# 2024 Corporate Energy Use and Greenhouse Gas Emissions Report

#LdnOnt ClimateAction

London CANADA

# Land Acknowledgement

We acknowledge that we are gathered today on the traditional lands of the Anishinaabek (ᐊUh-nish-in-ah-bek), Haudenosaunee (Ho-den-no-show-nee), Lūnaapéewak (Len-ah-pay-wuk) and Attawandaron (Add-a-won-da-run).

We acknowledge all the treaties that are specific to this area: the Two Row Wampum Belt Treaty of the Haudenosaunee Confederacy/Silver Covenant Chain; the Beaver Hunting Grounds of the Haudenosaunee NANFAN Treaty of 1701; the McKee Treaty of 1790, the London Township Treaty of 1796, the Huron Tract Treaty of 1827, with the Anishinaabeg, and the Dish with One Spoon Covenant Wampum of the Anishnaabek and Haudenosaunee.

This land continues to be home to diverse Indigenous peoples (First Nations, Métis, and Inuit) whom we recognize as contemporary stewards of the land and vital contributors to society. We hold all that is in the natural world in our highest esteem and give honor to the wonderment of all things within Creation. We bring our minds together as one to share good words, thoughts, feelings and sincerely send them out to each other and to all parts of creation. We are grateful for the natural gifts in our world, and we encourage everyone to be faithful to the natural laws of Creation.

The three Indigenous Nations that are neighbours to London are the Chippewas of the Thames First Nation; Oneida Nation of the Thames; and the Munsee Delaware Nation who all continue to live as sovereign Nations with individual and unique languages, cultures, and customs.

This Land Acknowledgement is a first step towards reconciliation. It is the work of all citizens to steps towards decolonizing practices and bringing our awareness into action. We encourage everyone to be informed about the traditional lands, Treaties, history, and cultures of the Indigenous people local to their region.

# Executive Summary

This document summarizes all significant energy consumption, emissions and costs associated with City of London (City) operations. In addition to the report requirements mandated by the *Electricity Act* and *Ontario Regulation 25/23,* information on all energy-consuming infrastructure (e.g., street lighting, sports fields, water and wastewater operations) as well as fleet fuel has been included to provide a complete picture of energy needs for municipal operations. Report highlights include:

- Energy use trends:
  - The City consumed approximately 173 million “equivalent” kilowatt-hours (ekWh) of energy in 2024. This is a decrease of 13 per cent from 2007 and an increase of 5 per cent from 2023 which is the latest Conservation and Demand Management Plan (CDM) baseline year.
  - Energy use rose across most commodities except diesel, which dropped by 14 per cent since last year.
- Key drivers of change:
  - Electricity use increased due to the addition of the Dingman Creek wastewater pumping station.
  - Natural gas use rose as major projects at the Greenway Wastewater Treatment Plant near completion.
  - Compressed natural gas (CNG) surged with the conversion of the solid waste truck fleet, while diesel dropped by 16 per cent from 2007.
- Energy costs:
  - Total energy cost in 2024 was $20.8 million, up 45 per cent from 2007 and seven per cent from 2023, driven mainly by rising electricity prices.
- Greenhouse gas emissions:
  - Despite four per cent emissions rise in 2024, energy efficiency projects helped limit the increase, emissions remain 51 per cent lower than 2007.
  - Fleet is the second highest source of corporate GHG emissions due to continued fossil fuel use, but efforts are underway through electrification projects and a planned net-zero fleet study.
- Efficiency and savings:
  - In 2024, the City avoided $2 million in energy costs compared to 2023 levels.
  - Since 2007, over $46 million in total avoided costs have been realized through efficiency measures.

The City’s ongoing investment in energy conservation, smart procurement, and operational improvements continues to reduce environmental impact and control utility costs.

# Table of Contents



# 1. Methods and Limitations of Measurement

The City has used EnergyCap since 2007 to track monthly utility bills for municipally owned buildings and facilities, supporting energy monitoring, reporting, and historical analysis. Fleet fuel data is tracked separately through the DX Fleet management system, with monthly fuel consumption now being uploaded to EnergyCap to centralize all energy and commodity data.

Annual energy and GHG reporting excludes leased office space with bundled utility costs, though an estimate is provided in Section 2.4

## 1.1. Service Area Categories and Energy Consumption

The City manages diverse operations of buildings, including office spaces, community centres, arenas, and fire halls which use energy for interior and exterior lighting, heating and cooling of buildings, and energy associated with maintaining recreational services like pools and arenas. The City also manages linear assets such as wastewater treatment facilities, water supply and pumping facilities, traffic lights, and City fleet operations. Ninety per cent of the energy consumed by linear assets is electricity associated with running and maintaining the processes.

For this report, all City services are divided into the following categories to compare their individual contribution to the City's total energy consumption:

- Facility Buildings
- Wastewater Treatment Operations
- Water Supply Operations
- Traffic Signals & Streetlights
- Fleet Operations

## 1.2. Sources and Emission Factors for Greenhouse Gases

Greenhouse gas emissions within City operations are primarily from the consumption of electricity, natural gas, steam, chilled water, diesel, and gasoline. Among these, fleet fuel (diesel, gasoline, not including compressed natural gas), followed by natural gas and steam have the highest emissions per equivalent kWh of fuel as shown in Table 1.

**Table 1 - Commodity Emission Factors - Grams of $CO_2$ equivalent per equivalent kilowatt-hour (kWh)**

| Commodity | Average Emission Factor in 2024[1] |
|---|---|
| Electricity | 65 |
| Natural Gas | 182 |
| Diesel | 262 |
| Gasoline (E-10 blend) | 237 |
| Steam | 143 |
| Chilled Water | 98 |

[1.]The electricity emission factors are based on the Ontario Electricity Average Emissions Factors in the National Inventory Report.

Steam and chilled water are supplied by Enwave Energy Corporation (formerly London District Energy) for City downtown office building locations and its associated emissions have been provided by Enwave.

# 2. Annual Corporate Energy Analysis

In 2024, the City's energy use is categorized by consumption, associated emissions, and costs by commodity. The 2024 energy data are also normalized to London's population to measure improvements in efficiency. This allows the City to demonstrate and relay to Londoners the energy consumed in relationship to service delivery provided by the City. For this report, all the 2024 energy emissions data are compared to the following years:

- 2007 – as this was the first year that City started measuring and monitoring its corporate energy consumption; and
- 2023 – as this is the baseline year for the 2024-2028 CDM Plan.

## 2.1 Total Corporate Energy Consumption

With the use of the EnergyCap software, the City can break down and report annual energy consumption by commodity and by service category.

The following Figure 1 represents the per centage of each commodity in overall energy consumption. This has also been further divided for each service area. Separating municipal services by category allows the City to better understand where progress is being made and where improvements can be targeted.

**Figure 1 – 2024 Energy Consumption by Commodity and Service Area**


Figure 1 shows that in 2024, electricity accounted for the majority (57 per cent) of the City's total energy consumption by commodity, followed by natural gas at 23 per cent. Smaller shares came from diesel fuel, gasoline, steam, chilled water, and CNG. When broken down by service area, buildings were the largest energy users at 37 per cent, followed by wastewater treatment operations at 28 per cent and fleet operations at 19 per cent. This highlights that most energy use is concentrated in essential infrastructure like buildings, water, and wastewater systems.

Figure 2 shows overall energy consumption (ekWh) by municipal service categories over the past five years, compared to the 2007. The last seven-year period is highlighted to show that 2020 and 2021 had the lowest consumption levels due to the pandemic. In contrast, 2024 marks the year when all City operations returned to normal, approaching pre-pandemic levels. In 2024, there was an overall five per cent increase in energy consumption, which is further detailed in Table 2.

**Figure 2 – Total Corporate Energy Consumption by Service Category (ekWhs)**

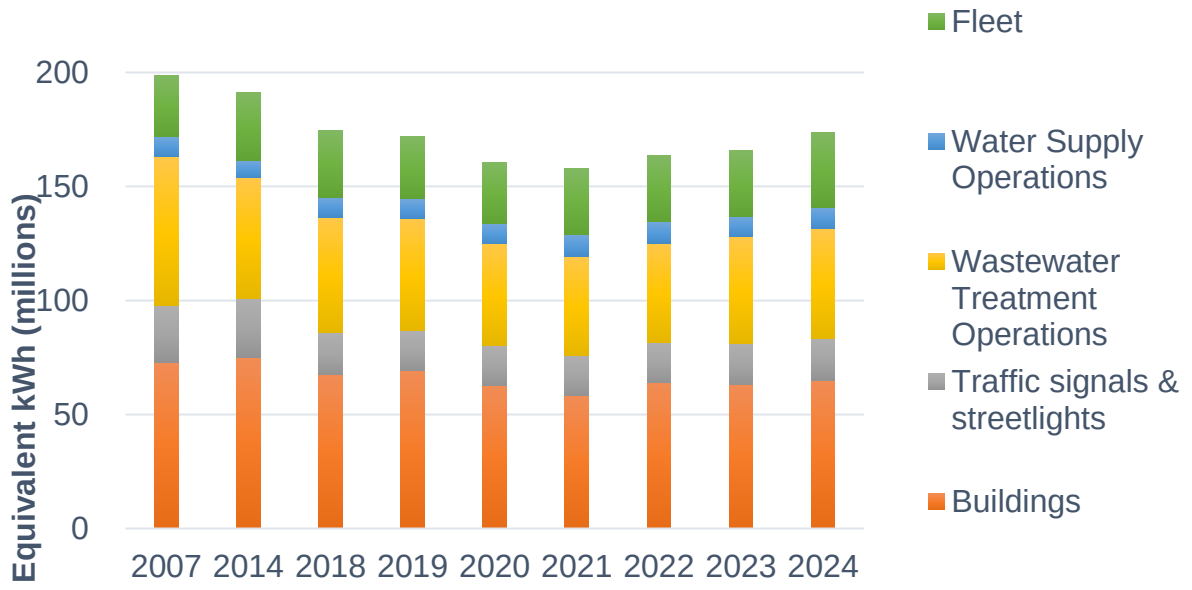



**Table 2 – Total Energy Consumption by Commodity**

| Energy Consumption (ekWh) | 2007 | 2023 | 2024 | Change from 2007 | Change from 2023 |
|---|---|---|---|---|---|
| electricity | 108,328,000 | 98,885,000 | 99,377,000 | -8% | 2.6% |
| natural gas | 58,254,000 | 36,038,000 | 36,857,000 | -37% | 2.3% |
| steam | 3,499,000 | 2,723,000 | 2,785,000 | -20% | 2.3% |
| chilled water | 1,759,000 | 1,385,000 | 1,910,000 | 9% | 37.9% |
| diesel fuel | 20,129,000 | 19,694,000 | 16,944,000 | -16% | -14.0% |
| gasoline | 6,718,000 | 7,417,000 | 7,806,000 | 16% | 5.2% |
| CNG fuel | - | 1,516,000 | 8,057,000 | n/a | 432% |
| **Total** | 198,687,000 | 165,658,000 | 173,736,000 | -13% | 4.9% |

Table 2 shows that in 2024, the City's total energy consumption reached 173 million equivalent kilowatt-hours (ekWhs). Compared to 2007, the year City energy use tracking with EnergyCap started, there is a 13 per cent reduction. However, consumption increased by five per cent from 2023, the baseline year for the City's current Conservation and Demand Management (CDM) Plan. All energy commodities saw an increase from 2023 levels, except diesel, which declined by 14 per cent compared to 2023.

Electricity use rose by two per cent, primarily due to the commissioning of the fully electric Dingman Creek wastewater pumping station. Electricity now accounts for 57 per cent of the City's energy use, with:

- 52 per cent supporting water and wastewater operations,
- 18 per cent for streetlights and traffic signals,
- and 30 per cent for building systems.

Natural gas consumption increased by two per cent in 2024, primarily due to resumed operations at the Greenway wastewater treatment plant. Past reductions were linked to the incinerator shutdown for the ORC project and refurbishment, which limited gas use in early 2024. With both systems now operational, gas use has risen and is expected to return to 2018 levels by 2026. Meanwhile, electricity use at the site is projected to decrease by 150,000 kWh annually starting in 2025. Natural gas remains the City's second-largest energy source, accounting for 23 per cent of total use, with 13 per cent attributed to wastewater treatment.

Steam and chilled water use also rose by two per cent, associated with downtown administrative buildings and increased cooling demands due to hotter weather. Both commodities account for a combined four per cent of total energy use and are supplied by Enwave.

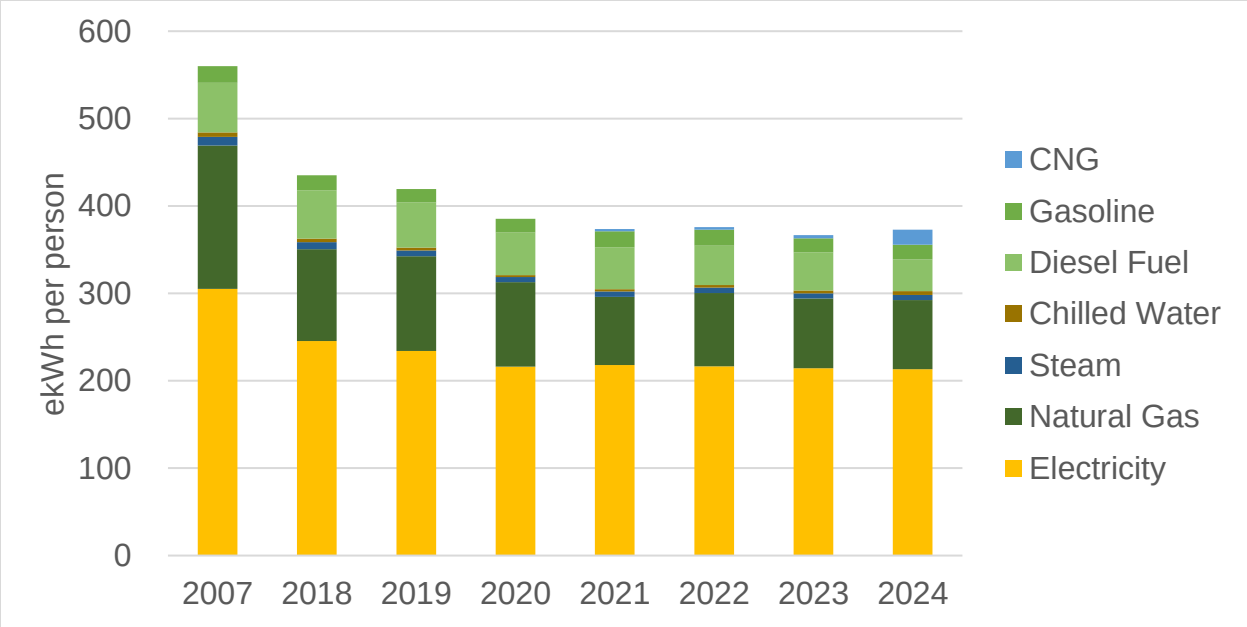
Fleet fuels, including diesel and gasoline, support a range of vehicles and equipment. Compressed natural gas (CNG) use rose sharply by 432 per cent as the City completed its waste collection fleet conversion to CNG trucks and retained 9 diesel trucks.

## 2.2 Total Corporate Energy Consumption Per Capita

The City's energy consumption is directly tied to serving the residents, businesses, and visitors of London. Trends in energy use reflect the level of municipal services provided. As London's population continues to grow, so does the demand for services. Measuring energy use per capita is important to demonstrate the City's progress in energy efficiency despite this growth. Figure 3 presents total energy consumption per capita by energy type, with key findings as follows.

Over the past 16 years, the City has achieved a 33 per cent reduction in corporate energy use per capita compared to 2007. In 2024, energy use per capita rose slightly by one per cent compared to 2023. This increase was largely due to higher CNG use, which was not fully offset by a reduction in diesel use, as explained under Table 2 previously.

**Figure 3 - Corporate Total Energy Consumption per Capita by Commodity Type**




## 2.3 Energy-Related Corporate Greenhouse Gas Emissions

For corporate greenhouse gas emissions as shown in Figure 4, Fleet emerges as the second highest (36 per cent) contributor after buildings (38 per cent). This is due to its heavy reliance on fossil fuels, whereas wastewater operations are approximately 90 per cent dependent on electricity. Since grid electricity has significantly lower emissions compared to fossil fuel combustion, Fleet's impact on overall emissions is significantly higher relative to other service areas.

In 2024, greenhouse gas emissions from energy use were four per cent (800 tonnes) higher than 2023, but 51 per cent lower compared to 2007. It is worth noting that the 2024 energy efficiency projects undertaken across the corporation (Appendix B) have reduced overall emissions by 682 tonnes. Without these projects the increase in emissions would have been 1,400 tonnes year over year.

Figures 5 and 6 show the greenhouse gas emission reduction trend since 2007. Emission reductions have been observed across the corporation since 2007, except for Fleet. Fleet is currently working on a few fleet electrification projects which are listed in Appendix B of this report and Fleet is also undertaking a complete Fleet net-zero emissions pathway study later in 2025.

**Figure 4 2024 Greenhouse Gas Emissions by Commodity and Service Area**

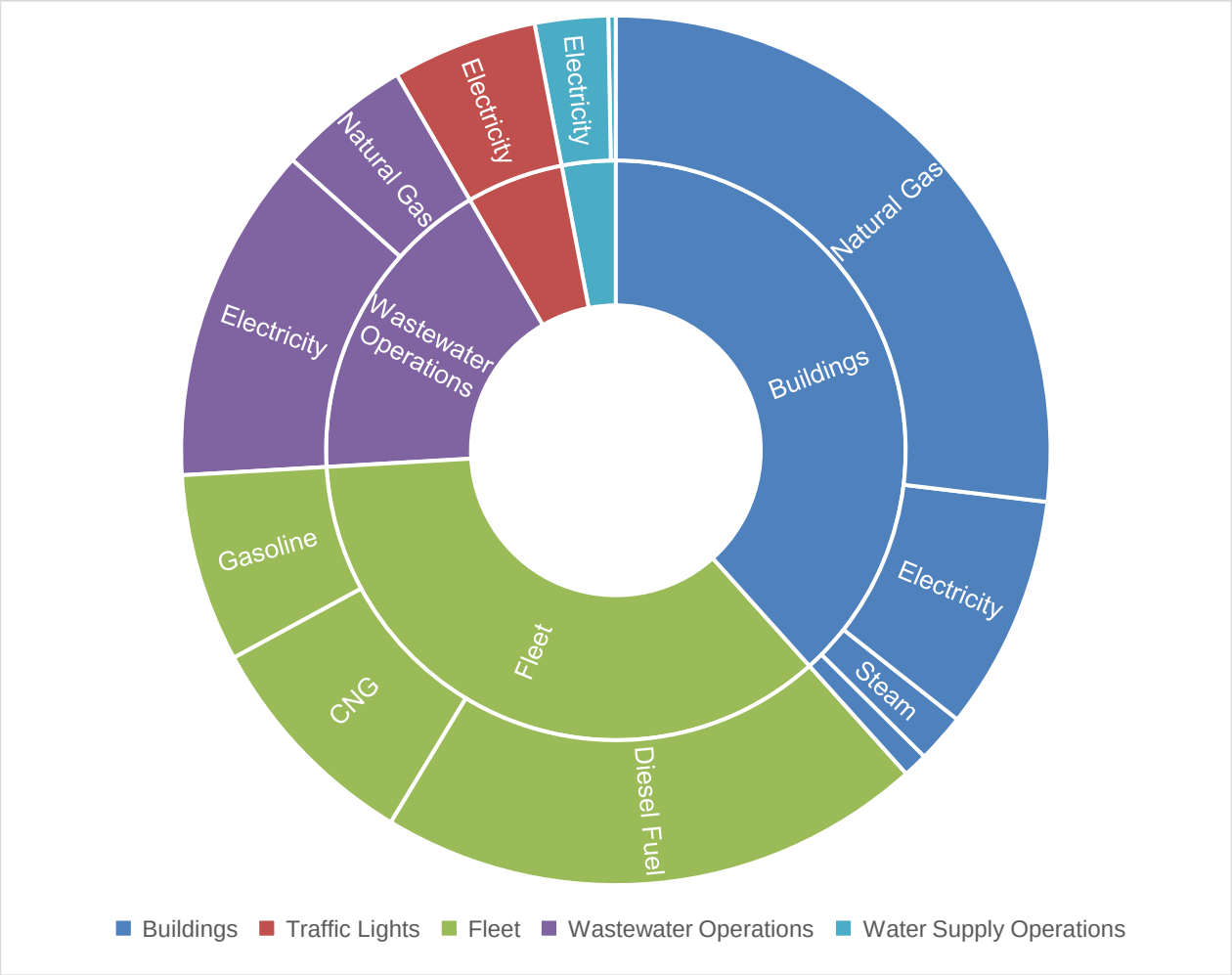



**Figure 5 – Corporate Energy-Related Greenhouse Gas Emissions since 2007 by Service Category**

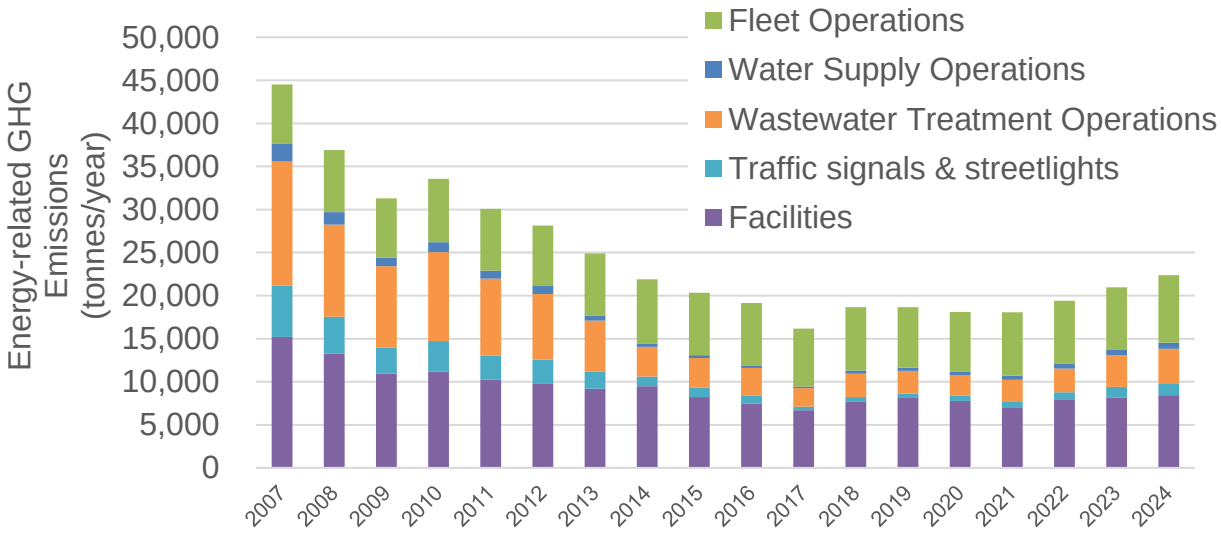


**Figure 6 – Corporate Energy-Related Greenhouse Gas Emissions since 2007 by Energy Commodity**

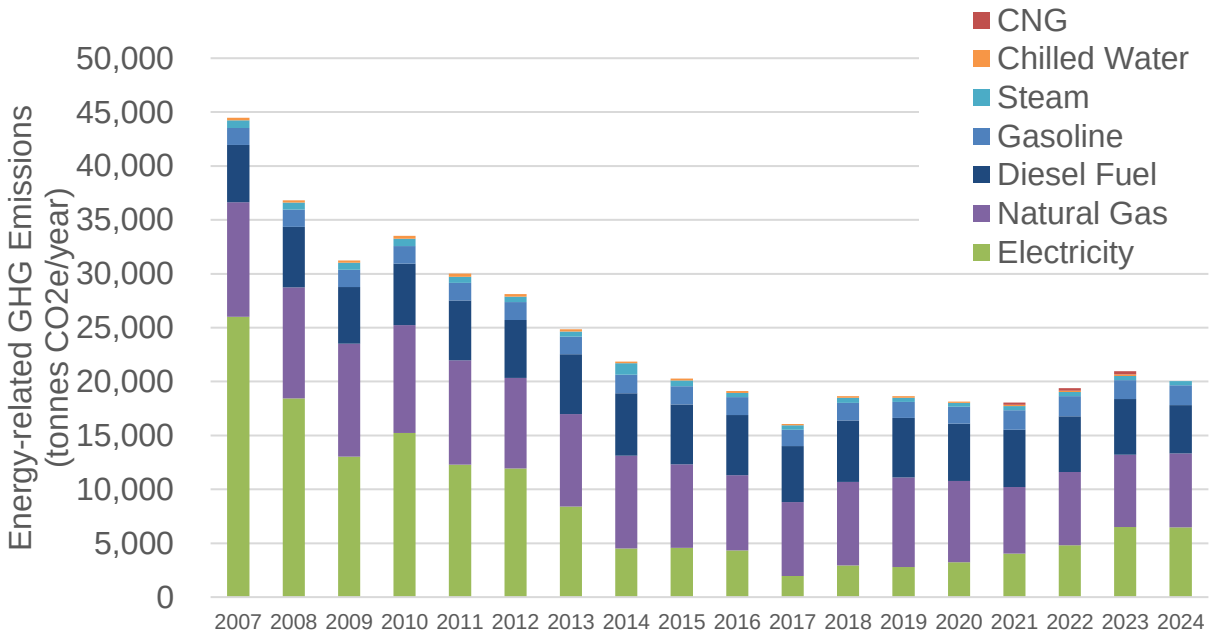
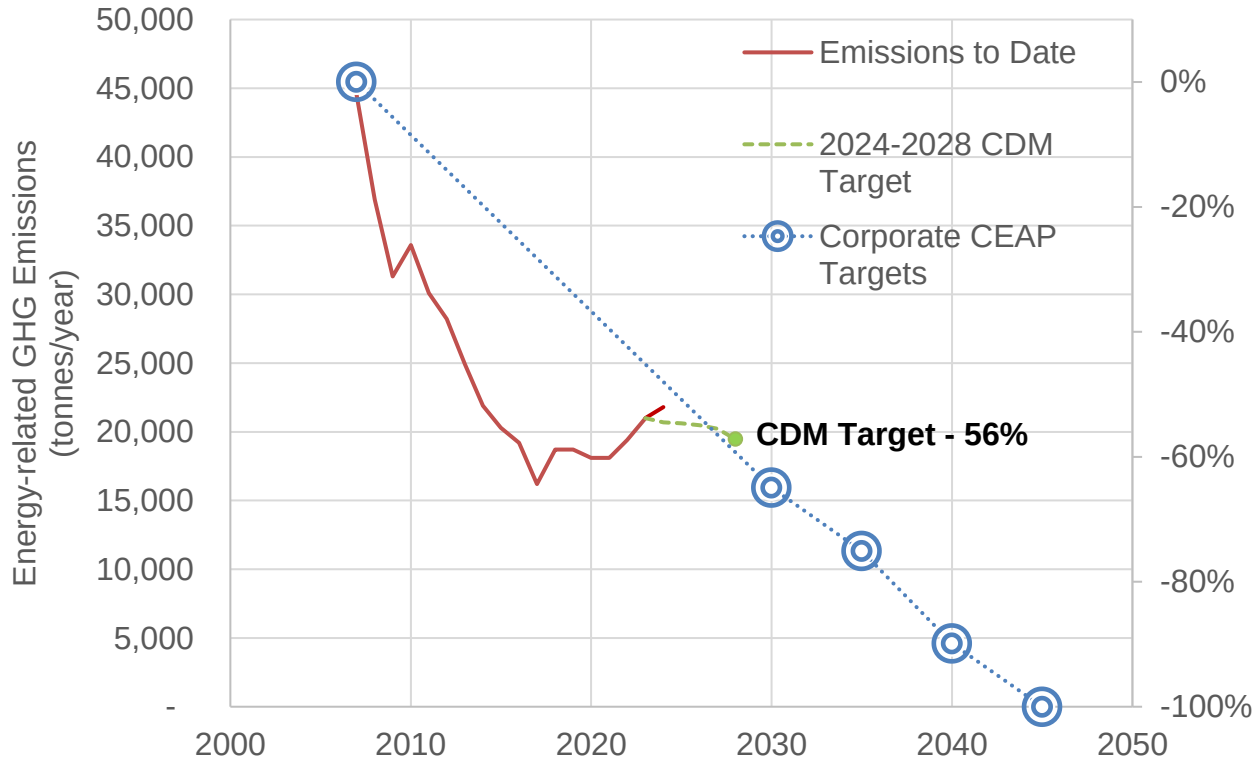



**Figure 7 - Corporate Greenhouse Gas Emissions Target versus Actual**



Since 2007, most emission reductions came from Ontario's cleaner electricity grid and increased conservation efforts, with,

- 84 per cent reduction in electricity-related emissions.
- 46 per cent reduction in steam-related emissions, due solely to corporate actions; and
- 33 per cent reduction in natural gas related emissions, due solely to corporate actions.

However, electricity emissions have more than doubled since 2018, raising the City's 2024 emissions by 3,600 tonnes (21 per cent). Emission factors are projected to rise further by 2030 due to increased natural gas power generation, potentially reversing past gains. The impact of this can be seen in the Figure 7 - corporate greenhouse gas emissions trend to the CEAP and CDM targets.

## 2.4 Leased Spaces

Leased spaces, for which the City does not pay for utility use, make up 7.3 per cent of city-owned spaces. The energy used by these spaces is not included within the City's reported energy use, but it has been estimated to provide an understanding of its potential contribution overall.

The energy intensity in Canada for office buildings in 2018 was reported to be 0.99 gigajoules per square metre ($GJ/m^2$) in a report by Natural Resources Canada (NRCan). Assuming the same in 2024, the City's leased spaces are estimated to have consumed about 4,500,000 ekWh which is almost three per cent (2.5%) of the total corporate energy consumption. Considering the leased space would have the same per unit cost and emission factor as the city owned buildings, leased space energy cost would be approximately $430,000 and would result in about 540 tonnes of greenhouse gas emissions in 2024.

These emissions are accounted for within the reported community GHG emission values for commercial office buildings.

## 2.5 Non-Energy Related Greenhouse Gas Emissions

The City directly controls two major non-energy greenhouse gas (GHG) sources:

- Methane from the W12A and closed landfills
- Nitrous oxide ($N_2O$) from sewage sludge incineration at the Greenway Wastewater Treatment Facility.

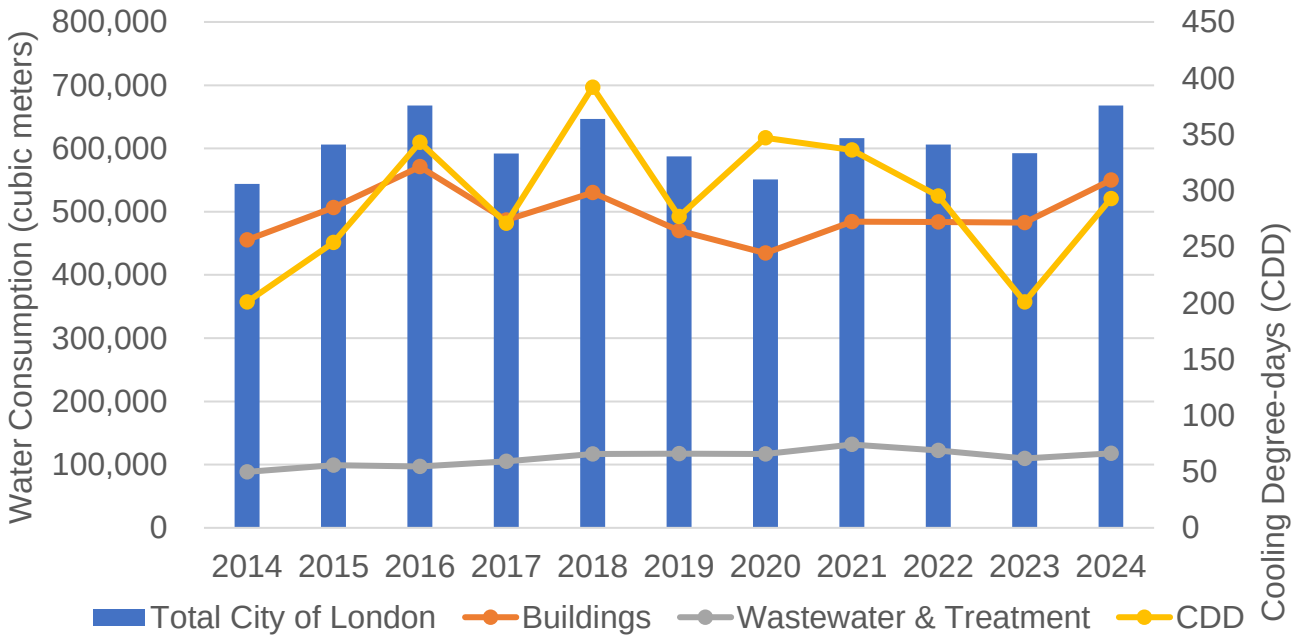
Methane emissions from landfills are significantly higher than energy-related GHGs. Since 2005, emissions have dropped substantially due to the landfill gas collection and flaring system at W12A. In 2024 alone, about 7,665 tonnes of methane (equivalent to 215,000 tonnes of $CO_2$) were captured and destroyed, approximately 66 per cent of total landfill emissions (see Table A-14).

As part of the Compact of Mayors commitment (2015), London now includes nitrous oxide ($N_2O$) emissions in its GHG inventory, which is 310 times more potent than $CO_2$ and is released during sludge incineration and varies based on combustion conditions. Annual stack testing at Greenway since 2008 is used to estimate these emissions, with results shown in Table A-13.

## 2.6 Water Consumption

Water is the City's second-highest utility cost, reaching $2.6 million in 2024, underscoring the need for close monitoring. As shown in Figure 8, water consumption is influenced by summer weather, increasing with higher cooling degree-days (CDD). Municipal buildings account for 80 per cent of total water use, primarily for public and employee needs, while wastewater operations use the remaining 20 per cent, mainly during summer months for flushing and cleaning holding tanks at pumping stations.

**Figure 8 – Total Water Consumption (cubic meters per year)**




Total water consumption has been reduced by 10 per cent from 2007 to 2024, but during the same period, water cost increased by more than double due to the changes made to water billing between 2012 and 2014.

## 2.7 Corporate Energy Cost

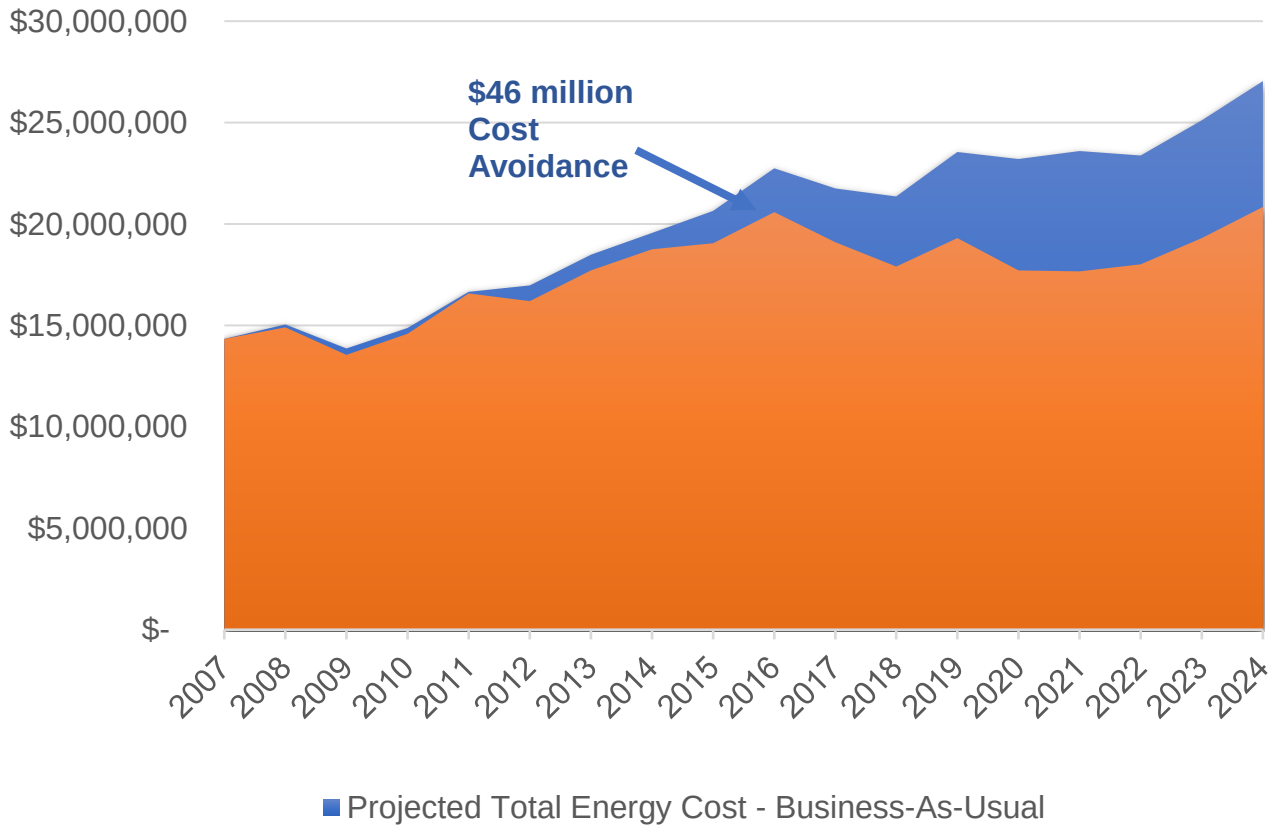
The City's corporate energy management practices including strategic procurement, building retrofits, and conservation measures help reduce energy use and offset rising market costs. In 2024, total energy costs reached $20.8 million, 45 per cent higher than

in 2007 and eight per cent higher than in 2023, with electricity prices remaining a major cost driver (see Table 11 in Appendix A)

Increases in natural gas and gasoline fuel costs are also related to carbon pricing. However, the impact of this was only five per cent and the major influence is from the global increase in commodity costs.

Energy efficiency and conservation measures have delivered significant financial benefits to the City. By comparing per capita energy use to 2007 levels, it's estimated the City avoided $6 million in energy costs in 2024 alone, and over $46 million cumulatively since 2007 (Figure 9). These efforts have helped offset rising energy prices and reduced impacts on the operating budget. Despite increased fossil fuel costs, per capita energy costs declined from $54 in 2016 to $44 in 2024, highlighting the effectiveness of ongoing cost avoidance and energy management initiatives.

**Figure 9 - Actual and Avoided Energy Costs**



### 2.7.1 Utility Cost Forecast

To assist the City of London in preparing forecasts for long-term budgetary considerations, Blackstone has provided the following commodity price escalation estimates in Table 3.

**Table 3 Commodity Cost Forecast 2024-2028**

| Commodity | 2025 | 2026 | 2027 | 2028 | 2029 |
|---|---|---|---|---|---|
| **Electricity** | 3.0% | 2.8% | 2.7% | 2.8% | 2.5% |
| **Natural gas** | -15.2% | -6.9% | -2.4% | -3.6% | 1.8% |
| **Steam** | -2.4% | -2.9% | -2.4% | 0.6% | 2.7% |
| **Water** | 1.5% | 2.6% | 4.8% | 3.9% | 3.9% |

# 3. Conclusion

Overall, in 2024, the focus shifted from purely reducing energy use to making decisions with a climate change perspective. Numerous internal studies are underway to identify net-zero opportunities at individual facilities. Detailed energy consumption and cost numbers and projects underway are listed in Appendix C.

In line with the City's declared climate emergency, there is a focus of future development, infrastructure, corporate energy planning and community engagement on improving the City's resiliency and striving for favorable climate change outcomes.

The City will always require energy to operate its facilities, vehicles, and operations, but strategic management of energy usage, emissions, and investment in renewable technologies will help reduce energy use and progress towards becoming carbon neutral.

# Appendix A – Energy Consumption and Cost Tables

## Total Energy Consumption

**Table A-1 – Consumption (equivalent kilowatt-hours) by Commodity 2023-2024**

| Energy Commodity | 2023 | 2024 | Change since 2023 | % Change |
|---|---|---|---|---|
| Electricity | 96,885,000 | 99,377,000 | 2,492,000 | 2.6% |
| Natural Gas | 36,038,000 | 36,857,000 | 819,000 | 2.3% |
| Steam | 2,723,000 | 2,785,000 | 62,000 | 2.3% |
| Chilled Water | 1,385,000 | 1,910,000 | 525,000 | 37.9% |
| Diesel Fuel | 19,694,000 | 16,944,000 | (2,750,000) | -14.0% |
| Gasoline | 7,417,000 | 7,806,000 | 389,000 | 5.2% |
| CNG | 1,516,000 | 8,057,000 | 6,541,000 | 432% |
| **Total** | **165,658,000** | **173,736,000** | **8,078,000** | **4.9%** |

**Table A-2 – Consumption (equivalent kilowatt-hours) by Commodity 2007 – 2024**

| Energy Commodity | 2007 | 2024 | Change since 2007 | % Change |
|---|---|---|---|---|
| Electricity | 108,328,000 | 99,377,000 | (8,951,000) | -8% |
| Natural Gas | 58,682,000 | 36,857,000 | (21,397,000) | -37% |
| Steam | 3,499,000 | 2,785,000 | (714,000) | -20% |
| Chilled Water | 1,759,000 | 1,910,000 | 151,000 | 9% |
| Diesel Fuel | 20,129,000 | 16,944,000 | (3,185,000) | -16% |
| Gasoline | 6,718,000 | 7,806,000 | 1,088,000 | 16% |
| **Total** | **199,115,000** | **165,679,000** | **(33,008,000)** | **-13%** |

## Energy Consumption by Municipal Service Categories

**Table A-3 Consumption (equivalent kilowatt-hours) by Municipal Service Categories 2023 – 2024**

| Service Category | 2023 | 2024 | Change since 2023 | % Change |
|---|---|---|---|---|
| Facility Buildings | 63,168,000 | 65,026,000 | 1,858,000 | 2.9% |
| Traffic Signals & Streetlights | 18,116,000 | 18,266,000 | 150,000 | 0.8% |
| Wastewater Treatment Operations | 46,640,000 | 48,105,000 | 1,465,000 | 3.1% |
| Water Supply Operations | 9,108,000 | 9,533,000 | 425,000 | 4.7% |
| Fleet Operations | 28,627,000 | 32,807,000 | 4,180,000 | 14.6% |
| **Total** | **165,659,000** | **173,737,000** | **8,078,000** | **4.9%** |

**Table A-4 – Consumption (equivalent kilowatt-hours) by Municipal Service Categories 2007 – 2024**

| Service Category | 2007 | 2024 | Change since 2007 | % Change |
|---|---|---|---|---|
| Facility Buildings | 73,225,000 | 65,026,000 | (7,942,000) | -11% |
| Traffic Signals & Streetlights | 24,762,000 | 18,266,000 | (6,496,000) | -26% |
| Wastewater Treatment Operations | 65,594,000 | 48,105,000 | (17,320,000) | -26% |
| Water Supply Operations | 8,687,000 | 9,533,000 | 846,000 | 10% |
| Fleet Operations | 26,847,000 | 32,807,000 | 5,960,000 | 22% |
| **Total** | **199,115,000** | **173,737,000** | **(24,952,000)** | **-13%** |

## Energy Consumption per Capita by Municipal Service Categories

**Table A-5 Consumption (equivalent kilowatt-hours) Per Capita 2023 – 2024**

| Service Category | | | Change since 2023 | Change since 2023 |
|---|---|---|---|---|
| | **2023** | **2024** | **Variance** | **% Change** |
| Facility Buildings | 140 | 140 | (0.2) | -0.2% |
| Traffic Signals & Streetlights | 40 | 39 | (0.9) | -2.2% |
| Wastewater Treatment Operations | 103 | 103 | 0.0 | 0.0% |
| Water Supply Operations | 20 | 20 | 0.3 | 1.5% |
| Fleet Operations | 63 | 70 | 7.1 | 11.2% |
| **Total** | **367** | **373** | **6.3** | **1.7%** |
| London's Population | 452,000 | 523,000 | 71,000 | 15.7% |

**Table A-6 Consumption (equivalent kilowatt-hours) Per Capita 2007-2024**

| Service Category | | | Change since 2007 | Change since 2007 |
|---|---|---|---|---|
| | **2007** | **2024** | **Variance** | **% Change** |
| Facility Buildings | 206 | 140 | (66) | -32% |
| Traffic Signals & Streetlights | 70 | 39 | (31) | -44% |
| Wastewater Treatment Operations | 185 | 103 | (81) | -44% |
| Water Supply Operations | 24 | 20 | (4) | -16% |
| Fleet Operations | 76 | 70 | (5) | -7% |
| **Total** | **561** | **373** | **(187)** | **-33%** |
| London's Population | 355,000 | 523,000 | 168,000 | 47.7% |

## Energy Costs per Capita by Municipal Service Categories

### Table A-7 – Energy Costs Per Capita 2023- 2024

| Service Category | | | Change from 2023 | Change from 2023 |
|---|---|---|---|---|
| | **2023** | **2024** | **Variance** | **% Change** |
| Facility Buildings | $14.11 | $15.35 | $1.24 | 9% |
| Traffic Signals & Streetlights | $7.07 | $7.54 | $0.47 | 7% |
| Wastewater Treatment Operations | $11.31 | $11.71 | $0.40 | 4% |
| Water Supply Operations | $2.22 | $2.19 | $(0.03) | -1% |
| Fleet Operations | $8.00 | $7.93 | $(0.07) | -1% |
| **Total** | **$42.47** | **$44.72** | **$2.02** | **5%** |
| London's Population | 452,000 | 523,000 | 71,000 | 15.7% |

### Table A-8 – Energy Cost Per Capita 2007- 2024

| Service Category | | | Change since 2007 | Change since 2007 |
|---|---|---|---|---|
| | **2007** | **2024** | **Variance** | **% Change** |
| Facility Buildings | $ 14.31 | $15.35 | $1.04 | 7% |
| Traffic Signals & Streetlights | $ 5.29 | $7.54 | $2.25 | 43% |
| Wastewater Treatment Operations | $ 12.59 | $11.71 | $(0.88) | -7% |
| Water Supply Operations | $ 2.07 | $2.19 | $0.13 | 6% |
| Fleet Operations | $ 6.15 | $7.93 | $1.79 | 29% |
| **Total** | **$ 40.41** | **$44.72** | **$4.32** | **11%** |
| London's Population | 355,000 | 523,000 | 168,000 | 47.7% |

## Greenhouse Gas Emissions

### Table A-9 – Greenhouse Gas Emissions (tonnes/year) by Commodity

| Commodity | 2007 | 2024 | Change since 2007 | % Change |
|---|---|---|---|---|
| Electricity | 26,000 | 6,460 | (19,540) | -75% |
| Natural Gas | 10,650 | 6,880 | (3,770) | -35% |
| Diesel Fuel | 5,290 | 4,460 | (830) | -16% |
| Gasoline | 1,590 | 1,850 | 260 | 16% |
| Steam | 700 | 400 | (300) | -43% |
| Chilled Water | 240 | 200 | (40) | -17% |
| CNG | | 1,538 | 1,538 | |
| **Total** | **44,500** | **21,800** | **(22,700)** | **-51%** |

### Table A-10 – Greenhouse Gas Emissions (tonnes/year) by Service Category

| Service Category | 2007 | 2024 | Change since 2007 | % Change |
|---|---|---|---|---|
| Facility Buildings | 15,210 | 8,280 | (6,930) | -46% |
| Traffic Signals & Streetlights | 5,940 | 1,190 | (4,750) | -80% |
| Wastewater Treatment Operations | 14,400 | 3,820 | (10,580) | -73% |
| Water Supply Operations | 2,080 | 660 | (1,420) | -68% |
| Fleet Operations | 6,880 | 7,848 | 968 | 14% |
| **Total** | **44,500** | **21,800** | **(22,700)** | **-51%** |

**Table A-11 – Energy Costs by Commodity**

| Commodity | 2007 | 2023 | 2024 | Change since 2007 | Change since 2023 |
|---|---|---|---|---|---|
| Electricity | $9,289,000 | $13,215,000 | $14,201,000 | 53% | 7.5% |
| Natural Gas | $2,350,000 | $1,854,000 | $1,755,000 | -25% | -5.3% |
| Steam | $273,000 | $257,000 | $313,000 | 15% | 21.8% |
| Chilled Water | $251,000 | $257,000 | $308,000 | 23% | 19.8% |
| Diesel Fuel | $1,518,000 | $2,472,000 | $1,978,000 | 30% | -20.0% |
| Gasoline | $664,000 | $1,024,000 | $1,076,000 | 62% | 5.1% |
| CNG fuel | - | 105,000 | $569,000 | n/a | 441.9% |
| **Total** | **$14,345,000** | **$19,184,000** | **$20,000,000** | **41%** | **5.3%** |

**Table A-12 - Summary of Stack Test Results for $N_2O$ Emissions from the Greenway Wastewater Treatment Plant's Sewage Sludge Incinerator**

| Year | Measured average $N_2O$ emissions g/s | Measured average $N_2O$ emissions kg/hour | Estimated annual $N_2O$ emissions tonnes/year | Estimated annual CO2e tonnes/year |
|---|---|---|---|---|
| **2008** | 0.1 | 0.4 | 3.1 | 800 |
| **2009** | 1.1 | 3.9 | 28.3 | 7,500 |
| **2010** | 1.1 | 3.9 | 28.0 | 7,400 |
| **2011** | 1.2 | 4.4 | 31.9 | 8,400 |
| **2012** | 1.0 | 3.5 | 25.5 | 6,800 |
| **2013** | 0.2 | 0.6 | 4.4 | 1,200 |
| **2014** | 1.1 | 4.1 | 29.3 | 7,800 |
| **2015** | 1.0 | 3.7 | 26.4 | 7,000 |
| **2016** | 0.3 | 1.1 | 7.4 | 2,000 |
| **2017** | 2.4 | 8.6 | 65.3 | 17,300 |
| **2018** | 1.7 | 6.0 | 42.6 | 11,300 |
| **2019** | 1.5 | 5.5 | 32.9 | 8,700 |
| **2020** | 0.8 | 3.0 | 16.4 | 4,400 |
| **2021** | 0.5 | 1.6 | 9.4 | 2,500 |
| **2022** | 1.2 | 4.4 | 26.2 | 6,900 |
| **2023** | 1.6 | 5.7 | 34.2 | 9,100 |
| **2024** | 1.4 | 5.0 | 15 | 4,000 |

**Table A-13 - Summary of Landfill Gas Flaring at W12A Landfill**

| Year | Methane Flared (tonnes) | Equivalent $CO_2$ Reduced (tonnes) | Cumulative Methane Flared (tonnes) | Cumulative $CO_2e$ Reduced (tonnes) |
|---|---|---|---|---|
| **2004** | 852 | 24,000 | 852 | 24,000 |
| **2005** | 1,980 | 55,000 | 2,830 | 79,000 |
| **2006** | 1,800 | 50,000 | 4,630 | 129,000 |
| **2007** | 1,440 | 40,000 | 6,070 | 169,000 |
| **2008** | 1,850 | 52,000 | 7,910 | 221,000 |
| **2009** | 2,280 | 64,000 | 10,200 | 285,000 |
| **2010** | 2,320 | 65,000 | 12,520 | 350,000 |
| **2011** | 2,660 | 74,000 | 15,180 | 424,000 |
| **2012** | 3,240 | 91,000 | 18,420 | 515,000 |
| **2013** | 4,520 | 127,000 | 22,930 | 642,000 |
| **2014** | 4,170 | 117,000 | 27,100 | 759,000 |
| **2015** | 4,300 | 120,000 | 31,400 | 879,000 |
| **2016** | 5,990 | 168,000 | 37,380 | 1,047,000 |
| **2017** | 6,380 | 179,000 | 43,760 | 1,226,000 |
| **2018** | 4,290 | 120,000 | 48,060 | 1,346,000 |
| **2019** | 5,250 | 147,000 | 53,300 | 1,493,000 |
| **2020** | 6,790 | 190,000 | 60,100 | 1,683,000 |
| **2021** | 7,860 | 220,000 | 67,950 | 1,903,000 |
| **2022** | 7,670 | 215,000 | 75,600 | 2,118,000 |
| **2023** | 7,450 | 209,000 | 83,050 | 2,327,000 |
| **2024** | 7,665 | 215,000 | 90,715 | 2,542,000 |

# Appendix B – Past Energy Projects

| Service Area | 2024 Energy Conservation Projects | GHG Reductions (tonnes/year)/comments |
|---|---|---|
| Facility Buildings | IESO Strategic Energy Management Program | The Facilities Energy Manager completed IESO's SEM training, gaining tools to help advance the City's strategic energy management efforts. |
| Facility Buildings | Parking lot lighting, RTUs, Boilers, and circulation pump replacements at Kiwanis | 17 |
| Facility Buildings | Parking lot lighting at Kinsmen Arena | 8 |
| Facility Buildings | Parking lot lighting upgrade at Stronach Arena | 11 |
| Facility Buildings | Boiler and water heater upgrades at Fire Hall # 10 | 8 |
| Facility Buildings | Boilers and circulation pump replacement at Dearness | 16 |
| Wastewater Treatment Operations | All electric Dingman Creek Pump Station completed and in operation | Avoided fossil fuel emissions |
| Wastewater Treatment Operations | Greenway – Organic Rankine Cycle Project | 212 (savings will be realized in 2025 as ORC returns to normal operations after being shut down due to incinerator refurbishments) |
| Fleet Operations | Solid waste trucks conversion from diesel to CNG | 150 (100 tonnes savings associated with 14 trucks conversion in 2024) |
| Fleet Operations | 8 cargo vans and 13 low-duty, medium-duty vehicles added to Fleet | 60 |
| Fleet Operations | 20 new corporate EV charging stations | Part of green fleet planning. Doesn't have direct emissions reduction. |

| Service Area | 2024 Energy Conservation Projects | GHG Reductions (tonnes/year)/comments |
|---|---|---|
| Water Supply Operations | Demand Response for SERPS & ARVA | 200 (annual savings associated with peak grid emission factor) |
| | **Total** | **682** |

# Appendix C – 2025-2028 Planned and Proposed Energy Projects

| Service Area | 2025-2028 Energy Conservation Projects | GHG Reductions |
|---|---|---|
| Facility Buildings | Adelaide Ops Centre HVAC upgrade (2025) | 17 |
| Environmental & Infrastructure Services | IESO Strategic Energy Management Program (SEM) | The Corporate Energy Management Engineer will complete IESO's SEM training, gaining tools to help advance the City's strategic energy management efforts. |
| Facility Buildings | Argyle Arena rooftop-hybrid heating (2028) | 26 |
| Facility Buildings | Carling Arena – Rooftop Hybrid Heat Pump (2028) | 49 |
| Facility Buildings | Carling Heights Optimist Community Centre and Pool – HVAC upgrades (2026) | 144 |
| Facility Buildings | City Hall – Hybrid Heating (2027) | 13 |
| Facility Buildings | Fire Station # 4 & 6 Rooftop Hybrid Heat Pump (2026) | 14 |
| Facility Buildings | Fire Station # 8 & 10 – Outdoor Hybrid heat pumps (2027) | 25 |
| Facility Buildings | Fire Station #12 & Emergency operations centre – Hybrid heap pumps (2027) | 27 |
| Facility Buildings | Hamilton Road Seniors Community Centre – Rooftop Hybrid Heat Pump (2026) | 25 |
| Facility Buildings | Lambeth Arena and community centre – HVAC upgrades (2028) | 113 |

| Service Area | 2025-2028 Energy Conservation Projects | GHG Reductions |
|---|---|---|
| Facility Buildings | Oakridge arena – Rooftop Hybrid Heat Pump (2027) | 17 |
| Facility Buildings | Ray Lanctin Arena – Rooftop Hybrid Heat Pump (2028) | 54 |
| Facility Buildings | South London Community Centre – HVAC upgrades and Heat pumps (2027) | 51 |
| Facility Buildings | Tourism London Information Centre – HVAC upgrades and heat pumps (2027) | 17 |
| Facility Buildings | Kinsmen Arena – Deep energy retrofit (2026) | 167 |
| Fleet Operations | Proposed conversion of 6 internal combustion engine mid-size vehicles to EVs and handheld electric equipment trials (trimmers, kombi tool, blowers, etc) | 40 |
| Facility Buildings | Earl Nichols Arena – Deep energy retrofit (2027) | 246 |
| Facility Buildings | Proposed – 2% reduction in natural gas from EMS optimization projects (On-going) | 120 |
| Fleet Operations | Proposed – 2% reduction in gasoline and 2% in overall other Fleet fuels due to additional fuel switching, optimization and awareness strategies (On-going) | 110 |
| Traffic signals & Streetlights | Planned and Proposed – Phase 3 LED lighting project | 165 |
| Wastewater Treatment Operations | Proposed – Solar PV at Vauxhall and Pottersburg PCP | 184 – Peak emissions reductions |
| Water Supply Operations | Proposed – Solar PV at Arva | 50 – Peak emissions reductions |

| Service Area | 2025-2028 Energy Conservation Projects | GHG Reductions |
|---|---|---|
| Water Supply Operations | Demand Response Participation for Arva and SERPS | 200 – Peak emissions reduction |
| **Total** | | **1,611** |