Steven T. Noble
Mayor

Kingston Greenhouse Gas Inventory for Government Operations 2024 Summary Report

Introduction

The City of Kingston recognizes that greenhouse gas (GHG) emissions from human activity are causing climate change, the consequences of which pose substantial risks to the future health and well-being of our community. To demonstrate its commitment to addressing the growing threat of climate change, in 2010 the City of Kingston became a registered Climate Smart Community by formally adopting the New York State Climate Smart Communities (CSC) pledge.

The CSC program, administered by the New York State Department of Environmental Conservation (DEC), is a certification program that provides a robust framework to guide the actions local governments can take to reduce GHG emissions and adapt to the effects of climate change. The first step in this process is to perform a GHG Inventory for all buildings, vehicles and operations controlled by the local government. Using data from 2024, this GHG inventory provides a baseline for which the City can set emissions and operation costs reduction goals, determine ways in which those goals can be reached, and track progress.

This GHG Inventory for Government Operations Report summarizes the GHG emissions from the City of Kingston's consumption of energy and materials within city-owned buildings, the wastewater treatment plant, vehicle fleet, outdoor lighting, and other facilities. This data was generated from electric and natural gas bills for all City owned buildings and operations, as well as fuel records for the City's vehicle fleet. The GHG emissions for all local government operations are measured in metric tons of CO2 equivalents (CO2e) and were calculated using emissions factors by the US Energy Information Administration (EIA), US Environmental Protection Agency (EPA) and the Climate Action Associates (CAA), LLC's GHG Inventory Tool.

Key Findings

In 2024, GHG emissions from Kingston's government operations totaled 2,500 MT CO2e. Figure 1 shows the emissions for government operations broken down by source. City fleet fuel emissions from burning gasoline and diesel account for the largest percentage of GHG emissions at 50%. The remaining emissions are split evenly between electric and natural gas use at City facilities, with a less significant portion of emissions from wastewater treatment plant nitrogen discharge.

The Inventory Results section of this report provides a detailed profile of emissions sources within Kingston. This data will also provide a baseline from which the City will be able to compare future performance and demonstrate progress in reducing emissions.

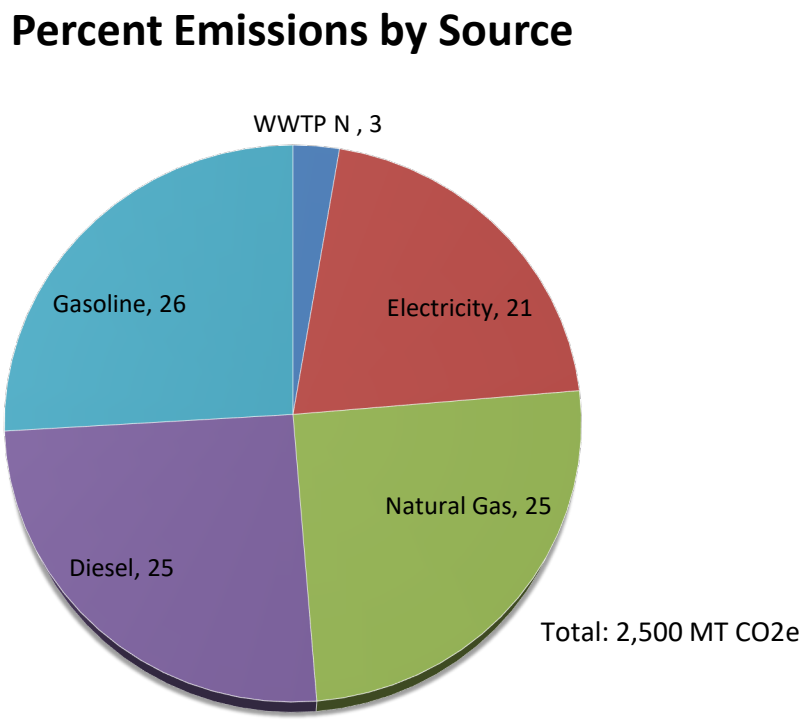

Figure 1 City of Kingston emissions percent of total by source.

Data Gathering and Methodology

The first step toward achieving tangible greenhouse gas emission reductions requires identifying baseline emissions levels and sources and activities generating emissions in the community. The City of Kingston is focusing first on government operations emissions to lead by example and will inventory community-wide emissions in a future report.

Kingston's Environmental Specialist, Philip Schoettle-Greene, led the GHG Inventory data collection effort, with the help of Hudson Valley Regional Council (HVRC).

Emissions Scopes

For the government operations inventory, emissions are categorized by scope. Using the scopes framework helps prevent double counting. There are three emissions scopes for government operations emissions, as defined below:

- **Scope 1**: All direct emissions from a facility or piece of equipment operated by the local government, usually through fuel (natural gas, propane, and fuel oil)

combustion. Examples include emissions from fuel consumed by the City's vehicle fleet and emissions from a furnace in a municipal building.

- **Scope 2**: Indirect GHG emissions from purchased electricity. This refers to operations powered by grid electricity.
- **Scope 3**: All other indirect GHG emissions not covered in scope 2. Examples include contracted services, emissions in goods purchased by the local government and emissions associated with disposal of government generated waste.

This inventory only accounts for Scope 1 and 2 emissions, as they are the most essential components of a government operations greenhouse gas analysis and are most easily affected by local policy making. Under the DEC's CSC program, tracking Scope 3 is encouraged, but optional. For 2024, only Scope 3 emissions from the wastewater treatment plant were accounted for.

Baseline Year

The inventory process requires the selection of a baseline year. Local governments examine the range of data they have over time and select a year that has the most accurate and complete data for all key emission sources. It is also preferable to establish a base year several years in the past to be able to account for the emissions benefits of recent actions. A local government's emissions inventory should comprise all greenhouse gas emissions occurring during the selected baseline year.

In 2010 the City of Kingston completed its first inventory of GHG emissions. However, inconsistency in reporting methods makes a direct comparison with this first analysis difficult. For this report, the baseline year used for comparison is 2019.

Quantification Methods

Greenhouse gas emissions in this inventory are quantified using calculation-based methodologies. Calculation-based methodologies calculate emissions using activity data and emissions factors. To calculate emissions accordingly, the basic equation is used:

$$Activity\ Data \times Emissions\ Factor_{(Fuel,\ GHG)} = GHG\ Emissions_{(Fuel,\ GHG)}$$

Activity data refer to the relevant measurement of energy use or other greenhouse gas-generating processes such as fuel consumption by fuel type, metered annual electricity consumption, and annual vehicle miles traveled. To obtain this data, the City gathered and reviewed all electric and natural gas bills for the City's Central Hudson accounts, fuel records for gasoline and diesel used to power the City vehicle fleet, and nitrogen discharge data from the City's wastewater treatment plant.

Calculations for this inventory were made using the consumption/production data and standard conversion factors. Data was first measured in kWh for grid electricity, kBtu for natural gas,

gallons for gasoline and diesel, and g/l for N discharge. This data was multiplied by emission factors published by the EPA and EIA to convert the energy usage, or other activity data in quantified emissions.

Emissions Factors

Each GHG has an emission factor unique to each fuel. For consistency with previous reports, the 2023 EPA eGRID subregion, which in this case is NYUP (Upstate), was used for the electricity emissions factor. However, this region is not representative of the grid electricity mix in the City of Kingston and significantly underpredicts the GHG emissions from electricity use. Please see the appendix for values using the emissions factor for the average NY grid composition (NYAVG) which is more comparable to Kingston's grid mix. The natural gas, diesel, and gasoline emissions factors are taken from the EIA database on carbon dioxide emissions coefficients. The GHG emissions in this inventory are measured in metric tons of CO2 equivalents (CO2e).

Facilities Master List

A key step in creating the GHG inventory is to compile a facility master list that includes the City's properties including streetlights, wastewater treatment plant, decommissioned landfill, and vehicle fleet, that use at least one form of energy. The City does not operate an ice rink. Each was assigned to a category to indicate the type of infrastructure and then similar facilities along with their energy use.

Inventory Results

For developing emissions reduction policies, it is often useful to look at emissions broken down by sector, as each sector will have a particular set of strategies to reduce emissions. Figure 1 shows the emissions for government operations broken down by source. Table 1 and Figure 2 show Kingston's government operations emissions broken down by GHG reporting sector. Table 2 and Figure 3 show Kingston's government operations emissions broken down by Department.

Category	Electricity	Natural Gas	Gas/Diesel	Discharge/Emissions	Total
Water Delivery Facilities	50	12			63
Parks	43	60			103
Streetlights and Traffic Signals	107	-			107
Wastewater Facilities	194	97		67	358
Administration Facilities	130	458			588
City Fleet			1,282		1,282
Total	**524**	**627**	**1,282**	**67**	**2,500**

Table 1 GHG emissions in MT CO2e by GHG reporting sector for municipal facilities.

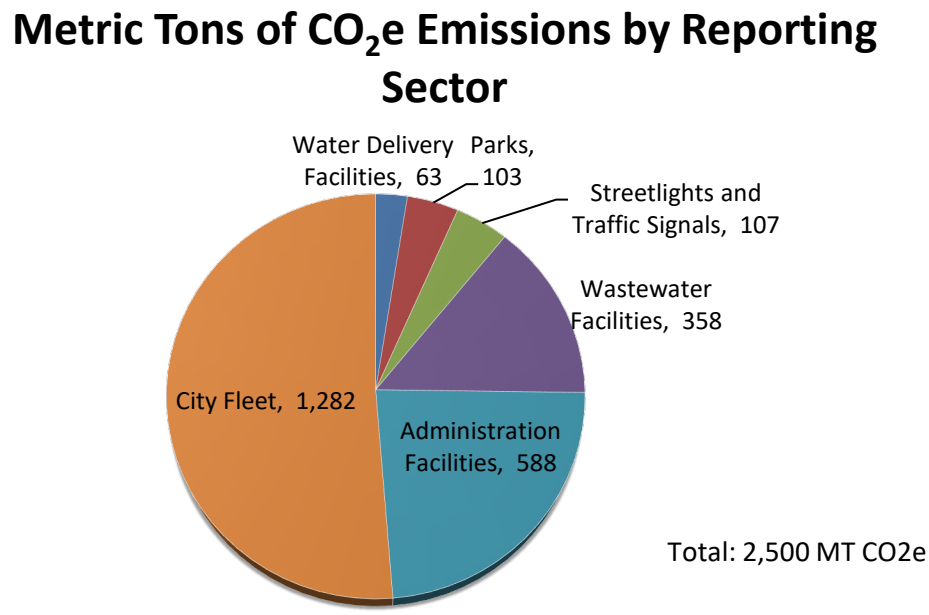

Figure 2 Metric tons of CO2e emissions by GHG reporting sector.

Department	Electricity	Natural Gas	Gas	Diesel	N Discharge	Total
Engineering			1			1
Assessor's Office			5			5
Building Safety			5			5
Parking			6			6
KHA			16			16
Clerk's Office	34	76	31	41		183
KWD	54	37	65	15		171
KFD	14	59	68	12		154
KPD	37	44	78	114		273
Parks	52	178	220	3		453
DPW	333	234	153	448	67	1234
TOTAL	**524**	**627**	**649**	**633**	**67**	**2501**

Table 2 GHG emissions in MT CO2e by source for City of Kingston departments.

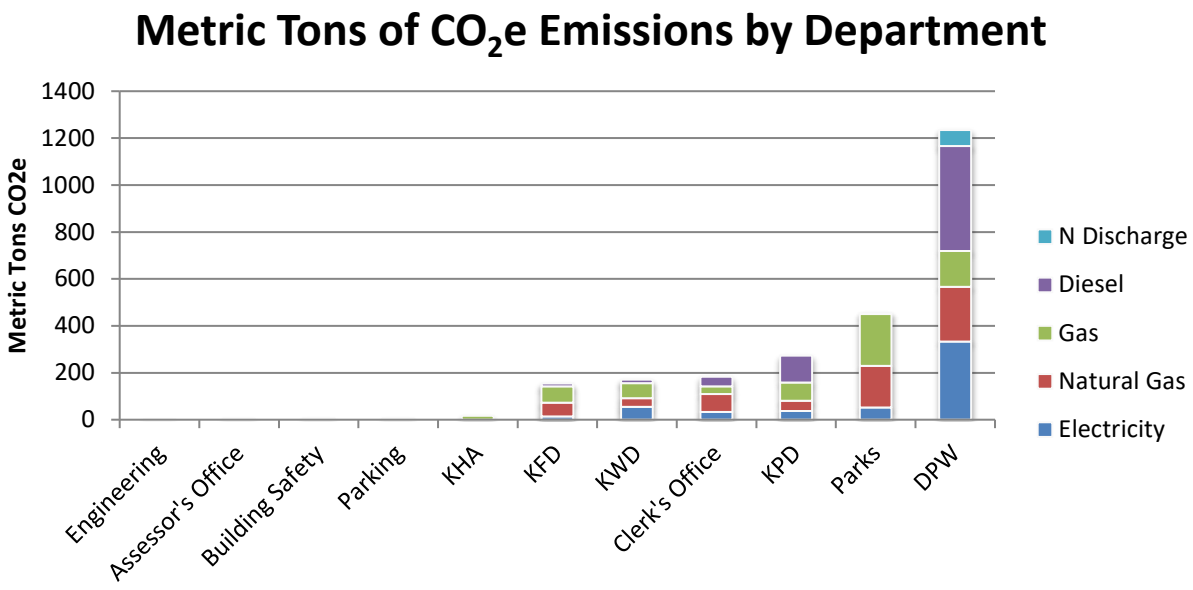

Figure 3 Metric tons of CO2e emissions for City of Kingston departments.

Opportunities to Reduce Greenhouse Gasses

Developing a GHG emissions baseline enables the City to set goals and targets for future reduction of GHG emissions. Notably, this exercise reveals that fleet fuel use is the largest source of municipal GHG emissions, accounting for 50% of emissions (see appendix for alternative scenario with a more carbon-intensive electric supply). Furthermore, this report shows that municipal operations emissions are down by 313 MT CO_2e relative to the last GHG emissions inventory completed in 2019 (2,500 vs 2,813 MT CO_2e).

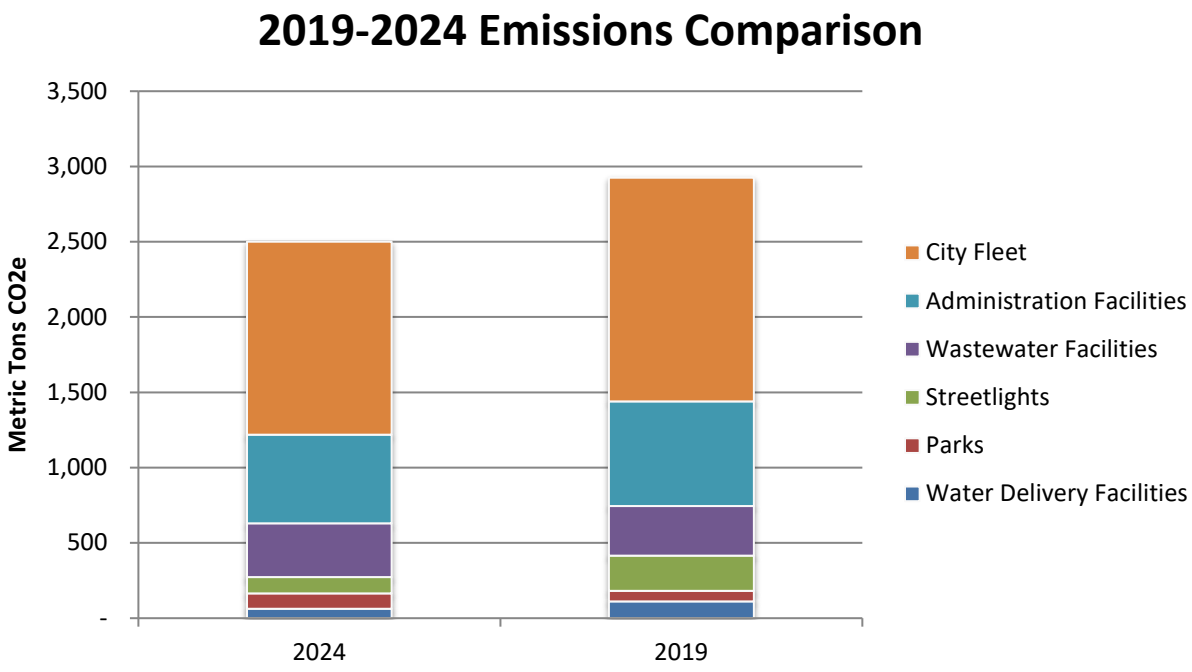

Figure 4 2019 to 2024 Emissions comparison

The City has been proactive to reduce GHG emissions and energy costs. The City is actively converting the light-duty fleet to EVs, began purchasing renewable diesel to reduce emissions from diesel, converted street lights, traffic signals, and indoor lighting to LED. Efforts are underway to increase municipally owned solar capacity, with multiple solar projects in the construction phase.

After implementing these proposed projects and identifying other Climate Action Plan (CAP) priorities / actions, total GHG emissions will inevitably be reduced.

This inventory shows that it will be particularly important to focus on the municipal fleet and administrative facilities. Future emissions reductions strategies for Kingston to consider for its climate action plan include increasing energy efficiency and renewable energy investments, as well as vehicle fuel efficiency. Other key data points to collect and track might include government employee vehicle trips and employee commuter miles, as well as solid waste collection rates.

Credits and Acknowledgements

This report was prepared by Philip Schoettle-Greene, Environmental Specialist and Julie Noble, Sustainability Coordinator with the City of Kingston.

Appendix

GHG Emssions Factors

Emission Factors for Fuels	
Electric CO2e (NYUP) (kg/MWh)	347.43
Electric CO2e (NYAVG) (kg/MWh)	765.95
Natural Gas CO2e (kg/MMBtu)	52.91
Liquid Propane CO2e (kg/gallons)	5.75
Heating Oil/Diesel CO2e (kg /gallon)	10.19
Gasoline CO2e (kg/gallon)	8.78

Table A1 GHG emissions factors used in this report

Below are estimates for Kingston greenhouse gas emissions using the NY Average (NYAVG) electricity emissions factor.

Category	Electricity	Natural Gas	Gas/Diesel	Discharge/Emissions	Total
Water Delivery Facilities	159	12			171
Parks	136	60			195
Streetlights and Traffic Signals	337	-			337
Wastewater Facilities	613	97		67	777
Administration Facilities	409	458			867
City Fleet			1,282		1,282
Total	**1,654**	**627**	**1,282**	**67**	**3,630**

Table A1 GHG emissions in MT CO2e by source for municipal GHG reporting sectors using NY Average electricity emissions factor.

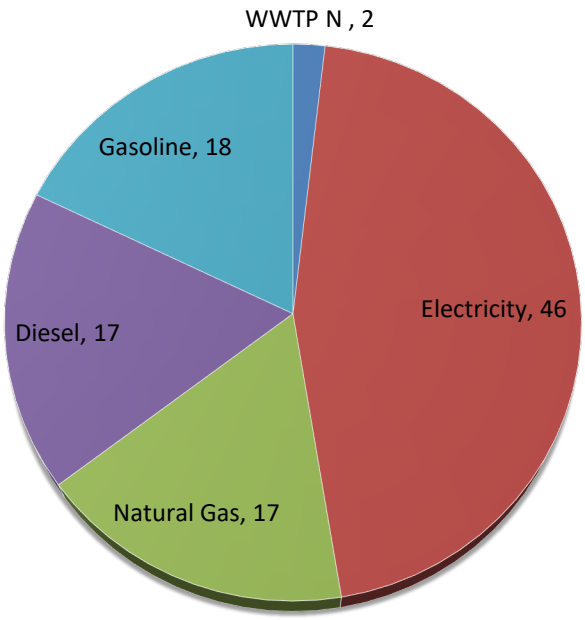

Figure A1 City of Kingston emissions percent of total by source using NY Average electricity emissions factor.

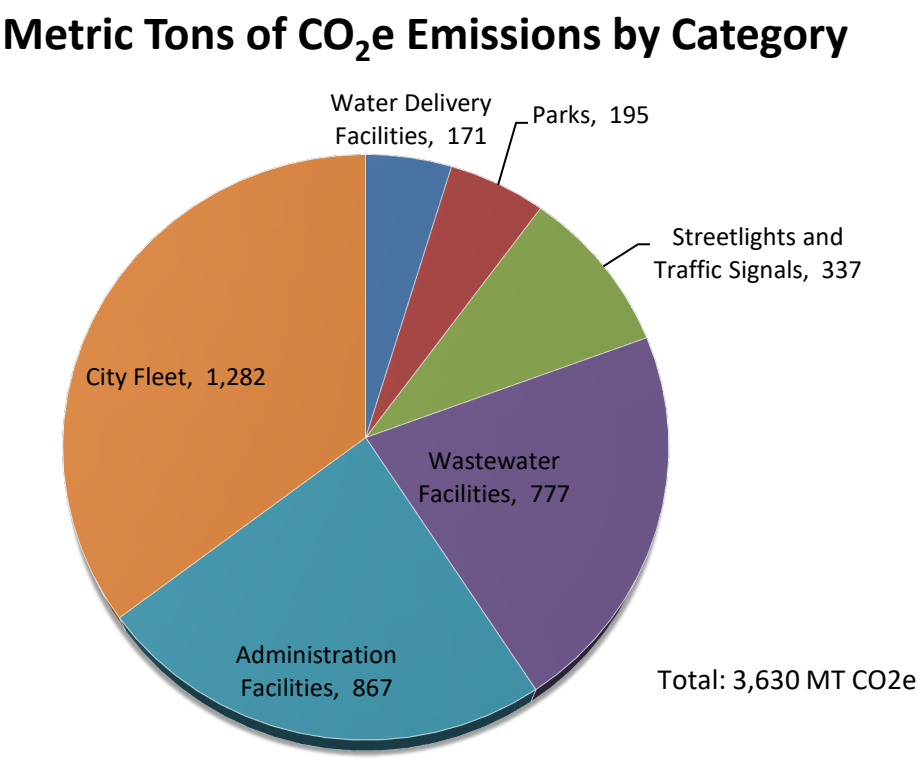

Figure A2 Metric tons of CO2e emissions by municipal GHG reporting sector using NY Average electricity emissions factor.