

To: Municipality of North Grenville
From: Greenscale Inc.
Date: March 6, 2026
Re: 2024 GHG Inventory — Results Summary

1. Overview

The 2024 greenhouse gas (GHG) inventory for the Municipality of North Grenville covers two portfolios: the community inventory, which accounts for all GHG-emitting activity occurring within the municipal boundary, and the corporate inventory, which accounts for municipal operations only. Both inventories were prepared in accordance with the Partners for Climate Protection (PCP) program methodology. Prepared as part of Greenscale Inc.'s engagement to support North Grenville's Climate Action Plan finalization and PCP reporting, this memorandum serves as the technical foundation against which reduction targets will be set and the effectiveness of future actions measured.

North Grenville has completed several components of its Climate Action Plan work, including community and stakeholder engagement, development of preliminary goals and actions, and compilation of corporate and community greenhouse gas data. The current phase of work focuses on consolidating the inventory results before advancing to target refinement and action planning. The emissions profile established here will inform both the ambition and the sectoral focus of the reduction targets that follow.

A defensible, methodology-consistent baseline is a prerequisite for setting meaningful reduction targets under the PCP framework. The inventory draws on a combination of directly measured utility data, municipal records, and estimation methods for sectors where local data is not yet available. Natural gas and electricity consumption were obtained directly from Enbridge Gas and Hydro One respectively. Known data gaps are identified and flagged for replacement as better local data becomes available, and are not expected to change the overall picture materially.

2. Corporate Inventory

The corporate inventory accounts for GHG emissions from municipal operations and assets directly owned or controlled by the Municipality of North Grenville. The sectors covered include facilities, transportation (municipal fleet), street lights, water, wastewater, and waste from closed landfill commitments. Together these sectors represent the portion of North Grenville's emissions footprint over which the municipality has the most direct operational influence.

North Grenville is a small rural lower-tier municipality in Eastern Ontario, with a 2024 population of 19,405 and a total municipal floor area of 209,607 ft². Its service portfolio is typical of a municipality of this size and character — a mix of recreational, operational, and administrative facilities, a general-purpose vehicle fleet, and water and wastewater infrastructure serving a dispersed rural population. Corporate emissions in this context are modest in absolute terms relative to the community as a whole, but represent the area of the emissions profile most directly within municipal control.

Corporate emissions were calculated from energy consumption and fuel use data drawn from a combination of sources. Utility consumption data for natural gas and electricity was obtained directly from Enbridge Gas and Hydro One, while fleet fuel volumes, facility operating records, and waste tonnage data were provided by the Municipality of North Grenville. All energy quantities were converted to greenhouse gas emissions using published emission factors from Environment and Climate Change Canada (ECCC) and the Canada Energy Regulator (CER), and results are expressed in tonnes of carbon dioxide equivalent (t CO₂e) using global warming potential values from the IPCC Fifth Assessment Report.

2.1 Data Sources

2.1.1. Facilities

Facilities cover all municipally-owned and operated buildings, including administrative, recreational, operational, and emergency services facilities across North Grenville's portfolio. Electricity and natural gas consumption were obtained from aggregated account data provided by Hydro One and Enbridge Gas respectively, covering all facilities billed under municipal accounts in 2024. Propane consumption was determined by tabulating individual purchase records from supplier invoices provided by the Municipality, and fuel oil consumption was drawn from municipal records where usage was documented. All fuel volumes were converted to energy using CER conversion factors and to emissions using ECCC emission factors. Table 1 summarizes facilities energy consumption by fuel type for 2024.

Table 1. Facilities Energy Consumption (2024)

Source	Consumption
Electricity (kWh)	2,231,966
Natural Gas (m ³)	269,945
Furnace Oil (L)	11,769
Propane (L)	12,524

2.1.2 Transportation

The municipal fleet covers all vehicles and equipment owned and operated by the Municipality of North Grenville, including light-duty vehicles, heavy equipment, and service vehicles across municipal departments. Fleet fuel consumption data was provided by the Municipality in the form of annual fuel purchase records, broken down by fuel type — gasoline, diesel, and propane — and by the general class of vehicles consuming each fuel. All reported fuel volumes were directly measured from purchase records, with no estimation required for any fuel type, and were converted to energy and emissions using ECCC transportation fuel emission factors. Table 2 summarizes fleet fuel consumption by vehicle class for 2024.

Table 2. Municipal Fleet Fuel Consumption (2024)

Vehicle Class	Diesel (L)	Gasoline (L)	Propane (L)
Zamboni	—	—	3,725
Heavy Duty Trucks	43,147	—	703
Heavy Duty Vehicles	55,929	—	—
Light Duty Vehicles	—	45,243	—
TOTAL	99,076	45,243	4,428

2.1.3 Street Lights

Street lights represent a small but fully measurable component of the corporate electricity load, covering all municipally-owned outdoor lighting infrastructure across North Grenville. Electricity consumption was obtained from municipal account ledgers maintained separately from other facility electricity accounts, providing a direct measure of lighting energy use without the need for allocation or estimation. Emissions were calculated using the Ontario grid average annual emission factor published by ECCC. Table 3 summarizes street light electricity consumption for 2024.

Table 3. Street Light Energy Consumption (2024)

Source	Consumption
Electricity (kWh)	65,525

2.1.4 Water

Municipal water operations cover the energy used to pump, treat, and distribute potable water to serviced areas of North Grenville, drawing on both electricity and natural gas. Electricity and natural gas consumption were obtained from dedicated utility meters, with Hydro One and Enbridge Gas providing account data specific to water system infrastructure. Emissions were calculated using the same ECCC emission factors applied consistently across all corporate sectors. Table 4 summarizes water system energy consumption for 2024.

Table 4. Water System Energy Consumption (2024)

Source	Consumption
Electricity (kWh)	935,360
Natural Gas (m ³)	67,570

2.1.5 Wastewater

Municipal wastewater operations cover the energy used to collect, pump, and treat sewage from serviced areas of North Grenville, drawing on both electricity and natural gas. Electricity and natural gas consumption were obtained from dedicated utility meters separate from those used for water and facilities, with account data provided by Hydro One and Enbridge Gas respectively. Emissions were calculated using the same ECCC emission factors applied across all corporate sectors. Table 5 summarizes wastewater system energy consumption for 2024.

Table 5. Wastewater System Energy Consumption (2024)

Source	Consumption
Electricity (kWh)	1,333,806
Natural Gas (m ³)	67,570

2.1.6 Waste — Closed Landfill Sites

North Grenville's four closed municipal landfill sites — South Gower, Oxford Mills, Burritts Rapids, and Kemptville — continue to generate methane as organic material deposited over their operational periods decomposes. All four sites stopped accepting waste between 1999 and 2007 and are in post-closure monitoring under Environmental Compliance Approvals issued by the Ministry of the Environment, Conservation and Parks (MECP).

Emissions were estimated using the IPCC First-Order Decay (FOD) model, applied to site-specific waste volume and operational data drawn from the 2024 annual monitoring reports for each site, published publicly on the Municipality of North Grenville's website. The FOD model calculates annual methane generation as a function of waste quantity and composition, the rate of organic decomposition, and time elapsed since deposition. Because none of the four sites have gas capture or flaring infrastructure, all generated methane is assumed to be emitted directly to atmosphere. Table 6 summarizes the modelled methane generation and CO₂e emissions for each site for 2024.

Table 6. Closed Municipal Landfill Sites — IPCC First-Order Decay Model Inputs (2024)

Site	Waste in Place (t)	Annual CH ₄ (t/yr)	Operational Period
South Gower	33,371	4.0	1952–1999
Oxford Mills	61,346	9.1	1972–1999
Burritts Rapids	44,533	7.5	1971–1999
Kemptville	34,763	11.1	1990–2007
TOTAL	174,012	31.7	

2.2. Corporate Inventory Results

Corporate operations in North Grenville span six sectors: facilities, fleet, street lights, water, wastewater, and waste from four closed municipal landfill sites. Together these sectors consumed 37,816 GJ of energy in 2024 and produced 2,385 t CO₂e — a figure that, at approximately 0.5% of total community emissions, is modest in absolute terms but represents the portion of North Grenville's emissions profile most directly within municipal control. Natural gas and diesel are the dominant emission-producing fuels across the portfolio, reflecting the municipality's reliance on gas-fired heating in buildings and diesel-powered equipment in its fleet. Table 7 breaks down corporate GHG emissions by sector, revealing the relative contribution of each operational area to the municipal footprint.

Table 7. Corporate GHG Emissions by Sector (2024)

Sector	Energy (GJ)	GHG (t CO ₂ e)	% of Total
Facilities	18,857	707	29.6%
Transportation	5,514	389	16.3%
Street Lights	236	4	0.2%
Wastewater	7,322	211	8.8%
Water	5,888	187	7.8%
Waste (Landfill)	—	888	37.2%
TOTAL	37,816	2,385	100%

* Waste total of 888 t CO₂e comprises 824 t CO₂e from four closed municipal landfill sites and 64 t CO₂e attributed to North Grenville's share of active landfill emissions at GFL's EOWHF facility.

Facilities consumed the most energy of any corporate sector at 18,857 GJ, producing 707 t CO₂e. Natural gas dominates at 522 t CO₂e — 73.8% of facilities emissions — reflecting its role as the primary heating fuel across the municipal building portfolio. Electricity, fuel oil, and propane account for the remainder at 134 t CO₂e, 32 t CO₂e, and 19 t CO₂e respectively.

The municipal fleet consumed 5,514 GJ in 2024, producing 389 t CO₂e. Diesel is the dominant fuel at 268 t CO₂e (68.9%), driven by the heavy-duty equipment and service vehicles that make up the majority of the fleet by fuel volume. Gasoline contributes 114 t CO₂e (29.3%) and propane 7 t CO₂e (1.8%).

Water and wastewater together consumed 13,210 GJ and produced 398 t CO₂e, reflecting the energy intensity of pumping and treatment infrastructure serving a dispersed rural population. Both sectors draw on the same two fuels — natural gas and electricity — with natural gas accounting for the majority of emissions in each case. Street lights consumed 236 GJ and produced 4 t CO₂e, a small but fully measurable load drawing entirely on grid electricity.

Waste from the four closed municipal landfill sites produced 824 t CO₂e in 2024, consuming no energy. Unlike every other corporate sector, these emissions arise entirely from the ongoing decomposition of organic material deposited at the sites over their operational periods, and will decline gradually over time as that material is exhausted. Kemptville is the largest contributor at 285 t CO₂e, reflecting that its waste is the youngest and gas generation remains near peak, while South Gower contributes the least at 105 t CO₂e, consistent with near-zero methane readings observed at monitoring vents in 2024. Table 8 breaks down corporate GHG emissions by energy source, revealing the relative contribution of each fuel type across the municipal portfolio.

Table 8. Corporate GHG Emissions by Energy Source (2024)

Energy Source	Energy (GJ)	GHG (t CO ₂ e)	% of GHG
Electricity	16,440	274	18.3%
Natural Gas	15,110	783	52.3%
Gasoline	1,568	114	7.6%
Diesel	3,832	268	17.9%
Heating Oil	432	32	2.1%
Propane	434	26	1.7%
TOTAL (energy)	37,816	1,497	100%

* Energy source totals exclude waste (landfill) emissions of 888 t CO₂e, which are process emissions not associated with fuel combustion. Including waste, the corporate GHG total is 2,385 t CO₂e.

Natural gas dominates at 522 t CO₂e — 73.8% of facilities emissions — reflecting its role as Natural gas is the single largest emission source across the corporate portfolio at 783 t CO₂e, accounting for 52.3% of energy-based emissions. Diesel follows at 268 t CO₂e (17.9%), concentrated in the fleet. Electricity contributes 274 t CO₂e (18.3%) despite representing the largest share of energy consumption at 16,440 GJ, reflecting Ontario's low-carbon grid. Gasoline, heating oil, and propane together account for the remaining 172 t CO₂e (11.5%).

3. Community Inventory

The community inventory accounts for all GHG-emitting activity occurring within North Grenville's geographic boundary, regardless of the responsible party. The sectors covered include on-road transportation, residential and ICI building energy use, solid waste disposal, wastewater treatment, and agriculture livestock and electricity use. Together these sectors capture the full emissions footprint of North Grenville as a community and form the basis against which community-level reduction targets will be set under the PCP framework.

3.1 Data Sources

Community emissions were calculated from a combination of directly measured utility data, municipal and provincial records, and estimation methods for sectors where local data is not yet available. Emission factors are drawn from Environment and Climate Change Canada's (ECCC) National Inventory Report (NIR) and the Canada Energy Regulator (CER), and all results are expressed in tonnes of carbon dioxide equivalent (t CO₂e) using global warming potential values from the IPCC Fifth Assessment Report.

3.1.1 Stationary Emissions (Buildings)

Natural gas consumption for the residential sector was obtained directly from Enbridge Gas, which provides annual community-level consumption data for PCP reporting. Electricity consumption was obtained from Hydro One. Electricity emissions are calculated using the Ontario grid average annual emission factor published by ECCC, consistent with PCP protocol guidance. Tables 9 and 10 summarize community electricity and natural gas consumption by sector respectively.

Table 9. Community Electricity Consumption by Sector — Hydro One (2024)

Sector	Consumption (kWh)	Energy (GJ)
Residential	80,647,944	290,333
Commercial (ICI)	39,962,436	143,865
Industrial (ICI)	231,874	835
Other	156,805	564
Agriculture	1,275,579	4,592
TOTAL	122,274,638	440,189

Table 10. Community Natural Gas Consumption by Sector — Enbridge Gas (2024)

Sector	Consumption (m ³)	Energy (GJ)
Residential	6,391,281	238,395
Commercial (ICI)	3,997,932	149,123
Other	73,201	2,730
TOTAL	10,462,414	390,248

Propane and heating oil — used primarily in properties not connected to the natural gas distribution network — were estimated using a per-capita downscaling approach applied to Ontario provincial fuel consumption data from Statistics Canada's Table 25-10-0066-01. Per-capita consumption rates were derived from 2021 Ontario residential sector sales and adjusted to 2024 using Ontario's population growth rate over the intervening period. A rural adjustment factor of 1.6 was applied to both fuels, based on the Financial Accountability Office of Ontario's 2021 report Home Energy Spending in Ontario: Income and Regional Distribution, which found that rural Ontario households spent an average of \$3,198 on home energy compared to \$2,002 for large urban centre households — a ratio of 1.60 attributable directly to the shift from natural gas to propane and heating oil in the absence of pipeline infrastructure. Because the FAO ratio is based on total home energy spending including electricity — for which rural-urban price differences are modest — the true propane and heating oil consumption differential is likely higher than 1.6, making the factor conservative. These estimates are placeholders pending receipt of local propane and heating oil distributor data. Table 11 summarizes estimated propane and heating oil consumption by sector.

Table 11. Estimated Propane and Heating Oil Consumption by Sector (2024)

Fuel / Sector	Per Capita Use (L)	Total Use (L)	Energy (GJ)
Propane — Residential	27.20	528,756	21,611
Propane — ICI	38.64	750,254	30,700
Heating Oil — Residential	13.99	271,585	11,115
Heating Oil — ICI	1.23	23,878	977
TOTAL	—	1,574,473	64,403

Estimated by per-capita downscaling from Statistics Canada Table 25-10-0066-01 with rural adjustment factor of 1.6. Placeholder pending receipt of local distributor data.

3.1.2 Transportation

A significant share of residents' commute to employment centres outside the municipality — primarily Ottawa — relying almost entirely on personal vehicles in the absence of intercommunity transit. These characteristics mean that transportation dominates North Grenville's community emissions profile to a degree more pronounced than in most Ontario municipalities, and they shape several of the methodological choices described below. Community transportation emissions were estimated by downscaling Ontario's annual road fuel sales to North Grenville by population share, then applying a locally-derived rural adjustment factor to account for the municipality's higher-than-average per-capita fuel consumption. Ontario's net road fuel sales — representing fuel on which road-use taxes were remitted — were obtained from Statistics Canada's Motor Vehicle Fuel Sales survey (Table 23-10-0066-01, released September 22, 2025). North Grenville's population share was calculated at 0.1268% based on the confirmed 2024 population of 19,405 against Ontario's 2024 population of 15,300,000.

A rural adjustment factor of 1.8 was applied to both gasoline and diesel, derived from 2021 Census commuting distance data (Statistics Canada, Table 98-10-0461-01). The population-weighted average straight-line commute distance for North Grenville residents is 23.5 km, compared to the Ontario average of 12.9 km — a ratio of 1.8. That ratio reflects a community where 93.8% of residents commute by car, truck, or van, 46.5% travel 30 km or more to their workplace, and 38.5% fall in the 35 km or more band. Straight-line distances underestimate actual road distances in rural areas where roads follow concession lines, so 1.8 is considered a conservative floor. Total gasoline consumption was further allocated across regular unleaded (70%), mid-grade (15%), and premium (15%) based on typical provincial retail distribution patterns, as each grade carries a slightly different emission factor. These estimates are placeholders pending receipt of local retail fuel sales data from Kalibrate, which will replace the provincial downscaling approach when available. Table 12 summarizes on-road fuel sales used in the transportation emissions calculation.

Table 12. On-Road Fuel Sales (2024)

Fuel Type	Sales (L)	Sales (GJ)	Expenditure (\$)
Regular Gasoline	27,610,300	956,973	\$41,691,553
Mid-Grade Gasoline	5,916,493	205,066	\$10,016,622
Premium Gasoline	5,916,493	205,066	\$10,472,192
Diesel	12,513,384	484,018	\$21,523,020
TOTAL	51,956,669	1,851,122	\$83,703,387

Source: Statistics Canada Motor Vehicle Fuel Sales survey (Table 23-10-0066-01), downscaled to North Grenville by population share with rural adjustment factor of 1.8.

3.1.3 Wastewater

Community wastewater emissions were calculated from annual flow and water quality data for North Grenville's wastewater treatment facility, using methods consistent with the 2019 IPCC Guidelines for Waste Water Treatment and Discharge. Annual flow data and average influent concentrations were obtained from North Grenville's published annual wastewater reports. Four emission components were calculated: methane from treatment (based on annual flow, CBOD5 concentration, and a facility-specific emission factor of 0.0036 kgCH₄/kgBOD); direct N₂O from biological treatment (based on raw TKN concentration, annual nitrogen load, and an emission factor of 0.016 kgN₂O-N/kgN); indirect N₂O from effluent discharge (based on ammonia nitrogen concentration, annual nitrogen load, and an N-removal fraction of 0.6); and emissions from a bypass event recorded on August 19, 2024. The Canadian maximum methane potential value of 0.36 kgCH₄/kgBOD from ECCC was used to derive the facility-specific emission factor, and CBOD5 values were converted to BOD5 using a ratio of 1.16 based on established literature values. Table 13 summarizes the key flow and water quality inputs used in the wastewater emissions calculation.

Table 13. Wastewater Treatment — Key Inputs (2024)

Parameter	Value	Unit
Annual flow	853,443	m ³ /yr
Average CBOD5	3 mg/L	mg/L
Average raw TKN	31.72	mg/L
Average ammonia nitrogen	0.14	mg/L
Bypass event flow (Aug 19)	47.4	m ³

3.1.4 Solid Waste

Community solid waste emissions reflect North Grenville's share of active landfill emissions at GFL Environmental's Eastern Ontario Waste Handling Facility (EOWHF) in Moose Creek, estimated using the IPCC First-Order Decay (FOD) model consistent with PCP reporting requirements. In 2024, 4,710.35 tonnes of solid waste were delivered to EOWHF. Organics collected curbside (1,164.13 tonnes) are diverted to the City of Ottawa composting facility and are excluded from the landfill emissions calculation. A gas collection efficiency of 0.75 is applied as a conservative estimate, reflecting the lower bound of the range typically reported for well-operated modern gas extraction systems. Methane captured and combusted at the facility's 4.2 MW gas-to-energy plant is excluded from the inventory as it is converted to biogenic CO₂ at the point of combustion. Table 14 summarizes the waste input quantities and FOD model parameters used in the solid waste emissions calculation.

Table 14. Solid Waste — EOWHF Inputs and FOD Model Parameters (2024)

Parameter	Value
Total waste to EOWHF (t)	4,710.35
Organics diverted to composting (t)	1,164.13
Waste subject to FOD model (t)	3,546.22
Gas collection efficiency	0.75
CH ₄ captured and combusted (t)	204.9
CH ₄ emitted to atmosphere (t)	68.3

3.1.5 Agriculture and Livestock

Agriculture and livestock emissions were estimated from 2024 census of agriculture data for North Grenville, covering enteric fermentation, manure management, and manure-related N₂O emissions for all major livestock categories present in the municipality. Emission factors for enteric fermentation and manure management were drawn from IPCC guidelines and applied to livestock head counts by category, with separate factors applied for enteric CH₄, manure CH₄, and manure N₂O. All results were converted to t CO₂e using IPCC AR5 global warming potential values. Table 15 summarizes livestock head counts and emission factors by category for 2024.

Table 15. Agriculture and Livestock — Head Counts and Emission Factors (2024)

Livestock Category	Head Count	Enteric EF (kgCH ₄ /head/yr)	Manure EF (kgCH ₄ /head/yr)	N ₂ O EF (kgN ₂ O/head/yr)	t CO ₂ e/yr
Beef Cows	525	120	4.5	1.094	1,982
Dairy Cows	661	145.3	39	0.927	3,573
Bulls	41	127.6	4.9	1.634	170
Heifers, Beef	85	90.9	3.2	0.837	243
Calves (under 1 yr)	557	43.9	2.9	0.383	786
Heifers, Dairy	436	76.7	17	0.752	1,231
Lambs	996	8	0.22	0.043	241
Sheep	1,334	8	0.33	0.044	327
Horses	149	20	0.22	0.222	93
Llamas & Alpacas	53	8	N/A	0.15	N/A
Geese	50	N/A	0.1	0.054	N/A
TOTAL	5,940	—	—	—	8,646

Emission factors from IPCC guidelines. N/A indicates factor not applicable to this livestock category. Total head count excludes llamas/alpacas and geese from CO₂e summation where factors are not available

3.2 Community Inventory Results

North Grenville's community emissions totalled 447,799 t CO₂e in 2024 across six sectors, drawing on 2,743,232 GJ of energy. Transportation dominates the profile at 405,216 t CO₂e — 90.5% of total community emissions — a share that reflects the municipality's near-total dependence on personal vehicles, its large Ottawa commuter population, and the absence of intercommunity transit. Residential and ICI buildings together contribute 31,802 t CO₂e (7.1%), with agriculture, solid waste, and wastewater accounting for the remaining 10,858 t CO₂e (2.4%). Forest carbon sequestration is not yet reflected in these totals; GIS mapping of woodland cover within the municipal boundary using SOLRIS 3.0 is underway and is expected to reduce the net community footprint once complete. Table 16 breaks down community GHG emissions by sector, revealing the relative contribution of each area to the overall footprint.

Transportation's dominance of the community profile is the defining feature of North Grenville's emissions footprint and warrants close attention in action planning. At 405,216 t CO₂e, the sector accounts for 90.5% of total community emissions, drawing on 1,851,122 GJ of energy — more than twice the combined energy consumption of all other sectors. The municipality's rural settlement pattern, large lot sizes, and dependence on Highway 416 as the primary Ottawa commuter corridor mean that per-capita transportation emissions are substantially higher than the Ontario average, and meaningful reductions in this sector will require a combination of mode shift, electrification, and land use changes that play out over long timeframes.

Table 16. Community GHG Emissions by Sector (2024)

Sector	Energy (GJ)	GHG (t CO ₂ e)	% of Total	Notes
Residential	561,454	19,693	4.4%	Natural gas, electricity, propane, heating oil
ICI	326,064	12,109	2.7%	Commercial, institutional, and industrial buildings
Transportation	1,851,122	405,216	90.5%	On-road gasoline and diesel
Solid Waste	—	1,912	0.4%	Active landfill (EOWHF); process emissions*
Wastewater	—	223	0.05%	CH ₄ and N ₂ O from treatment and effluent; process emissions*
Agriculture & Forests	4,592	8,646	1.9%	Livestock enteric, manure CH ₄ and N ₂ O; process emissions*
TOTAL	2,743,232	447,799	100%	

* Solid waste, wastewater, and agriculture emissions arise from biological and chemical processes rather than fuel combustion and are not associated with energy consumption. Including these sectors, total community GHG emissions are 447,799 t CO₂e.

Residential buildings produced 19,693 t CO₂e from 561,454 GJ of energy consumption. Natural gas is the dominant fuel, reflecting the prevalence of gas-heated single-detached housing across North Grenville's dispersed rural settlements. Propane and heating oil together contribute a meaningful share relative to what would be expected in a more urbanized municipality, consistent with the proportion of rural properties outside the natural gas distribution network. Electricity consumption is comparatively low-emission given Ontario's low-carbon grid, but represents a significant share of total residential energy use.

ICI buildings produced 12,109 t CO₂e from 326,064 GJ, a profile broadly similar in fuel mix to the residential sector though with a higher proportion of natural gas relative to propane and heating oil, consistent with the concentration of commercial and institutional floor area in Kemptville where gas distribution infrastructure is available. Together, residential and ICI buildings represent the sector where building retrofit programs, fuel switching, and electrification of space and water heating will have the most direct municipal influence after transportation.

Agriculture produced 8,646 t CO₂e, driven primarily by enteric fermentation and manure management emissions from North Grenville's substantial livestock population of 5,940 head across eleven categories. These are process emissions arising from biological activity rather than fuel combustion, and are not meaningfully reducible through energy efficiency measures — they respond to changes in herd size, manure management practices, and feed composition. The 4,592 GJ of energy consumption in this sector reflects electricity use associated with farm operations.

Solid waste contributed 1,912 t CO₂e from North Grenville's share of waste deposited at GFL Environmental's Eastern Ontario Waste Handling Facility in Moose Creek. Wastewater treatment produced 223 t CO₂e from the Kemptville Water Pollution Control Plant, comprising methane and nitrous oxide from biological treatment processes, effluent discharge, and a bypass event recorded on August 19, 2024. Both are modest contributors in absolute terms but represent sectors where municipal policy on diversion, organics management, and treatment operations can yield incremental reductions over time. Table 17 breaks down community GHG emissions by energy source, revealing the relative contribution of each fuel type across the municipal boundary.

Table 17. Community GHG Emissions by Energy Source (2024)

Energy Source	Energy (GJ)	GHG (t CO ₂ e)	% of GHG
Electricity	440,189	7,336	4.5%
Natural Gas	387,518	20,076	12.2%
Gasoline	1,367,104	98,972	60.1%
Diesel	484,018	33,892	20.6%
Heating Oil	12,093	1,302	0.8%
Propane	52,311	3,164	1.9%
TOTAL (energy)	2,743,232	164,742	100%

** Energy source totals exclude process emissions from solid waste (1,912 t CO₂e), wastewater (223 t CO₂e), and agriculture and forests (8,646 t CO₂e). Including all sectors, total community GHG emissions are 447,799 t CO₂e.*

Gasoline is the dominant emission source at 98,972 t CO₂e, accounting for 60.1% of energy-based community emissions and reflecting the scale of on-road vehicle use across the municipality. Diesel contributes a further 33,892 t CO₂e (20.6%), concentrated in freight and heavy vehicle movements. Natural gas follows at 20,076 t CO₂e (12.2%), drawn from residential and ICI building heating loads. Electricity, propane, and heating oil account for the remaining 11,802 t CO₂e (7.2%), with electricity's modest share relative to its energy volume reflecting Ontario's low-carbon grid.

3.3. Corporate Intensity Metrics

Corporate GHG emissions and energy consumption can be expressed on a per-capita and per-floor-area basis to provide normalized comparisons across years and against peer municipalities. North Grenville's 2024 corporate portfolio serves a population of 19,405 and encompasses 209,607 ft² of municipal floor area. Table 18 summarizes corporate intensity metrics by sector for 2024. At 0.0364 t CO₂e per capita, facilities represent the largest per-capita corporate emission source, reflecting the scale of the municipal building portfolio relative to the population served. Fleet follows at 0.0200 t CO₂e per capita, consistent with a rural municipality maintaining a heavy-duty equipment complement for road maintenance and public works.

Table 18. Corporate GHG Intensity Metrics by Sector (2024)

Sector	GHG (t CO ₂ e)	t CO ₂ e / capita	t CO ₂ e / ft ²	GJ / capita	GJ / ft ²
Facilities	707	0.0364	0.0034	0.972	0.0900
Fleet	389	0.0200	—	0.284	—
Street Lights	4	0.0002	—	0.012	—
Water	187	0.0096	—	0.303	—
Wastewater	211	0.0109	—	0.377	—
Waste (Closed Landfills)	888	0.0457	—	—	—
TOTAL	2,386	0.1229	0.0034	1.948	0.0900

Per-floor-area metrics apply to facilities only. Fleet, street lights, water, wastewater, and waste intensity is expressed on a per-capita basis. Total GJ/ft² reflects facilities energy only. Population: 19,405. Floor area: 209,607 ft².

Water and wastewater together contribute 0.0205 t CO₂e per capita, reflecting the energy intensity of distributed infrastructure serving a dispersed population. Waste from the four closed landfill sites contributes 0.0457 t CO₂e per capita — the second-largest per-capita figure in the corporate portfolio — underscoring the ongoing significance of legacy landfill emissions despite no active waste acceptance at any of the four sites since 2007.

On a floor area basis, total corporate emissions across energy-consuming sectors are 0.0034 t CO₂e per ft², with facilities energy intensity at 0.0900 GJ per ft². Street lights, water, and wastewater do not carry a meaningful floor area intensity given that their operations are not building-dependent, and intensity for those sectors is expressed on a per-capita basis only. These metrics will serve as the baseline against which future corporate energy management and retrofit initiatives are evaluated.

5. Next Steps

With the 2024 corporate and community GHG baselines established, the project advances to the following stages:

- **Target and action review and refinement** — draft corporate and community climate targets will be reviewed in relation to the inventory structure, with emissions estimates quantified where required to support target interpretation and action alignment.
- **Integration of community and stakeholder engagement inputs** — engagement themes will be organized and integrated into the Climate Action Plan so connections between feedback, targets, and actions can be followed.
- **Final Climate Action Plan and supporting documentation** — inventory context, refined targets and actions, and engagement inputs will be assembled into a complete Plan suitable for staff review and Council consideration, and for submission under the PCP program.

The following data gaps remain open and will be incorporated as improved data becomes available: Kalibrate retail fuel sales data to replace the provincial downscaling approach for transportation; local propane and heating oil distributor data to replace per-capita estimates for residential heating; GFL site-specific gas collection efficiency for the solid waste sector; and forest cover quantification using SOLRIS 3.0 to add a sequestration component to the community inventory.