Energy Conservation & Demand Management Plan 2024 – 2029

Municipality of Brighton

Prepared by: BLUE SKY Energy Engineering & Consulting Inc. with AMO/LAS

Our Commitment to Energy Conservation

Message from the Mayor of Brighton

Managing our energy resources efficiently is not just a responsibility; it is a cornerstone of our commitment to the community we serve.

The Municipality of Brighton is committed to delivering projects and programs that will improve our energy efficiency and reduce the impact we have on the environment. Through our Energy Conservation and Demand Management Plan, we are dedicated to proactively identifying and implementing cost-effective measures, that promote energy conservation and generate savings.

Our 5-year Municipal Energy Management Plan articulates our vision and unwavering dedication to energy conservation:

> *The Municipality of Brighton will demonstrate leadership in managing our energy use to minimize costs, showcase environmental stewardship, and enhance services delivered to our residents.*

We are committed to upholding this vision by reducing energy consumption and greenhouse gas emissions across our operations. By doing so, we not only fulfill our environmental obligations but also set a standard of fiscal prudence and sustainability leadership in our community.

Together with the Council and our dedicated municipal staff, I wholeheartedly endorse this plan and pledge our full support for its diligent implementation.

Sincerely,

Brian Ostrander
Mayor of Brighton

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1.0 Introduction

1.1 Overview

This report presents the 2024 - 2029 Energy Conservation and Demand Management (CDM) Plan for the Municipality of Brighton. The plan will assist the Municipality in achieving reductions in overall energy use and the related Greenhouse Gas (GHG) emissions, across its existing operations, and it has been prepared to comply with Ontario Regulation 25/23 of the Electricity Act.

Energy management has become increasingly important to Ontario Municipalities as the cost of energy continues to rise and reducing greenhouse gas (GHG) emissions becomes more critical. In line with the Regulation's requirements, this plan builds on previous CDM plans and includes the following key elements:

- Summary of the Municipality's energy baseline, recent energy performance and GHG emissions, and renewable energy systems.
- Brighton conservation successes.
- Corporate goals, objectives and strategic priorities for managing energy use.
- A specific, actionable, and prioritized inventory of energy conservation and demand management measures planned over the next five years supporting the 2029 conservation goals.
- A commitment from the Municipality's senior management.

The Municipality of Brighton has developed this plan to formalize and consolidate its energy management efforts and intends to revisit and update this plan every five years, as required under the regulation.

1.2 Background – Ontario Regulation 25/23 of the Electricity Act

In 2008, Ontario's 445 municipalities spent $680 million on electricity, equating to 4.3% of Ontario's consumption (Power Application Group 2008). In response, Ontario's Green Act was created to expand renewable energy generation, encourage energy conservation and promote the creation of green energy jobs (Ministry of Energy 2014). Under the Green Energy Act, Ontario Regulation 397/11 was introduced for public agencies – municipalities, municipal service boards, universities, colleges, hospitals and school boards to apply the Act's principles. This Regulation is now part of the Electricity Act, Ontario Regulation 25/23.

Under this Regulation, public agencies must report annual energy consumption and greenhouse gas emissions for buildings that have heating and cooling and for operations related to water and sewer

services. Public agencies must also create an Energy Conservation and Demand Management Plan (CDM) which requires updating every five years. The CDM plan must include goals for increasing energy efficiency, measures for obtaining the goals, and timelines for implementation.

Energy management is important to the Municipality of Brighton because it results in reduced costs through better equipment maintenance, facility upgrades, and cost-effective planning. Responsible energy management promotes green development and sets a good example for the community.

1.3 Overview of Municipal Facilities

The Regulation states that energy use and greenhouse gas emissions must be reported for buildings or facilities the Municipality owns or leases that:

> "(a) the building or facility is heated or cooled and the public agency is issued the invoices and is responsible for making the payments for the building or facility's energy consumption; or
>
> (b) the operation is related to the treatment of water or sewage, whether the building or facility is heated or cooled, and the public agency is issued the invoices and is responsible for making the payments for the building or facility's energy consumption.
>
> (O. Reg. 25/23 s. 6)."

The Municipality of Brighton has eleven (11) facilities and eight (8) locations related to water and wastewater treatment and pumping. In addition to the mandatory facilities that are required by the regulation, the Municipality also tracks the energy use of streetlighting. The facilities are listed below in Table 1.1 with their address, age and size.

Table 1.1: Corporate Facilities Included in the Plan

Facilities		Year Built	Size (ft^2)
1	**King Edward Arena and Community Centre** 75 Elizabeth Street	Arena - 1976, Community Cen.- 2009	Arena - 31,500, Community Cen. - 6,500
2	**Municipal Office** 35 Alice Street	1982	13,704
3	**South Public Works Garage and Public Works Office** 67 Sharp Road	1991, 2 additions ~2005, ~2011	Garage - 10,332, Offices - 6,208
4	**North Fire Hall** 1256 County Road 27	1995, addition 2012	5,386
5	**North Public Works Garage** 71 Chatten Road	1958	5,337
6	**South Fire Hall** 20 Elizabeth Street	1970	4,527
7	**Health Services Building** 170 Main Street	1990, addition 2019	12,269
8	**Bay St. Marina & Washrooms** 3 Bay Street East	2004	270
9	**Memorial Park Stage & Washrooms** 60 Main Street	2018	930
10	**Water Treatment Plant** 406 County Road 26	2005	3,875
11	**Parks and Recreation Garage** 32 Pinnacle Street	2005	3,200
12	**Hilton Hall Heritage Centre** 50 Chatten Road	1861	1,367
13	**Water Pollution Control Plant** 100 County Road 64	1962	n/a
14	**Water Pollution Control Plant - Constructed Wetland** 71 County Road 64	1999	n/a
15	**Sewage Pumping Station** 7 Harbour Street	1975; Renovated 2023	n/a
16	**Sewage Pumping Station** 820 Bayshore Road	2003	n/a
17	**Booster Station** 232 Presqu'ile Parkway	2003	n/a
18	**Pumping Chamber** 105 Dundas Street	Circa 1975	n/a
19	**Pumping Chamber** 1 Lakeview Heights	Circa 2010 – 2015	n/a
Additional Tracked Accounts			
20	**Street Lighting**		

1.4 Renewable Energy Sources

Currently, the Municipality operates several photovoltaic panels. The largest are a series of solar panels on the roof of the Codrington Community Centre located at 2992 Highway 30. The solar panels consist of an 11.96 kW photovoltaic rooftop system, which was installed by Essex Energy Systems in 2012.

Figure 1.1 Solar Panels - Codrington Community Centre

Solar panels are also used to power crosswalks, speed cameras and digital speed signs throughout the municipality.

2.0 Our Accomplishments

Brighton staff have delivered numerous projects improving energy efficiency at Municipal facilities over the last 5 years. This work has resulted in 2.7% energy savings and an 8.3% reduction in greenhouse gas (GHG) emissions over the last 5 years (2023 results compared to 2019). A few of the completed projects include:

- High efficiency hot water tank replacement at the Health Services Building
- Purchase of three electric vehicles (EV) and the installation of an EV station
- Installation of a high efficiency heat recovery ventilator (HRV) at the Municipal Offices
- Recycling program under facilities department
- Upgrade of Harbour St. Lift Station:
    - Variable Frequency Drive (VFD) installation
    - LED lighting
    - New HVAC system
    - New Sewage pumps

Figures 2.1 to 2.4 below, illustrate several of the noted systems upgrades which contributed to energy savings at the Municipality.

Figure 2.1 High Efficiency Hot Water Tank at Health Services Building

Figure 2.2 New Electric Vehicles and Charging Stations

Figure 2.3 Heat Recovery Ventilator (HRV) at the Municipal Offices

Figure 2.4 Upgrades to Harbour Street Lift Station

3.0 Energy Consumption and Emissions

3.1 Energy Baseline

An energy baseline was previously established from which annual energy consumption is compared and tracked. This information has been compiled back to 2011, however in the earlier years, data was unavailable for several large facilities. In order to properly compare consumption data from 2023 and review trends, the year 2019 was selected as the energy baseline.

The following dataset in Table 3.1 below represents the Municipality's baseline (2019) and current level (2023) of energy performance.

Table 3.1: Municipality of Brighton Energy Consumption Compared to Baseline

Account Centre	Energy Type	2019	2023	% Change vs 2019
Facilities	Electricity (kWh)	1,898,035	1,940,759	2.3%
	Natural Gas (m3)	112,352	99,412	-11.5%
	Propane (L)	28,049	24,364	-13.1%
	Subtotal (ekWh)	**3,257,502**	**3,140,425**	**-3.6%**
Streetlights	Electricity (kWh)	452,245	469,635	3.8%
Total Energy	**(ekWh)**	**3,709,747**	**3,610,060**	**-2.7%**
Total GHG Emissions	**(tCO2e)**	**327.3**	**300.2**	**-8.3%**

Note: ekWh (equivalent kWh) is a calculated value using the thermal energy content of Natural Gas and Propane to convert consumption to units of "equivalent" kWh for comparison.

The Municipality achieved a 2.7% reduction in energy use and an 8.3% reduction in greenhouse gas (GHG) emissions over a five-year period leading up to 2023. The following section outlines the specific energy use by facility both historically and currently (2023).

3.2 Corporate Energy Consumption Breakdown

In order to track progress, it is important to review past performance. The following are a series of images that illustrate the energy consumption for individual facilities and the Municipality as a whole. Brighton primarily uses electricity as an energy source; however, six (6) facilities consume natural gas and currently three (3) use propane.

Figure 3.1, 3.2 and 3.3 below illustrate the electricity, natural gas and propane consumption for 2023 at various facilities throughout the Municipality.

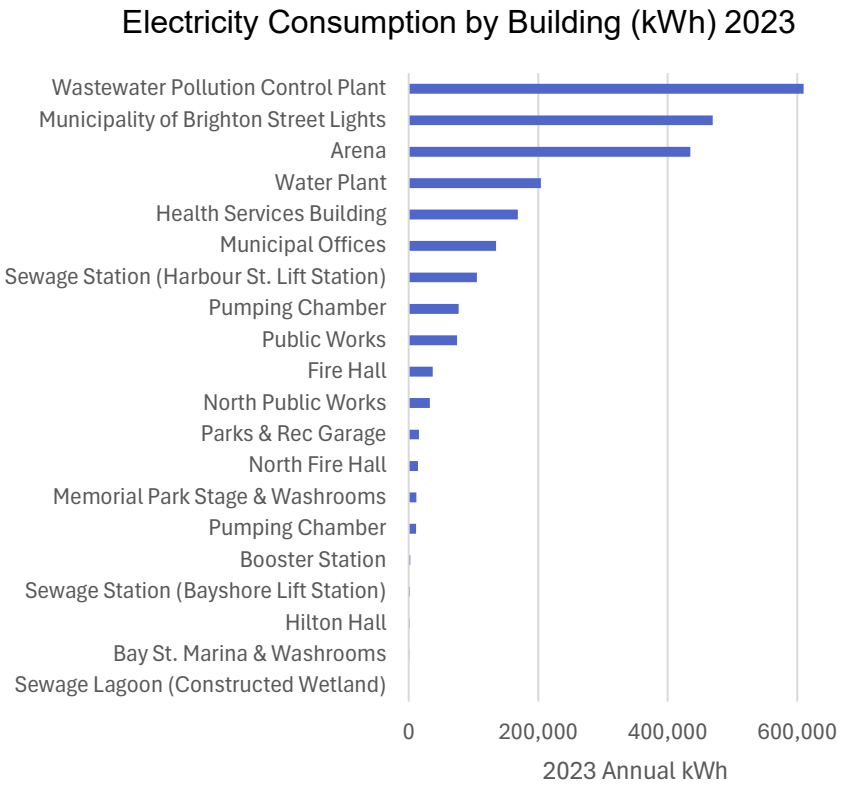

Figure 3.1 Electricity Consumption 2023 by Facility

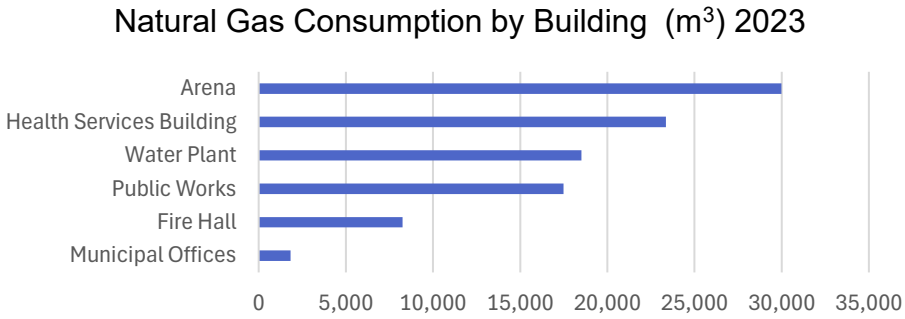

Figure 3.2 Natural Gas Consumption 2023 by Facility

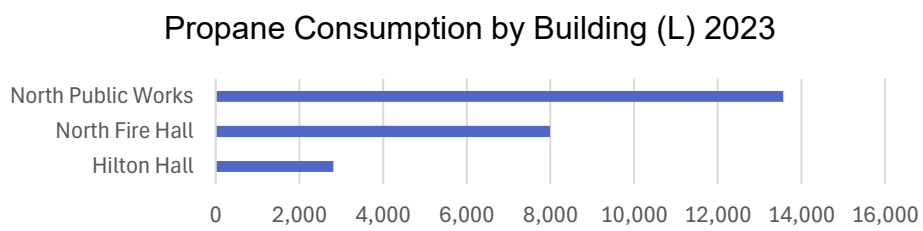

Figure 3.3 Propane Consumption 2023 by Facility

In order to compare different energy sources, the natural gas and propane consumption was converted to equivalent kWh (ekWh). Figures 3.4 below shows the total annual Municipal energy consumption broken down by fuel source for 2023.

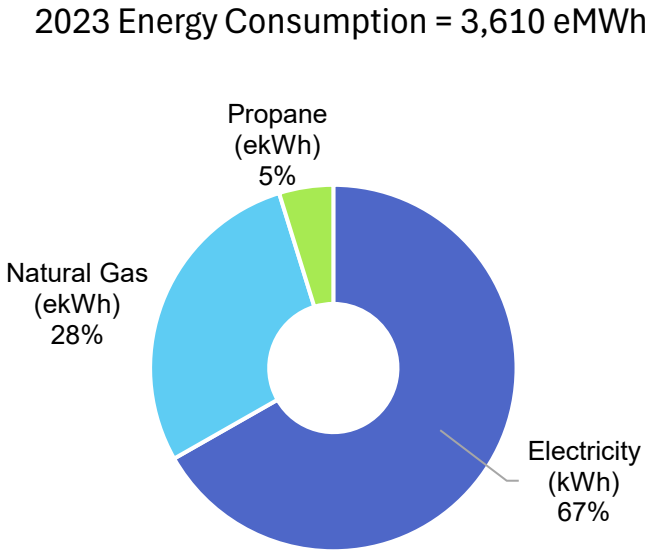

Figure 3.4 Total Municipal Energy Consumption by Source 2023

In 2023, the Municipality energy consumption was led by electricity use (67%) followed by natural gas (28%) and propane (5%). To reduce energy consumption alone would mean that electricity would be a primary focus, however, as will be noted in the subsequent section, natural gas and propane are responsible for a significant portion of greenhouse gas emissions. As such, the reduction of natural gas consumption (and propane consumption) is equally important to this plan.

Figure 3.5 below illustrates the total energy consumption breakdown over a number of years (2019 – 2023).

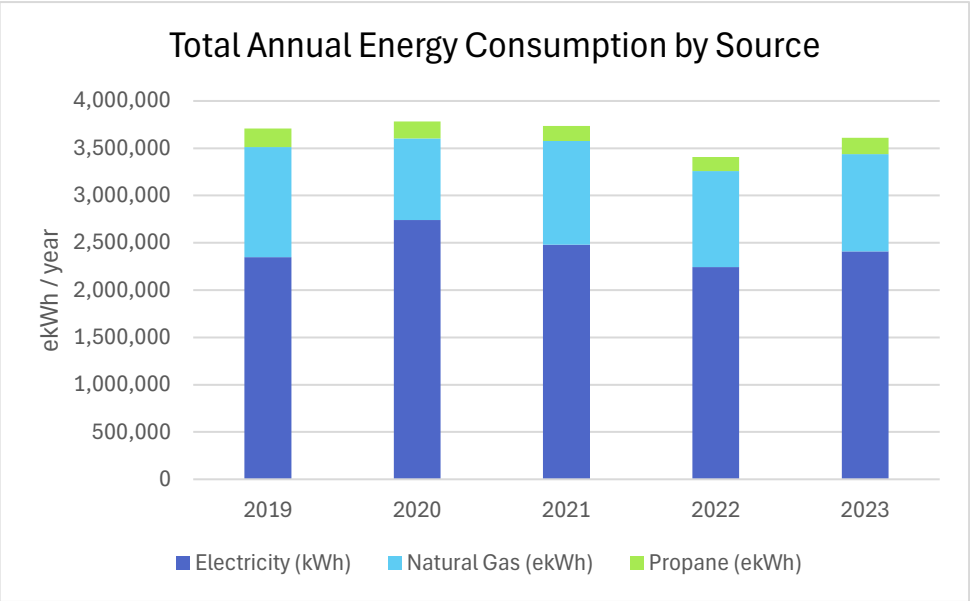

Figure 3.5 Total Municipal Annual Energy Consumption 2019 to 2023

Figure 3.5 illustrates the 2.9% improvement in energy consumption between 2019 and 2023 achieved by the Municipality.

The following six facilities were responsible for 80% of the total energy consumption (all fuel types combined) in 2023. Table 3.2 shows their energy consumption along with the facility energy intensity and benchmark.

Table 3.2: Facilities with Highest Energy Consumption

Facility Name	Energy Consumption 2023 (ekWh)	Energy Intensity 2023 (ekWh/ft^2)
Arena	744,613	23.6
Wastewater Pollution Control Plant	609,854	N/A
Street Lighting	469,635	N/A
Health Services Building	409,762	33.4
Water Plant	395,296	N/A
Public Works Building	255,264	15.4

3.3 Carbon Emissions

Carbon emissions resulting from energy consumption at the Municipality will vary based on the type of fuel being used. The rate of greenhouse gas production varies by energy source and is directly affected by emissions conversion factor along with Brighton's consumption. Emission conversion factors used in this report were published values for Ontario and can vary year to year based on how clean the energy generation is. The GHG emissions were calculated for the Municipality and are broken down by fuel source in Figure 3.6 below.

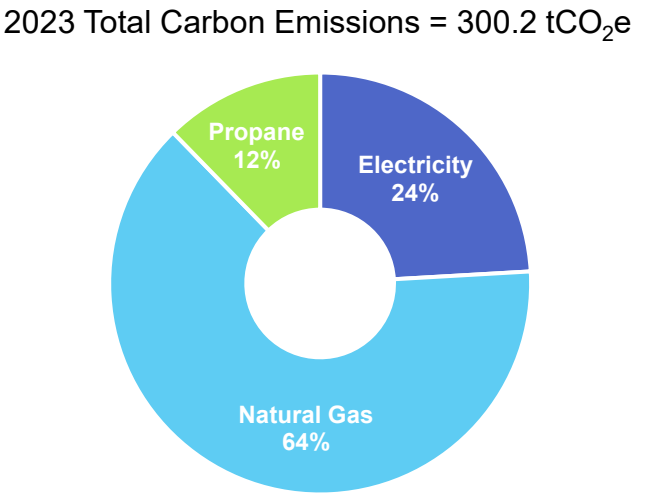

Figure 3.6 Total Annual GHG Emissions for 2023 by Energy Source

Note that although natural gas provides 24% of the total energy for the Municipality, it is responsible for 64% of the GHG emissions. Propane also has a disproportionate impact on carbon emissions compared to electricity. Although fossil fuels are typically a less expensive energy source than electricity, carbon reduction is an important reason why energy management plans must continue to focus on the wise and efficient use of fossil fuels. Figure 3.7 below shows GHG emissions annually from 2011 to 2023.

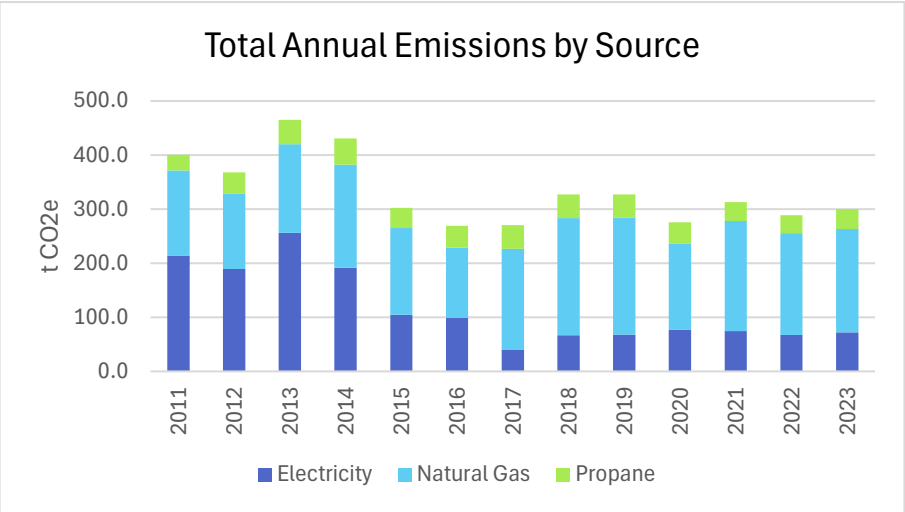

Figure 3.7 Total Annual GHG Emissions from 2011 to 2023 by Energy Source

As noted previously, the years 2011 to 2014 exclude the energy consumed by street lighting. In addition, several facilities (Health Services Building and two pumping chambers) were not tracked until 2017. Therefore, the data from years before these dates is underreported.

Comparing the five years between 2019 and 2023, as illustrated in Figure 3.7, the Municipality achieved an 8.3% reduction in carbon emissions.

The emissions conversion factors changed significantly for electricity production in Ontario in 2014 when the last of the coal fired electricity generation plants were shut down. For this reason, as is evident in Figure 3.7, the generation of GHGs from electricity consumption dropped significantly in 2015.

Figure 3.8 below illustrates the GHG emissions generated from energy consumption at each facility for 2023.

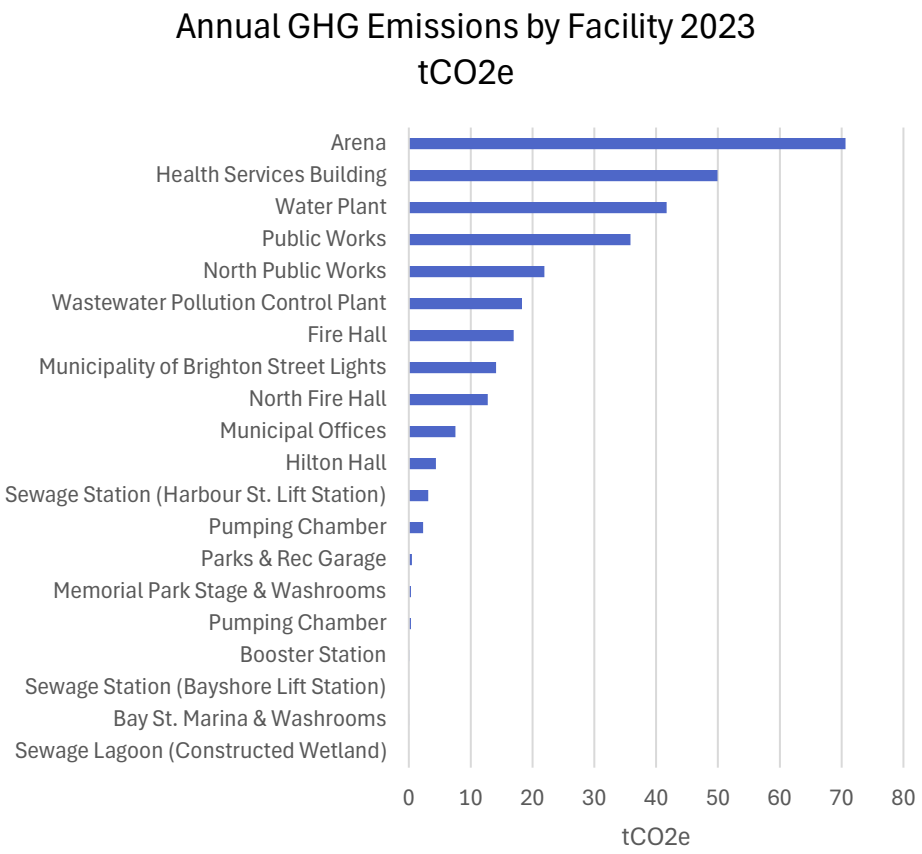

Figure 3.8 Total Annual GHG Emissions in 2023 by Facility

The Arena, Health Services Building, Water Plant, Public Works and the North Public Works facilities create over 70% of the total energy related Municipal emissions.

4.0 Energy Strategy, Goals and Targets

4.1 Goals and Targets

The Municipality of Brighton has established the following goals and targets for this plan. They were developed within the context of the Municipality's current energy performance, factoring in savings from projects identified in the plan. The energy targets cover this Plan's five-year period (2024 – 2029).

Goals

1. Energy conservation will be integrated into the decision-making process for the capital planning processes (end of equipment life – asset management).
2. Energy information will become more visible to Municipal staff and measurement and monitoring will become more frequent.
3. Consistent standards will be applied across all Municipal buildings.

Target

By 2029, the Municipality of Brighton will reduce energy use by 5%, measured against the total energy use in 2023 (3,610,060 ekWh).

4.2 Conservation Strategy

In order to ensure continuous progress towards Brighton's energy conservation goals, the following focus areas will be undertaken as part of the conservation strategy over the next 5-year period.

Capital Planning – Energy Efficient Guidelines and Standards

The Municipality will develop an energy efficiency standard for future capital purchases covering various topics including:

- Heating systems - boilers, packaged rooftop units,
- Refrigeration and cooling systems – space cooling, refrigerators, freezer chests
- Ice Plant equipment for Arenas
- Building Controls

Given that natural gas and propane significantly impact the carbon footprint of the Municipality, energy efficient options and fuel switching where available, will be considered.

Building and Operational Improvements (Upgrades)

Energy savings will be delivered through the identification and implementation of projects which reduce energy consumption across the facility portfolio. The majority of the projects fall into one of the following categories:

- Heating systems - boilers, packaged rooftop units,
- Refrigeration and cooling systems – space cooling, refrigerators, freezer chests
- Ice Plant equipment for Arenas
- Air Handling
- Building and Process Controls
- Building Envelope
- Lighting
- Domestic Hot Water

Measurement, Monitoring and Tracking

The Municipality will continue to improve energy measurement, monitoring and energy tracking systems to improve visibility of energy information. This will support capital decision making, improve opportunity identification, and support continuous improvement. Key facilities will be closely reviewed and measured to identify opportunities through energy audits, infrared imaging, and through improved submetering.

5.0 Action Plan

A critical part of any plan is the detailed list of specific actions needed to achieve the desired goals and objectives. The Municipality of Brighton has developed a key project list which will help ensure the Municipality meets energy reduction goals and targets. The list of actions shown in Table 5.1 below are outlined by facility, strategic focus (as outline in section 4.1), description, person/department responsible and forecasted timing.

Municipality of Brighton

Table 5.1 Corporate Energy Management Plan - Action List

No.	Facility	Strategic Focus	Project Type	Description	Responsible	Forecasted Timing
1	All	Capital Planning	Standards	Develop energy efficient purchasing standards and guidelines for key infrastructure: Heating systems, pumping, cooling system, ice plant equipment, equipment controls, building envelope.	John Gooding - Capital Infrastructure / Danny Blatenszky - Facilities	2024 Onward
2	All	Capital Planning	Standards	Develop natural gas reduction strategy to support capital planning.	John Gooding - Capital Infrastructure / Danny Blatenszky - Facilities	2024 Onward
3	All	Measure, Monitor, Track	Standards	Develop energy measurement / monitoring policy for Municipal Facilities.	Danny Blatenszky - Facilities	2024 Onward
4	Various	Measure, Monitor, Track	Study	Facility energy audits completed for key buildings	Danny Blatenszky- Facilities	2024 Onward
5	Wastewater Treatment Plant	Measure, Monitor, Track	Metering	Ensure new systems include appropriate energy submetering	Adam Walraven - WW Supervisor	2027
6	New Firehall	Measure, Monitor, Track	Metering	Ensure new systems include appropriate energy submetering	Gene Thompson - Fire Chief	RFP Q3 2024 SOC 2025 Q1-Q2
7	New Arena	Measure, Monitor, Track	Metering	Ensure new systems include appropriate energy submetering	Vicki Hallam - Parks & Rec	2030 - 2032
8	Various	Measure, Monitor, Track	Metering	Install energy meters as per policy on all large systems	Danny Blatenszky - Facilities	2028
9	Various	Measure, Monitor, Track	Study (Archflash)	Inspect all indoor power panels of key buildings using infrared camera to identify heat; loads locations and any thermal bridging opportunities.	Danny Blatenszky - Facilities	2025
10	Water Plant	Measure, Monitor, Track	Study	Install programable thermostats for all unit heaters. Review temperature setpoints for unoccupied buildings and consider dropping setpoints back after hours.	Mark Alexander - Water Supervisor	2024 Onward
11	Wastewater Treatment Plant	Upgrades	Lighting	New LED Lighting	Leslie Whiteman - Director PW / Adam Walraven - WW Supervisor	2027

No.	Facility	Strategic Focus	Project Type	Description	Responsible	Forecasted Timing
12	Wastewater Treatment Plant	Upgrades	Pumping	Upgrade chemical pumps, flash mixers	Leslie Whiteman - Director PW / Adam Walraven - WW Supervisor	2027
13	Wastewater Treatment Plant	Upgrades	Aeration	Install energy efficient aeration system	Leslie Whiteman - Director PW / Adam Walraven - WW Supervisor	2027
14	Streetlights	Upgrades	Lighting	Upgrade LED to 'dark light' compliant standards	Danny Blatenszky - Facilities	2027
15	Arena	Upgrades	Controls	Setback temperature programing for Natural Gas boiler in shoulder seasons	Vicki Hallam - Parks & Rec	2024 Onward
16	Arena	Upgrades	Controls	Ensure that the boiler is set to summertime setpoints once heating is no longer required. Consider alternative heating methods for DHW in summer (electric tankless) to allow the natural gas boiler to be shut down completely.	Vicki Hallam - Parks & Rec	2024 Onward
17	Arena	Upgrades	Controls	Review Ice Plant controls to determine if floating head pressure setpoints have been applied to compressors. Upgrade controls as necessary.	Vicki Hallam - Parks & Rec	2024 Onward
18	Arena	Upgrades	Lighting	Review and replace any remaining T8 lighting fixtures with LED	Vicki Hallam - Parks & Rec	N/A
19	Water Plant	Upgrades	Controls	Review setpoints on radiant natural gas heaters. Program temperature setbacks wherever possible.	Mark Alexander - Water Supervisor	2024
20	Water Plant	Upgrades	Lighting	Upgrade any remaining lighting to LED	Mark Alexander - Water Supervisor / Danny Blatenszky - Facilities	Lighting replaced w/ LED as needed
21	Health Services	Upgrades	HVAC	Install two new high efficiency AC commercial units	Danny Blatenszky - Facilities	2025
22	Health Services	Upgrades	DHW	Replacement of existing aging natural gas DHW boiler with new efficiency electric	Danny Blatenszky - Facilities	2030
23	Health Services	Upgrades	Lighting	Accelerate upgrade of existing lighting to LED	Danny Blatenszky - Facilities	2030
24	Public Works - 67 Sharp Road	Upgrades	Air Handling	Review and upgrade as necessary destratification fans. Ensure they are running continuously in heating season.	Danny Blatenszky - Facilities	2032
25	Fire Hall Station #1	Upgrades	Air Handling	Install destratification in bay areas	Gene Thompson - Fire Chief	With New Build 2025
26	Fire Hall Station #1	Upgrades	Controls	Review airflow and balancing of building - seal doors from office to garage bays.	Gene Thompson - Fire Chief	With New Build 2025

No.	Facility	Strategic Focus	Project Type	Description	Responsible	Forecasted Timing
27	Fire Hall Station #1	Upgrades	Building Envelope	Increase roof insulation	Gene Thompson - Fire Chief	With New Build 2025
28	Fire Hall Station #1	Upgrades	Lighting	Replace any remaining fluorescent or other fixtures with LED	Gene Thompson - Fire Chief	With New Build 2025
29	Fire Hall Station #1	Upgrades	Building Envelope	Replace window and door seals and weatherstripping as needed.	Gene Thompson - Fire Chief	With New Build 2025
30	Fire Hall Station #2	Upgrades	Air Handling	Install destratification in bay areas	Gene Thompson - Fire Chief	2026
31	Fire Hall Station #2	Upgrades	Lighting	Replace any remaining fluorescent or other fixtures with LED	Gene Thompson - Fire Chief	2025, or when grants are available or partner w/ other departments
32	Municipal Offices	Upgrades	Controls	Rebalance HVAC system to improve heat/cool distribution and to reduce infiltration.	Danny Blatenszky - Facilities	In Progress
33	Municipal Offices	Upgrades	Controls	Audit controls on electric baseboards and replace any older model thermostats with new programable models.	Danny Blatenszky - Facilities	2028
34	Municipal Offices	Upgrades	HVAC	Replace older packaged rooftop units at end of life with high efficiency upgrades.	Danny Blatenszky - Facilities	2025
35	Municipal Offices	Upgrades	Electrical Systems	Install new higher efficiency 600A service.	Danny Blatenszky - Facilities	2025 - 2026
36	All Facilities	Upgrades	Electrical Systems	De-energize maintenance on electrical systems to identify issues and upgrade wiring as necessary.	Danny Blatenszky - Facilities	2025 - 2026

6.0 Conclusion

Through application of the CDM Plan, the Municipality of Brighton has an opportunity to reduce our energy use and related greenhouse gas emissions within our operations. This report builds on the accomplishments of previous plans and will not only drive improvements to energy efficiency, but will help build awareness, and show our commitment to protecting the environment for future generations. The Municipality of Brighton is committed to this plan and will be proactive in identifying and delivering cost-effective energy conservation projects to demonstrate good stewardship of the natural environment.