastewater
- Hamilton Water Division within the Public Works Department also reports GHG emissions to the federal government. The Woodward Wastewater Treatment Plant's GHG emission are available at the Government of Canada's GHGRP database.[4]

**Summary:**

- The Woodward Wastewater Treatment Plan has been reporting to the federal GHGRP since 2019 and shows a GHG emissions increase of approximately 75% between 2019 and 2023.
- Further investigation is required regarding the existing and historical impact of GHG emissions from Nitrous oxide ($N_2O$) is unclear. This is an issue many municipalities are facing as the ability to measure GHG emissions from $N_2O$ from wastewater emissions has evolved.

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[4] Government of Canada (2025). Greenhouse Gas Reporting Program. Retrieved from: https://climate-change.canada.ca/facility-emissions/GHGRP-G12265-2023.html

# 2.6 Agriculture


(Source: Invest in Hamilton: https://investinhamilton.ca/wp-content/uploads/2023/07/Hamilton-Agriculture-Profile-2021.pdf)

**Total GHG Emissions Agriculture 2023: 30,099 tCO2e**

Table 4.0 Hamilton's Estimated Agricultural Emissions

| Type of Livestock Category | Enteric Fermentation Emissions (tCO2e) | Manure Management (tCO2e) | Total Emissions (tCO2e) |
|---|---|---|---|
| Cattle | 22,174 | 3,486 | 25,660 |
| Pigs | 236 | 1,312 | 1,548 |
| Sheep and Lambs | 468 | 15 | 483 |
| Poultry | N/A* | 2,157 | 2,157 |
| Other Livestock | 1,029 | 121 | 1,150 |
| **Totals** | **23,907** | **7,091** | **30,099** |

**Data Sources:**

- The City of Hamilton estimates GHG emissions using 2021 Statistics Canada Census Data of Livestock Counts combined with National Inventory (NIR) Emission Factors from Annex 6.
- It is assumed other sources of GHG emissions from machinery are included in the Transportation Sector from "Off-Road".

**Summary:**

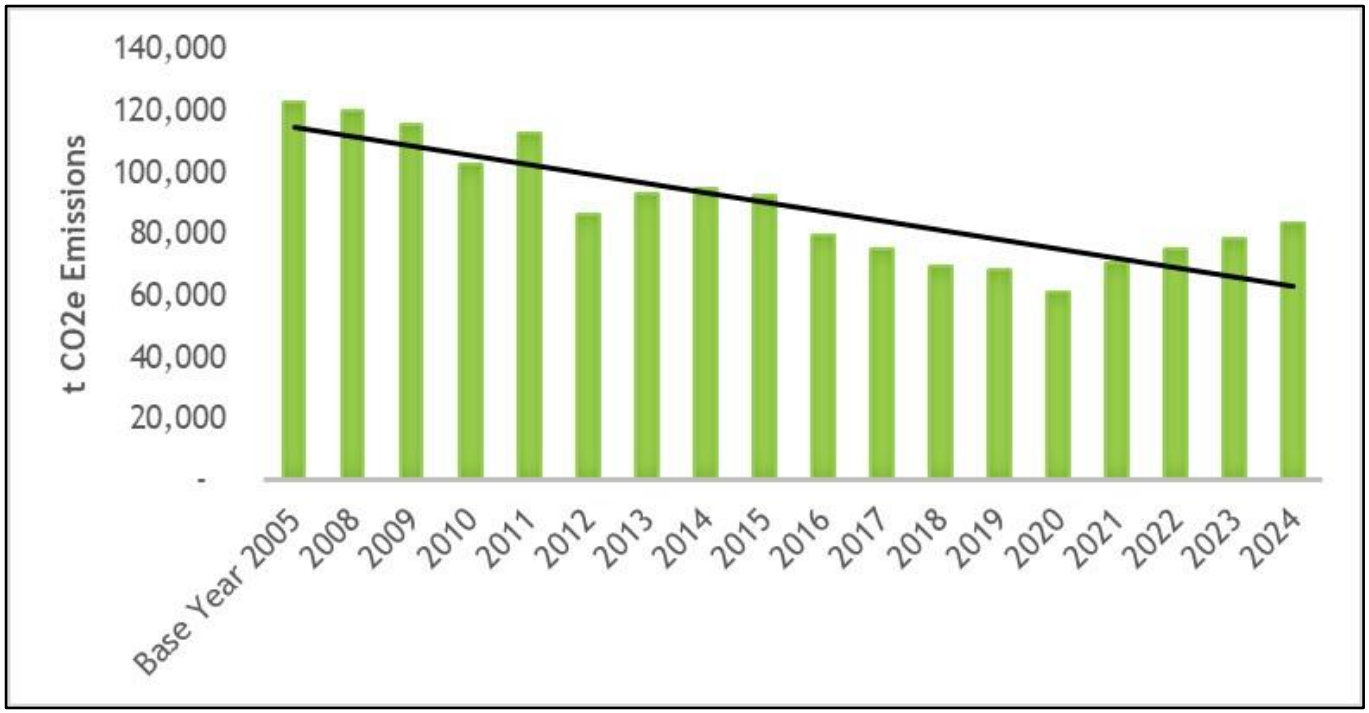
- Based on livestock head counts and emission factors Hamilton's agricultural GHG emissions have increased approximately 18% between 2020 and 2023
- Agricultural emissions have increased approximately 13% between 2022 and 2023

(Low Confidence Data)

* Statistics Canada rated data as F for too unreliable

# 3.0 Corporate GHG Emissions

Figure 6.0 Hamilton's Corporate-Wide GHG Emissions 2005 - 2024




**Summary:**

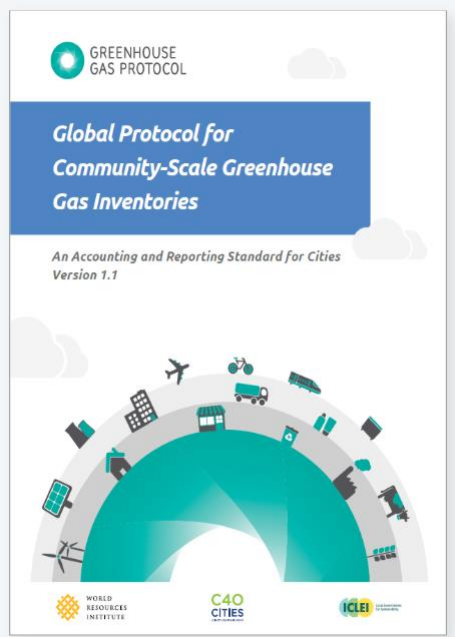
- Hamilton's Corporate-Wide emissions have been reduced 36% between 2005 baseline and 2023.
- Corporate emissions have increased over the past four years and most recently corporate emissions have been reduced 32% in 2024 compared to the 2005 baseline.
- Corporate emissions increased between 2023 and 2024 by 7%.

Table 5.0 Hamilton's Corporate Emissions Breakdown 2024

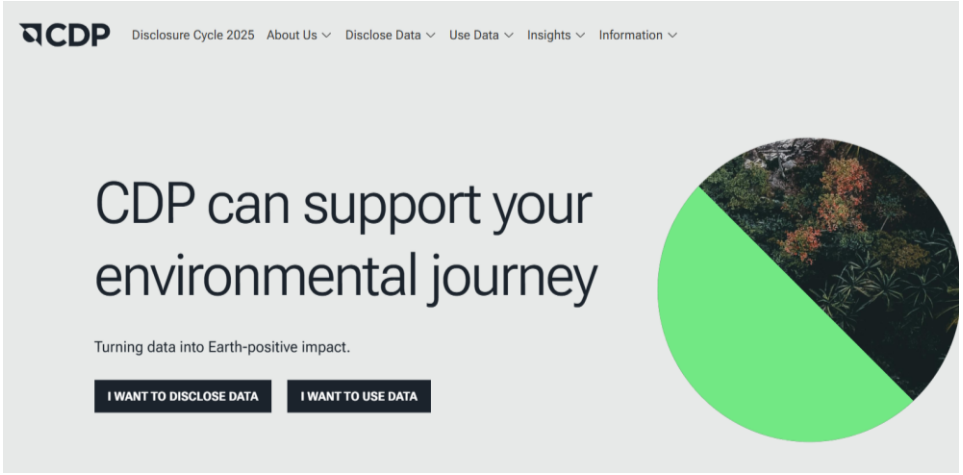
| Sector | 2024 Total CO2e | Sector | 2024 Total CO2e |
|---|---|---|---|
| Corporate Buildings | 22,461 | Streetlights & Traffic Lighting | 1,073 |
| Vehicle Fleet | 41,200 | Expensed Kilometers | 171 |
| Water & Sewage Buildings | 17,284 | Wastewater Emissions | 565 |
| Contracted Waste Fleet | 793 | **Corporate Wide Total** | **83,948** |

(High Confidence Data)

# 4.0 Methodology and Disclosures




Source: https://ghgprotocol.org/ghg-protocol-cities




Source: https://www.cdp.net/en

**Hamilton's Commitment to Transparent Reporting**

The City of Hamilton adheres to the Greenhouse Gas Protocol (GPC) Global Protocol for Community-Scale Greenhouse Gas Inventories.

In the City's commitment to transparency Hamilton publishes annually our progress on Hamilton's Climate Action Strategy and both our community-wide and corporate-wide GHG emission inventory. In addition, the City reports through the Carbon Disclosure Project – a global non-profit that runs the world's only independent environmental disclosure system for companies, capital markets, cities, states and regions to manage their environmental impacts and make Earth-positive decisions.

# 5.0 Stay Involved

**Contact Details:**

**Office of Climate Change Initiatives**

**City Hall 71 Main Street West 7th Floor**

**Hamilton, Ontario L8P 4Y5**

**Em: Climate.Change@hamilton.ca**

**To request a presentation on Hamilton's Climate Action email: Climate.Change@hamilton.ca**

**Learn more and visit the City of Hamilton's website at:**

**Hamilton's Climate Action Strategy**