TOWN OF TRUCKEE
KEEP TRUCKEE GREEN

2023 Municipal Operations Greenhouse Gas Emissions Inventory

April 2025

TOWN OF TRUCKEE

Introduction

The Truckee Town Council has set a priority for the Town to reduce greenhouse gas (GHG) emissions and become a leader in environmental sustainability. Reducing the GHG emissions generated by the Town's government operations is an opportunity to lead the community in this goal. The Town has adopted the following GHG emissions reduction targets for municipal operations relative to a 2008 baseline:

- Reduce emissions 40% by 2030
- Reduce emissions 80% by 2040
- Achieve carbon neutrality by 2045

These targets are the same as the adopted community-wide goals, but the Town will strive to achieve these sooner for municipal operations to the extent feasible. To measure and quantify progress towards these goals, the Town committed to conducting annual municipal operations GHG emission inventories beginning with the 2022 inventory year.

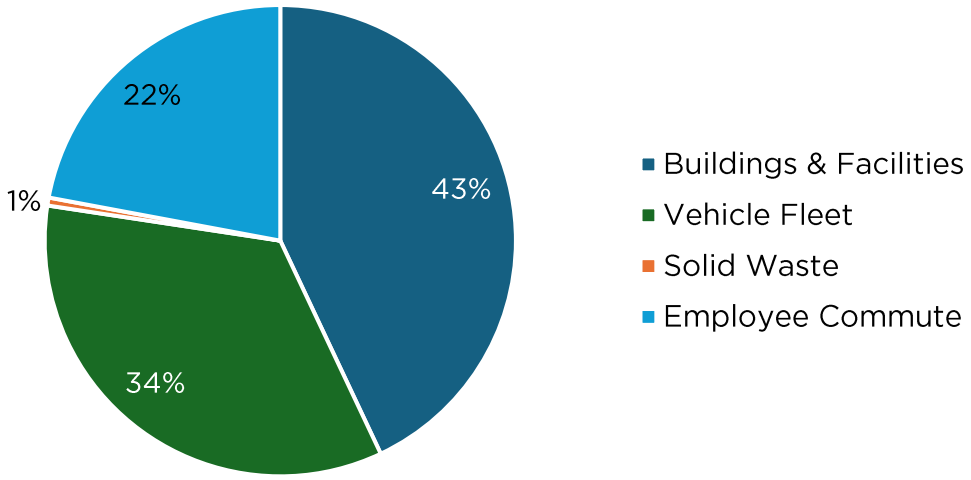
This greenhouse gas emissions inventory estimates greenhouse gas emissions resulting from the Town's municipal operations for the year 2023. This inventory measures the greenhouse gas emissions from Town buildings and facilities, streetlights and public lighting, vehicle fleet, employee commute, and solid waste generation.

All of the Town's municipal operation GHG inventories have used a national standard, the Local Government Operations Protocol (LGOP), developed by the California Air Resources Board, the California Climate Registry, and the International Council for Local Environmental Initiatives (ICLEI). This protocol provides standard accounting principles, boundaries, quantification methods, and procedures for reporting GHG emissions from local government operations. The Town used this LGOP to inventory Truckee's municipal operations inventory. The operational control framework was used, setting the inventory boundary to emissions that the Town has operational control over. Although the protocol provides a common national framework for all local governments to assess GHG emissions, any GHG inventory represents an estimate of emissions using the best available data and calculation methodologies at the time it was conducted. These estimates are subject to change as better data and calculation methodologies become available.

2023 GHG Emissions Summary

In 2023, municipal operations generated 2,388 metric tons of carbon dioxide equivalent (MT CO_2e). Buildings and facilities continue to be the largest contributor to municipal GHG emissions in 2023, followed by the Town's vehicle fleet, employee commute, and government-generated solid waste.

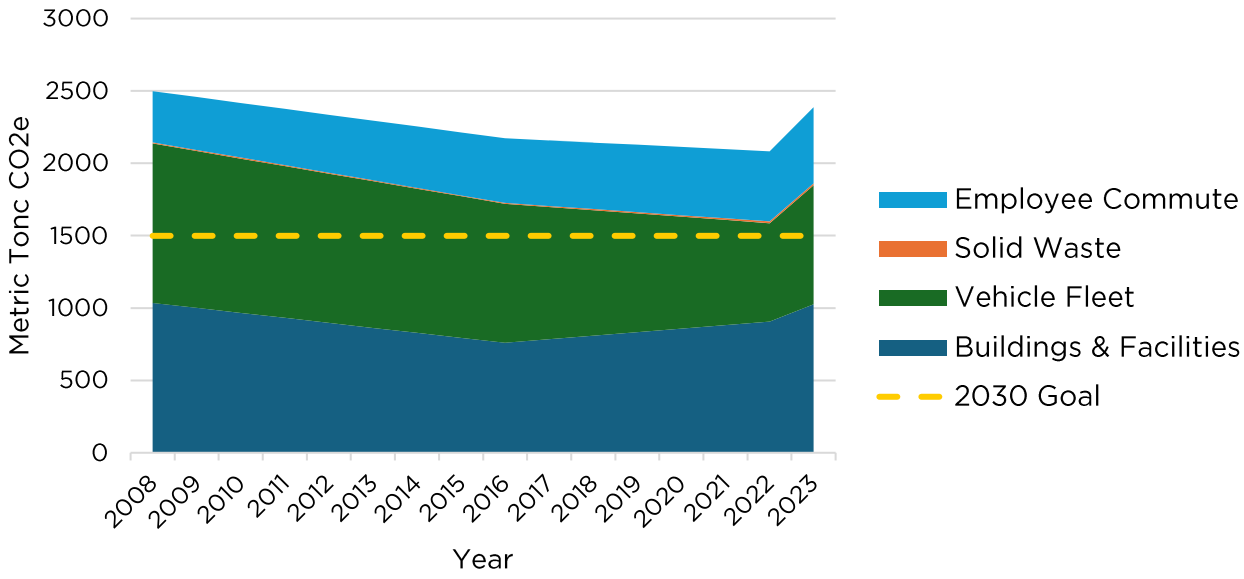
Figure 1: 2023 Municipal Operations GHG Emissions by Sector (Metric Tons CO_2e)



GHG Emissions Trends

The Town's 2023 municipal operations GHG emissions are 4% below 2008 baseline emissions, increasing 15% from 2022 emissions. The Town will need to increase efforts to reduce emissions to meet the interim target of reducing GHG emissions by 40% by 2030. Municipal operations GHG emissions since the baseline year are shown in Figure 2, with emissions levels interpolated between inventory years.

Figure 2: Municipal Operations GHG Emissions 2008-2023



While overall emissions have decreased since 2008, the increase from 2022-2023 shows that year-to-year changes in GHG emissions can make it more challenging to

examine long-term trends. Weather is the largest factor that can impact emissions changes from year-to-year, often eclipsing the effect of even substantial GHG emissions reduction efforts. Many of the Town's operations and subsequent emissions are affected by seasonal and annual variability in weather conditions such as temperature and snow, and the emissions calculations in this inventory are not weather-normalized. As the Town begins to conduct annual municipal operations inventories, this volatility will become more apparent. More details on each sector's emissions are in Table 1.

Table 1: Municipal Operations GHG Emissions Summary

Sector	Metric Tons CO_2e				Percent Change	
	2008	2016	2022	2023	2008-2023	2022-2023
Building Electricity Use	630	284	257	287	-54%	+12%
Building Natural Gas Combustion	358	460	622	725	+102%	+16%
Public Lighting Electricity Use	40	15	14	15	-63%	+9%
Total Buildings and Facilities	**1028**	**759**	**893**	**1027**	**0%**	**+15%**
Vehicle Fleet Gasoline Consumption	435	346	361	458	+5%	+27%
Vehicle Fleet Diesel Consumption	628	565	117	0	-100%	-100%
Vehicle Fleet Renewable Diesel Consumption	-	-	142	299	-	+111%
Leaked Refrigerants	39	49	60	65	+67%	+8%
Total Vehicle Fleet	**1,102**	**960**	**680**	**822**	**-25%**	**+21%**
Government-Generated Solid Waste	7	6	13	13	+86%	0%
Total Government-Generated Solid Waste	**7**	**6**	**13**	**13**	**+86%**	**0%**
Employee Commute Emissions	354	447	347	527	+49%	+9%
Total Employee Commute	**354**	**447**	**484**	**527**	**+49%**	**+9%**
Total Municipal-Operations Emissions	**2,491**	**2,172**	**2,070**	**2,388**	**+49%**	**+9%**

Table 1 shows the significant increases in emissions from both Buildings and Facilities and Vehicle Fleet from 2022-2023. These are the two sectors most impacted by changes in weather, as colder temperatures increase energy use for heating Town facilities, and increased snowfall increases vehicle use for snow removal operations.

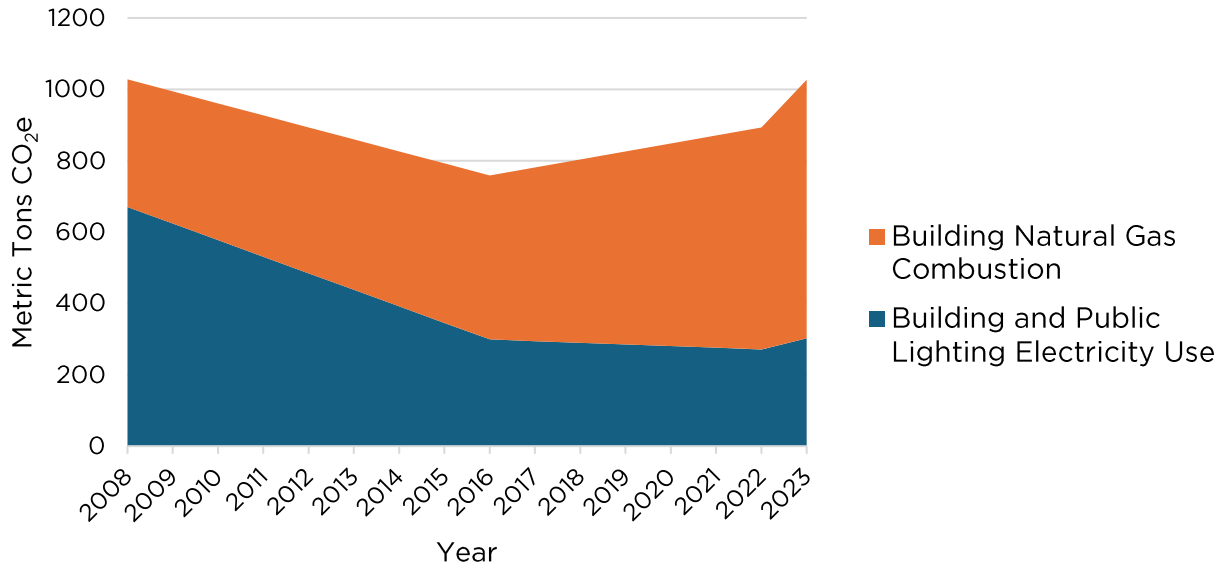
The majority of these GHG emissions increases from 2022-2023 are likely driven by the colder and snowier winter of 2023. To better assess the impact of annual changes in weather on GHG emissions from municipal operations, staff are seeking tools to weather-normalize both energy and fleet fuel use. This would allow staff to separate out the influence of weather from other factors that are under the Town's control and better assess long-term GHG emissions trends despite annual weather volatility.

The following sections have more detail about the activities and emissions sources contributing to each sector of the Town's municipal operations GHG inventory.

Buildings and Facilities

Emissions from the Buildings and Facilities sector include electricity and natural gas used to power and heat Town buildings, as well as electricity used for outdoor public lighting, including streetlights and traffic lights.

Figure 3: Building and Facilities GHG Emissions 2008-2023



Emissions from Town buildings and facilities in 2023 are equal to 2008 emissions and increased 15% since 2022. The majority of the spike from 2022-2023 can likely be attributed to the colder winter of 2023, resulting in more energy use to heat Town facilities. However, there is still a longer-term trend of increased natural gas use that could be due to other factors. Staff are exploring tools that would allow for weather-normalization of energy use data for the inventory, to separately analyze the impacts of weather from other factors that are under the Town's control.

Figure 4: 2023 Building Energy Use GHG Emissions

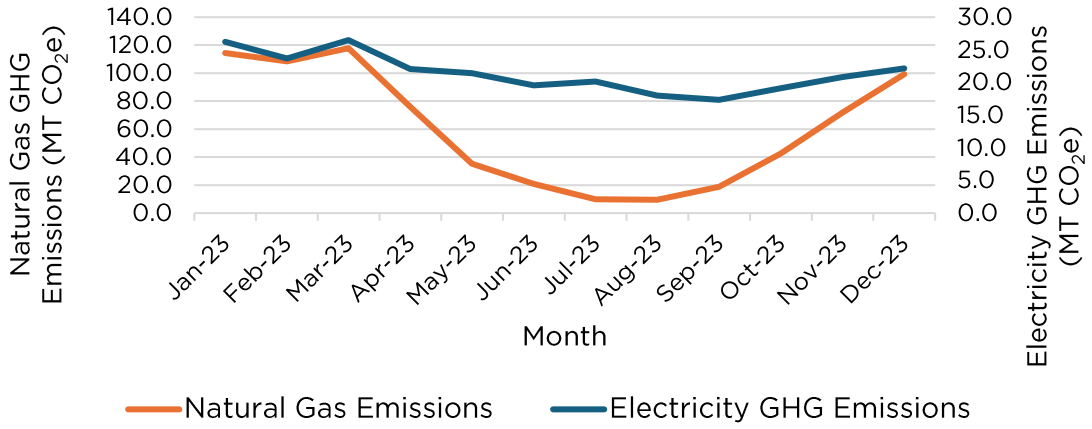
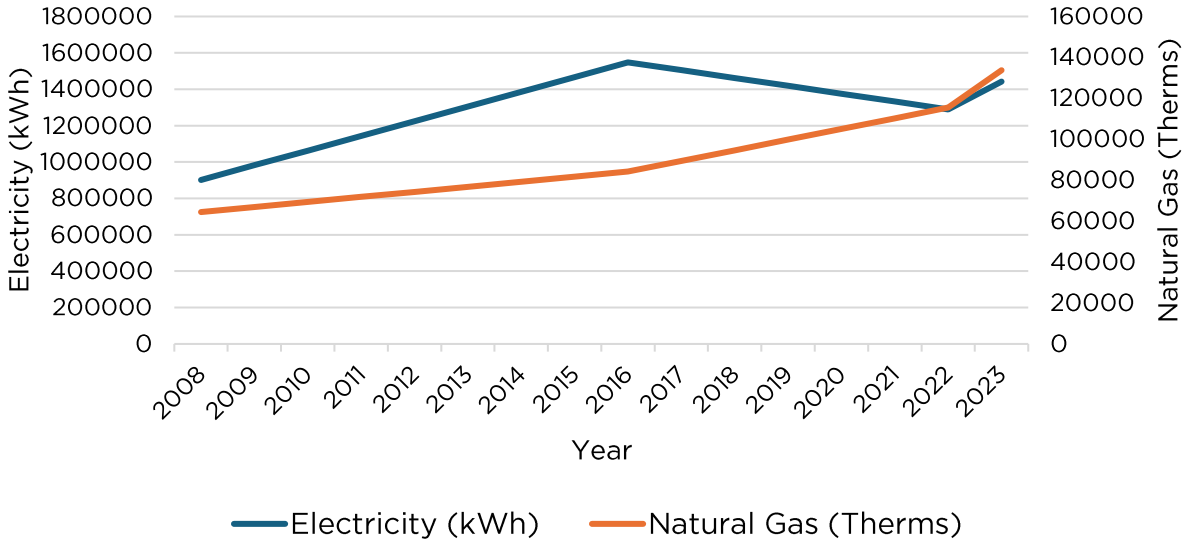


Figure 4 shows the seasonal variability of GHG emissions from Town buildings and facilities. January through March 2023 saw increased GHG emissions due to the colder winter and significantly higher natural gas use.

Figure 5: Energy Usage 2008-2023



Natural gas use at Town buildings and facilities has been increasing steadily since 2008 and saw a larger increase in 2023, likely due to the colder winter. Although electricity use has also increased during that time, GHG emissions associated with electricity use have decreased due to higher use of renewable energy. In 2023, 45.5% of the Town's electricity procured from Truckee Donner Public Utility District is sourced from renewable energy. Table 2 provides a more detailed look at energy use changes in Town buildings.

Table 2: Building Energy Use

Activity / Source	2008	2016	2022	2023	Change 2008-2023	Change 2022-2023
Town Hall - Truckee Airport Road						
Electricity (kWh)	656,160	503,280	457,502	496,585	-24%	+9%
Natural Gas (Therms)	27,529	9,094	5,531	7,982	-71%	+44%
Public Works Corporation Yard - Stevens Lane						
Public Works Main/Admin						
Electricity (kWh)	N/A	444,960	451,154	583,535	N/A	+29%
Natural Gas (Therms)	N/A	31,496	24,918	30,800	N/A	+24%
Public Works South Garage (Police)						
Natural Gas (Therms)	N/A	N/A	17,543	16,297	N/A	-7%
Public Works North Garage (Facilities)						
Natural Gas (Therms)	N/A	N/A	16,867	17,648	N/A	+5%
Public Works - Sand Barn						
Natural Gas (Therms)	N/A	N/A	8,933	9,771	N/A	+9%
Stevens Lane Animal Shelter						
Electricity (kWh)	N/A	318,840	339,697	314,819	N/A	-7%
Natural Gas (Therms)	N/A	24,467	26,323	28,227	N/A	+7%
River View Old Corp Yard / Animal Shelter						
Electricity (kWh)	206,248	261,142	21,510	25,161	-88%	+17%
Natural Gas (Therms)	25,242	8,592	7,926	13,690	-46%	+73%
Tahoe Donner Corp Yard						
Electricity (kWh)	38,959	19,409	19,255	22,554	-42%	+17%
Natural Gas (Therms)	11,680	10,536	7,409	9,314	-20%	+26%
Truckee Depot (Main)						
Electricity (kWh)	79,753	90,195	68,900	74,956	-6%	+9%
Natural Gas (Therms)	2,823	2,403	1,747	2,724	-4%	+56%

In 2023, nearly all Town buildings saw an increase in energy use compared to 2022, likely due to the colder and more extreme winter. Natural gas use at the recently constructed Stevens Lane Public Works garages continues to be the largest source of natural gas use (77%). These garages include vehicle maintenance bays and storage

for snow removal equipment that use natural gas-powered radiant heating. These types of heaters are also used in the outdoor spaces at the animal shelter. While this type of heating equipment is more efficient than heating the air in these otherwise unconditioned spaces, they still use a significant amount of energy. Staff will be exploring options to implement decarbonization retrofits at these facilities, but unfortunately, finding a lower-impact alternative for this equipment may be very challenging.

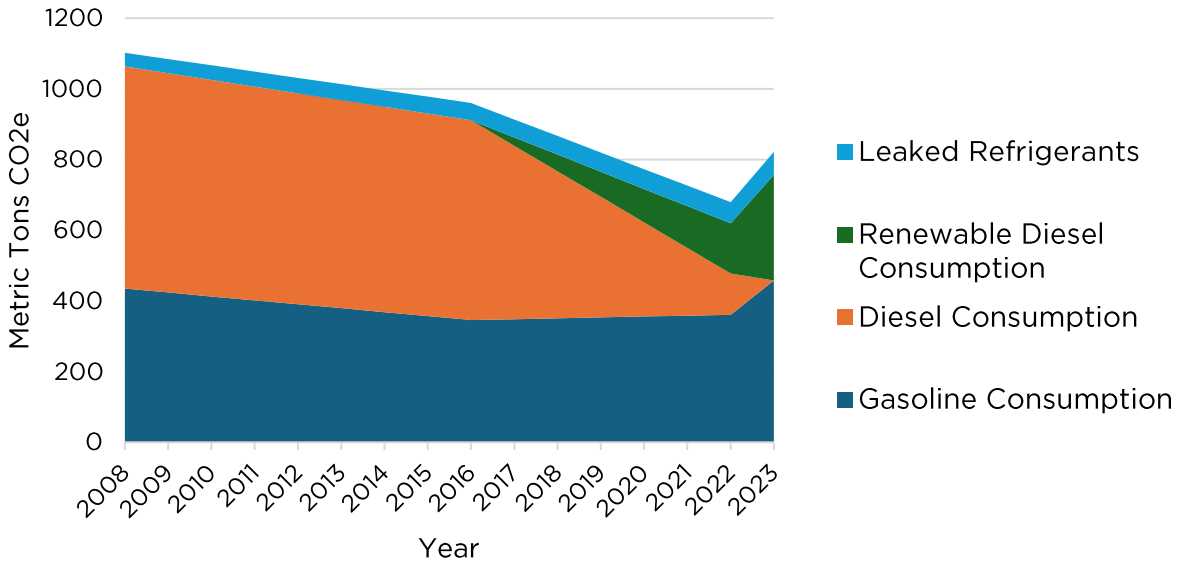
The River View Old Corp Yard has not been occupied following the construction of the new Steven's Lane Corp Yard, but TART Connect began using the facility in 2023, which is likely the cause for the increase in energy use between 2022-2023.

Per the Local Government Operations Protocol (LGOP), electricity transmission and distribution (T&D) losses, and tenant energy usage at the train depot were not accounted for in this inventory. According to the LGOP, emissions associated with T&D losses should be reported by the entity that owns or controls the T&D lines, not by the end-user of power. The Town utilized the operational control framework of the LGOP, setting the inventory boundary to only include emissions the Town has operational control over, which does not include utility accounts paid by a tenant. These emissions were included in the Town's previous municipal inventories and have been removed from previous emission totals in this report for standardization and to allow for more accurate assessment of GHG emissions trends.

Vehicle Fleet

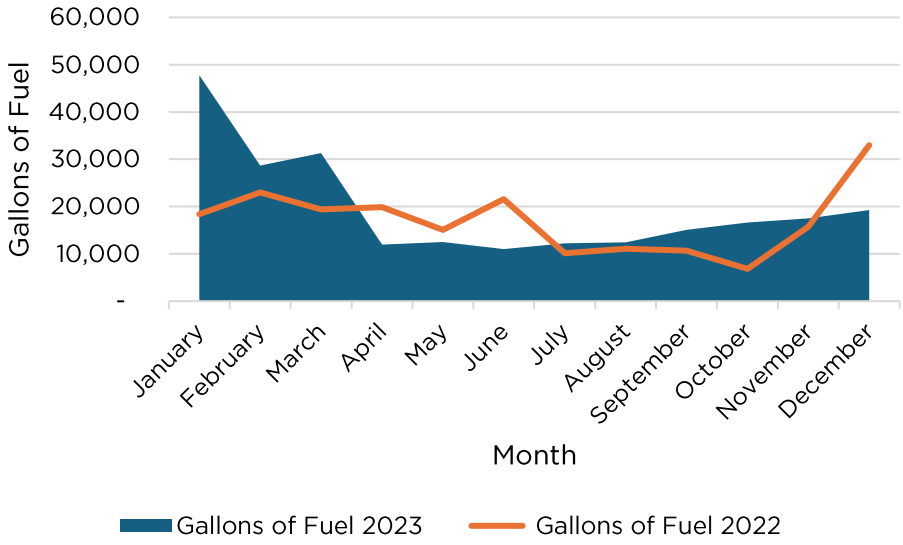
This category includes emissions associated with the gasoline and diesel fuel combustion used in Town vehicles and mobile equipment, as well as refrigerants from vehicle air conditioning.

Figure 6: Vehicle Fleet GHG Emissions 2008-2023



Vehicle fleet emissions are also highly dependent on seasonal and annual variability, as a large portion of the Town's vehicle fuel consumption is from snow removal equipment. Vehicle fleet emissions typically increase in the winter months as snow removal activity increases, as shown in Figure 7. This is typical, however fleet fuel use and accompanying GHG emissions in January through March 2023 are significantly larger due to the increased snow removal activity in the 2022-2023 winter season. The relatively mild start to the 2023-2024 winter season is also apparent, with little increase in fleet fuel emissions near the end of 2023 compared to the large fuel increase in December 2022.

Figure 7: Vehicle Fleet Fuel Use 2022 vs. 2023



GHG emissions from the Town's vehicle fleet increased 21% from 2022-2023. 2023 was one of the snowiest winters on record, with Central Sierra Snow Lab reporting 62.8 ft of snowfall on nearby Donner Summit. Snowier winters result in significantly more use of snow removal equipment, and therefore higher associated GHG emissions. Snow removal equipment uses renewable diesel, but these equipment types are generally much less fuel efficient than other vehicle types in the Town's fleet, so they contribute much more to overall GHG emissions from this sector. Unlike building energy use, there is no standard methodology for weather-normalizing vehicle use based on snowfall, but Town staff are exploring supplemental data sources that may assist in identifying how changes snow removal operations impact this sector.

Despite seasonal variability, this sector is showing an overall 25% decrease in emissions from 2008 estimates due to the integration of renewable diesel, which has 57% less GHG emissions compared to fossil fuel diesel. The Town fully replaced regular diesel with renewable diesel in 2023.

Figure 8: Fleet Fuel Usage 2008-2023

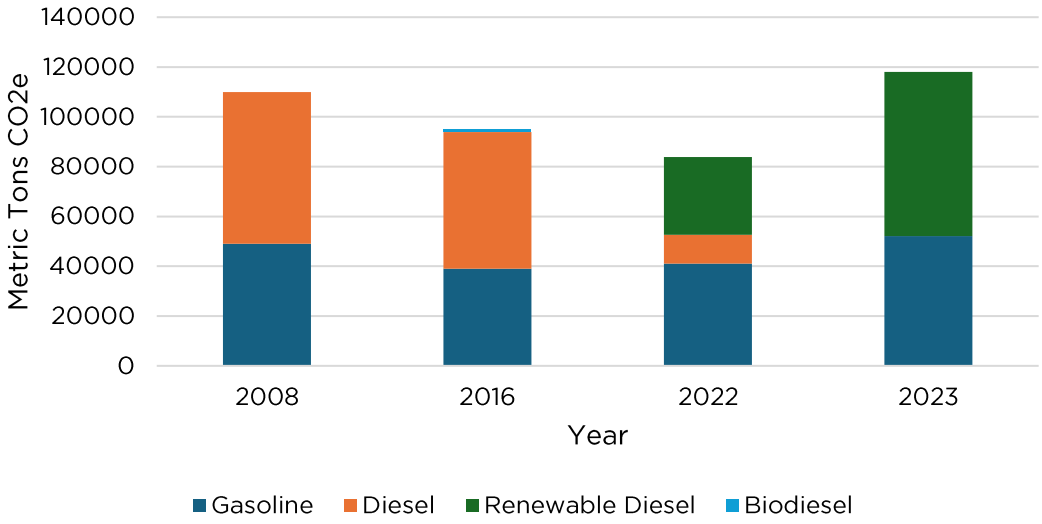


Table 3: Vehicle Fleet Fuel Usage

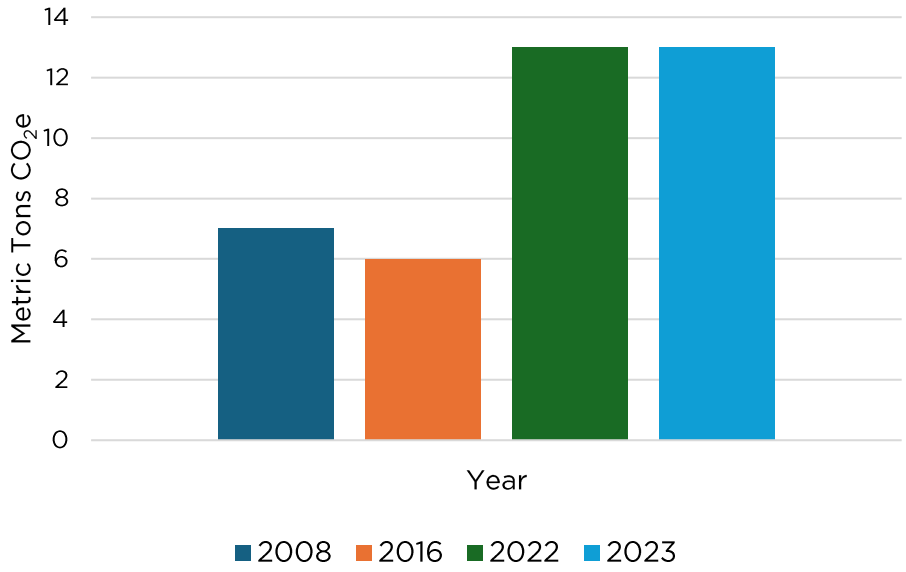
	2008	2016	2022	2023	Change 2008-2023
Gasoline (Gallons)	48,999	38,970	41,101	52,138	+6%
Diesel (Gallons)	60,932	54,881	11,468	-	-100%
Renewable Diesel (Gallons)	-	-	31,273	65,951	-
Total Fuel Use (Gallons)	109,931	93,851	83,843	118,089	+7%
Total Vehicle Miles Traveled	456,270	503,691	787,456	655,361	+44%
Biodiesel (Gallons)	-	887	-	-	-

The Town added two additional electric motorcycles to the Police Department fleet in 2023, increasing the total number of electric vehicles to five vehicles. The Town's transition towards electric vehicles will contribute to reduced vehicle fleet emissions in future years. Consistent with Local Government Operations Protocol (LGOP), emissions from EV charging are included in the building and facilities emission sector.

Government-Generated Solid Waste

This sector estimates the methane emissions from landfill disposal of organic material produced by local government operations.

Figure 9: GHG Emissions from Government Generated Solid Waste 2008-2023



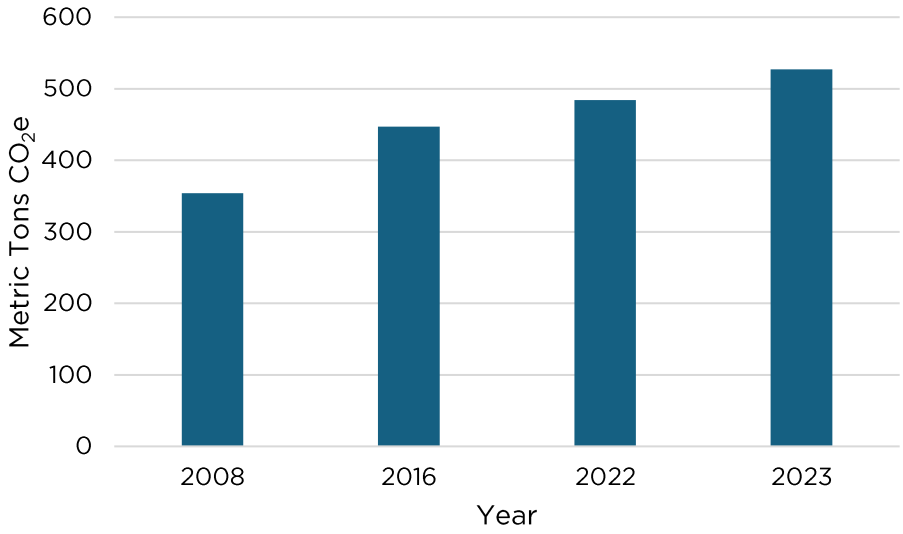
Calculated GHG emissions from government-generated solid waste increased by 86% since 2008 and did not change from 2022-2023. The amount of trash generated by Town operations is estimated based on trash service levels at Town facilities, which did not change between 2022-2023, but increased slightly since 2008. Staff then estimates the waste actually sent to landfill after sorting at Eastern Regional Landfill Material Recovery Facility (ERL MRF), using the facility's reported recovery rate. Some of the change in emissions since 2008 is likely due to use of different recovery rates in previous consultant-calculated inventories, which staff believe underestimated the amount of waste sent to landfill. Given that this sector is an extremely small percentage of overall emissions (0.5% in 2023), staff do not anticipate this methodology difference having a significant effect on overall reported GHG emissions or the Town's ability to meet adopted targets.

This data does not necessarily reflect updates to waste and recycling programs, including source-separated recycling collection implemented at all Town facilities in 2018. The emissions from this sector are estimated rather than measured, so they will primarily be impacted by changes in trash service levels.

Employee Commute

Emissions from employee commutes focus on quantifying the emissions from vehicle-based commutes and are estimated based on employee commute surveys to determine the typical commute methods and distances for Town staff.

Figure 10: Employee Commute Emissions 2008-2023



Total GHG emissions from employee commutes increased 49% since 2008 and 9% since 2022. Data used for 2022 and 2023 employee commute estimates is based on a 2021 employee survey. Survey results may have been skewed due to a decrease in carpooling and more remote work resulting from the COVID pandemic. The only variable between 2022 and 2023 commute emissions is the number of full-time and part-time employees, and the number of days seasonal employees worked. Table 4 below shows the change in employee data between inventory years.

Table 4: Town Employee Data 2008-2023

Employee Data	2008	2016	2022	2023
Number of Employees (Full Time, Part Time, Seasonal)	125	168	158	173

Employee commute emissions are affected by the number of employees, the number of days they commute to work, the transportation mode they use, and the distance of commutes. Employee numbers have increased each of the years measured, which is likely the largest factor contributing to increased emissions in this sector.

The number of days employees commute to work is also dependent on the winter conditions and work required for seasonal employees in the Roads and Snow and Facilities Divisions. These staff are responsible for snow removal operations and are on-call depending on the work required. In snowier winters, additional seasonal staff will commute into work. The number of days seasonal employees worked is factored into emissions calculations.

Driving alone is the most common commute method amongst Town staff (73% of respondents), which is also the highest emissions per mile compared to other modes.

The Town has implemented additional alternative transportation incentives to encourage employees to utilize alternative commute methods, including cycling, carpooling, and transit. The Town has also implemented remote work policies for eligible staff, providing additional opportunities to reduce commuter emissions. Since both the 2022 and 2023 municipal operations inventories both used data from a 2021 commuter survey due to lack of updated data, the impact of these programs will not be reflected in the calculated 2022 and 2023 emissions. Staff conducted an updated commute survey in early 2025 and will continue to collect this data more regularly moving forward, so estimates for future inventories will better reflect the impact of commuter incentive programs.