



# Energy Conservation & Demand Management Plan 2024

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# 1. Regulatory Update

**O. Reg. 397/11: Conservation and Demand Management Plans** was introduced in 2013. Under this regulation, public agencies were required to report on energy consumption and greenhouse gas (GHG) emissions and develop Conservation and Demand Management (CDM) plans the following year.

Until recently, O. Reg. 397/11 was housed under the Green Energy Act, 2009 (GEA). On December 7, 2018, the Ontario government passed Bill 34, Green Energy Repeal Act, 2018. The Bill repealed the GEA and all its underlying Regulations, including O. Reg. 397/11. However, it re-enacted various provisions of the GEA under the Electricity Act, 1998.

As a result, the conservation and energy efficiency initiatives, namely CDM plans and broader public sector energy reporting, were re-introduced as amendments to the Electricity Act. The new regulation is now called **O. Reg. 507/18: Broader Public Sector: Energy Conservation and Demand Management Plans (ECDM)**.

As of January 1, 2019, O. Reg. 397/11 was replaced by O. Reg. 507/18, and BPS reporting and ECDM plans are under the Electricity Act, 1998 rather than the Green Energy Act, 2009.

As of February 23, 2023, O. Reg. 507/18 was replaced by **O. Reg. 25/23, and BPS reporting and ECDM Plans** are under the Electricity Act, 1998 rather than the Green Energy Act, 2009.

## 2. Executive Summary

The purpose of this Energy Conservation and Demand Management (ECDM) Plan from Cambridge Memorial Hospital is to outline specific actions and measures that will promote good stewardship of our environment and community resources in the years to come. The Plan will accomplish this, in part, by looking at future projections of energy consumption and reviewing past conservation measures.

In keeping with Cambridge Memorial Hospital's vision of Creating healthier communities, together, we acknowledge how important sustainability is to community health, this ECDM outlines how Cambridge Memorial Hospital will reduce overall energy consumption, operating costs and greenhouse gas emissions. By following the measures outlined in this document, we will be able to continue to improve our efficiency in providing compassionate service to the community we serve. This ECDM Plan is written in accordance with O. Reg. 25/23 of the recently amended Electricity Act, 1998.

Through past conservation and demand initiatives, Cambridge Memorial Hospital has achieved the following results from 2019-2023:

- 7,657,541 kwh reduction in electricity use

Today, utility and energy related costs are a significant part of overall operating costs. In 2023:

- Energy Use Intensity (EUI) Index was 73.78 ekWh/sq. ft.
- Energy-related emissions equaled 8,130 tCO<sub>2</sub>e

To obtain full value from energy management activities, Cambridge Memorial Hospital will take a strategic approach to fully integrate energy management into its business decision-making, policies, and operating procedures. This active management of energy-related costs and risks will provide a significant economic return and will support other key organizational objectives.

With this prominent focus on energy management, by implementing recommended initiatives, Cambridge Memorial Hospital can expect to achieve the following targets by 2029:

- 16% reduction in electricity consumption
- 19% reduction in natural gas consumption
- 19% reduction in GHG emissions

## Cambridge Memorial Hospital's Energy Performance and Path Forward

The results and the progress of the ECDM activities implemented over the past five years, and the projected impact of the new ECDM Plan is presented in the graph below.

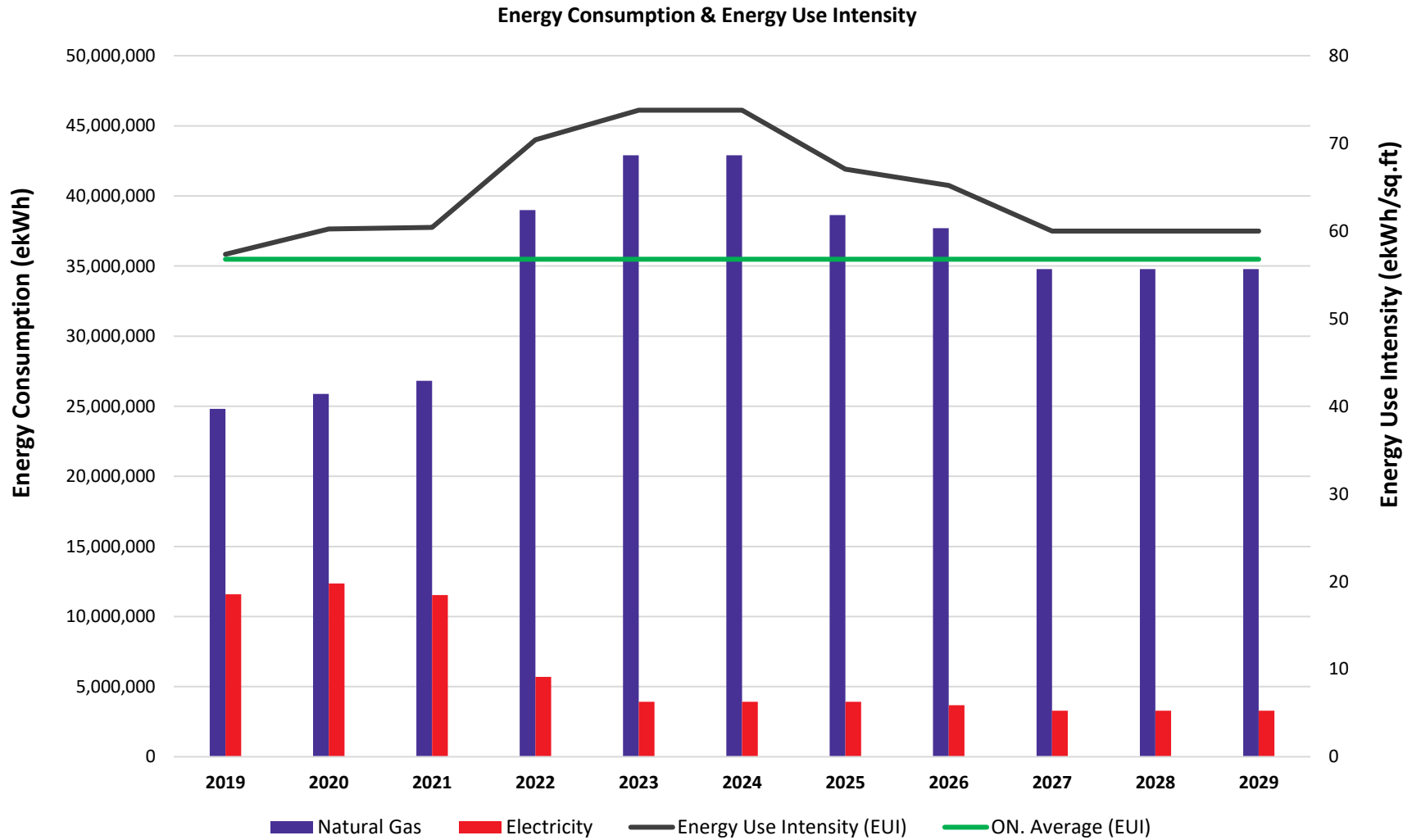


Figure 1. Energy Consumption Trends & Projections

### 3. About Cambridge Memorial Hospital



*Figure 2. Cambridge Memorial Hospital*

Cambridge Memorial Hospital proudly traces its roots to 1888, when the Region of Waterloo’s first community hospital, known then as Galt Hospital, opened its doors to treat patients in a localized health care setting.

Sixty-five years later, in 1953, a brand-new facility was built on the current Coronation Blvd. location, which was better suited to serve the major communities of Galt, Hespeler, Preston and the Township of North Dumfries. At that time, the hospital was also renamed South Waterloo Memorial Hospital in honour of the local women and men that gave their lives for their country. As local boundaries changed and communities merged to become the City of Cambridge, the hospital adopted the new name of Cambridge Memorial Hospital. Prior to 2014, the last major expansion of the hospital was in the early 1970's when the Wing B patient care facility was built.

In 2020, Cambridge Memorial Hospital proudly opened a new patient care wing, featuring the latest hospital building codes and technologies designed to enhance the safety and well-being of both staff and patients. This new wing represents our commitment to providing high-quality healthcare in a safe and modern environment. With the timing of COVID-19 coming to the region a few months later, these safeguards proved invaluable to keeping outbreaks at a minimum during the pandemic. Once the 50-year-old Wing B refurbishment is finished, it will boast the same advanced technologies and safety features as Wing A.

Cambridge Memorial Hospital Facility Information	
Facility Name	Cambridge Memorial Hospital
Type of Facility	Healthcare Centre
Address	700 Coronation Blvd, Cambridge, ON N1R 3G2
Gross Area (Sq. Ft)	635,000
Average Operational Hours in a Week	168
Number of Beds	200
Number of Floors	5

*Table 1. Cambridge Memorial Hospital Facility Information*

In order to obtain full value from energy management activities, and to strengthen our conservation initiatives, a strategic approach must be taken. Our organization will strive to fully integrate energy management into our practices by considering indoor environmental quality, operational efficiency and sustainably sourced resources when making financial decisions.

**Our Vision**

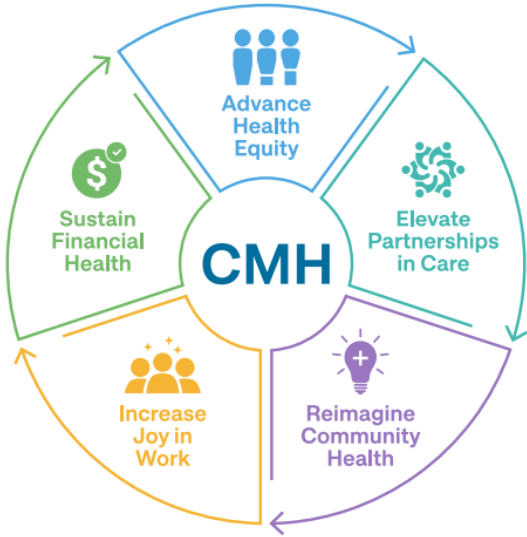
Creating healthier communities, together.

**Our Mission**

An exceptional healthcare organization keeping people at the heart of all we do.

**Our Values**

Caring, Collaboration, Accountability, Innovation, Respect



*Figure 3. CMH Strategic Pillars*

## 4. Historical Site Analysis

### 4.1. Historical Energy Intensity

Energy Utilization Index is a measure of how much energy a facility uses per square foot. By breaking down a facility's energy consumption on a per-square-foot-basis, we can compare facilities of different sizes with ease. In this case, we are comparing our facility to the industry average for Ontario hospitals (derived from Natural Resources Canada's Commercial and Institutional Consumption of Energy Survey), which was found to be 56.77 ekWh/sq. ft.

Year	2019	2020	2021	2022	2023
<b>Total</b>	57.34	60.24	60.40	70.40	73.78

Table 2. Historic Energy Use Intensity

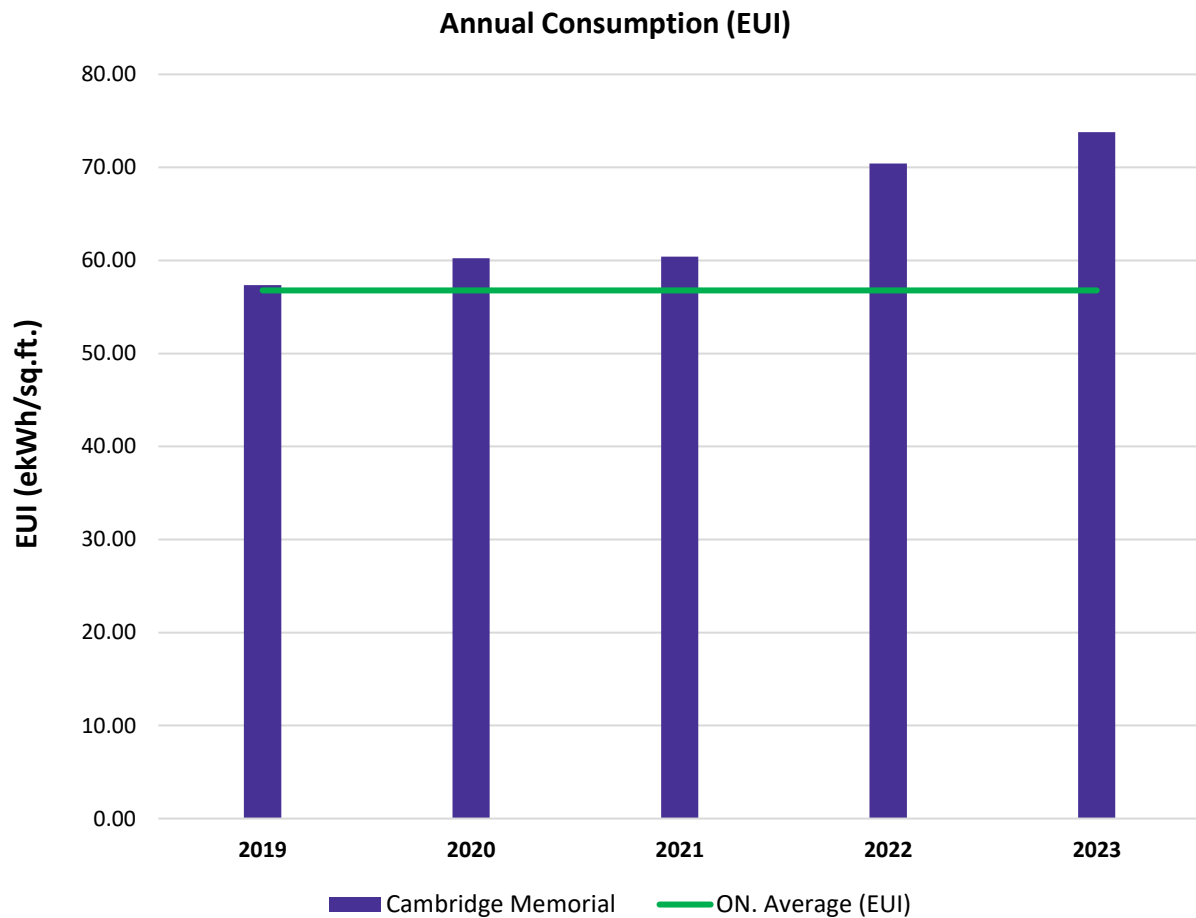


Figure 4. Historic Annual Energy Utilization Indices

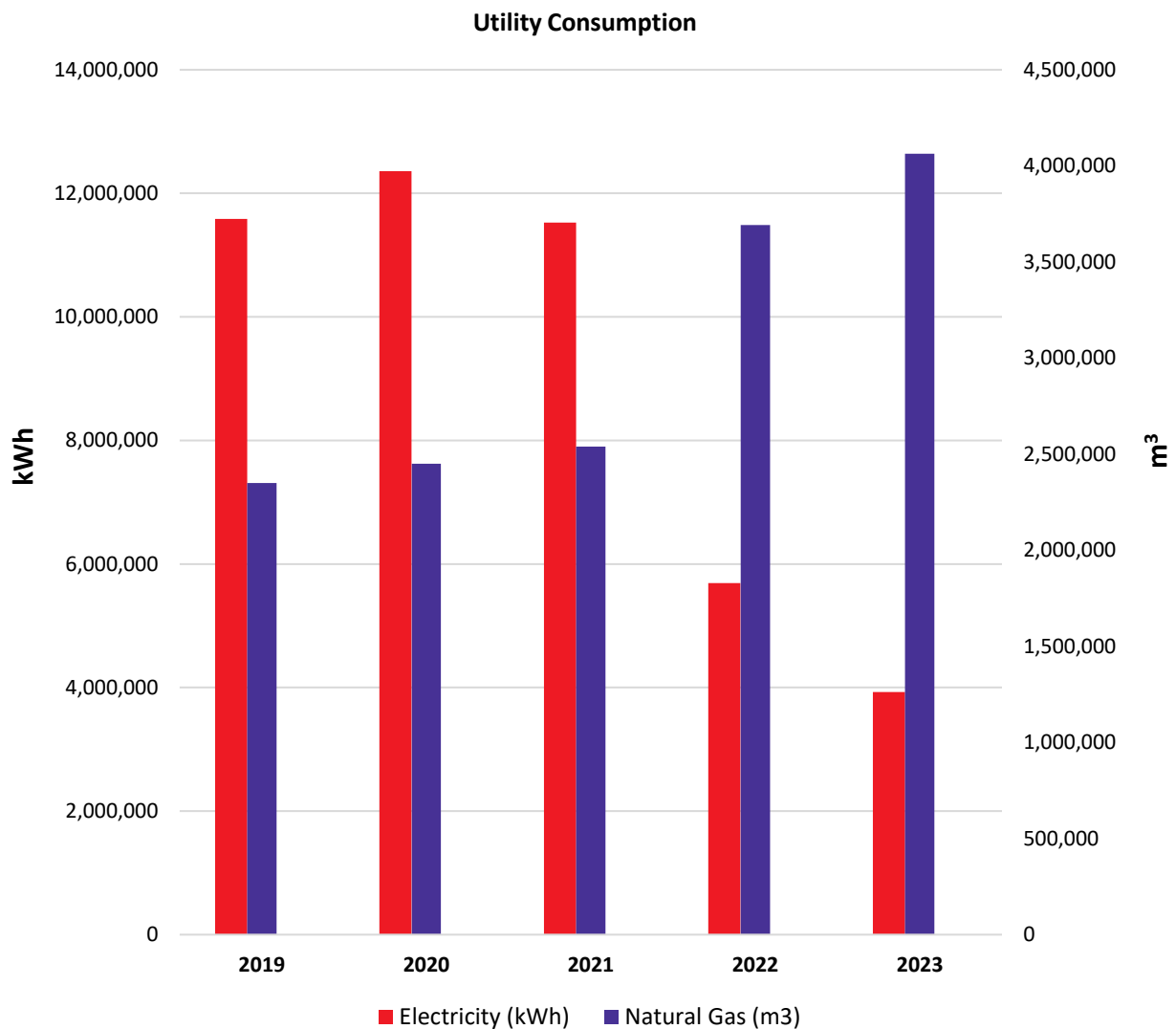


## 4.2. Historical Utility Consumption Analysis

Utilities to the site are electricity and natural gas. The following table summarizes the accounts for each utility. Consumption for each respective utility has been adjusted to fit a regular calendar year (365 days).

Year	2019	2020	2021	2022	2023
<b>Electricity (kWh)</b>	11,584,494	12,356,213	11,527,567	5,691,016	3,926,953
<b>Natural Gas (m<sup>3</sup>)</b>	2,349,374	2,450,547	2,538,815	3,692,793	4,062,944

*Table 3. Annual Utility Consumption*



*Figure 5. Annual Utility Consumption*

### 4.3. Historical GHG Emissions

Greenhouse gas (GHG) emissions are expressed in terms of equivalent tonnes of Carbon Dioxide (tCO<sub>2</sub>e). The GHG emissions associated with a facility are dependent on the fuel source — for example, hydroelectricity produces fewer greenhouse gases than coal-fired plants, and light fuel oil produces fewer GHGs than heavy oil.

Electricity from the grid in Ontario is relatively “clean”, as the majority is derived from low-GHG nuclear power and hydroelectricity, and coal-fired plants have been phased out. Scope 1 (such as natural gas directly used in facilities), and Scope 2 (such as purchased electricity) consumptions have been converted to their equivalent tonnes of greenhouse gas emissions in the table below. Scope 1 represents the direct emissions from sources owned or controlled by the institution, and Scope 2 consists of indirect emissions from the consumption of purchased energy generated upstream from the institution.

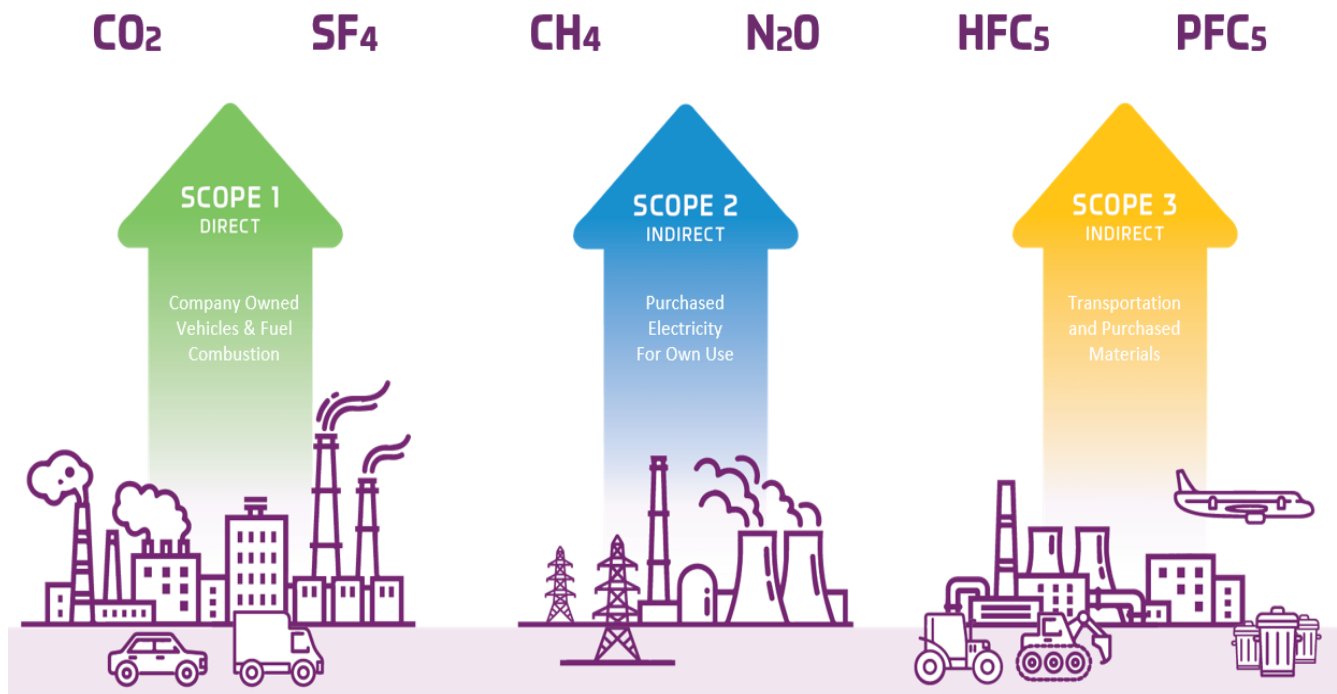


Figure 6. Examples of Scope 1 and 2

The greenhouse gas emissions for Cambridge Memorial Hospital have been tabulated and are represented in the table and graph below.

GHG Emissions (tCO <sub>2</sub> e)	2019	2020	2021	2022	2023
Scope 1 (natural gas)	4,513	4,708	4,877	7,094	7,805
Scope 2 (electricity)	290	319	302	402	325
<b>Total Scope 1 &amp; 2 Emissions</b>	<b>4,803</b>	<b>5,026</b>	<b>5,179</b>	<b>7,496</b>	<b>8,130</b>

Table 4. Historic Greenhouse Gas Emissions

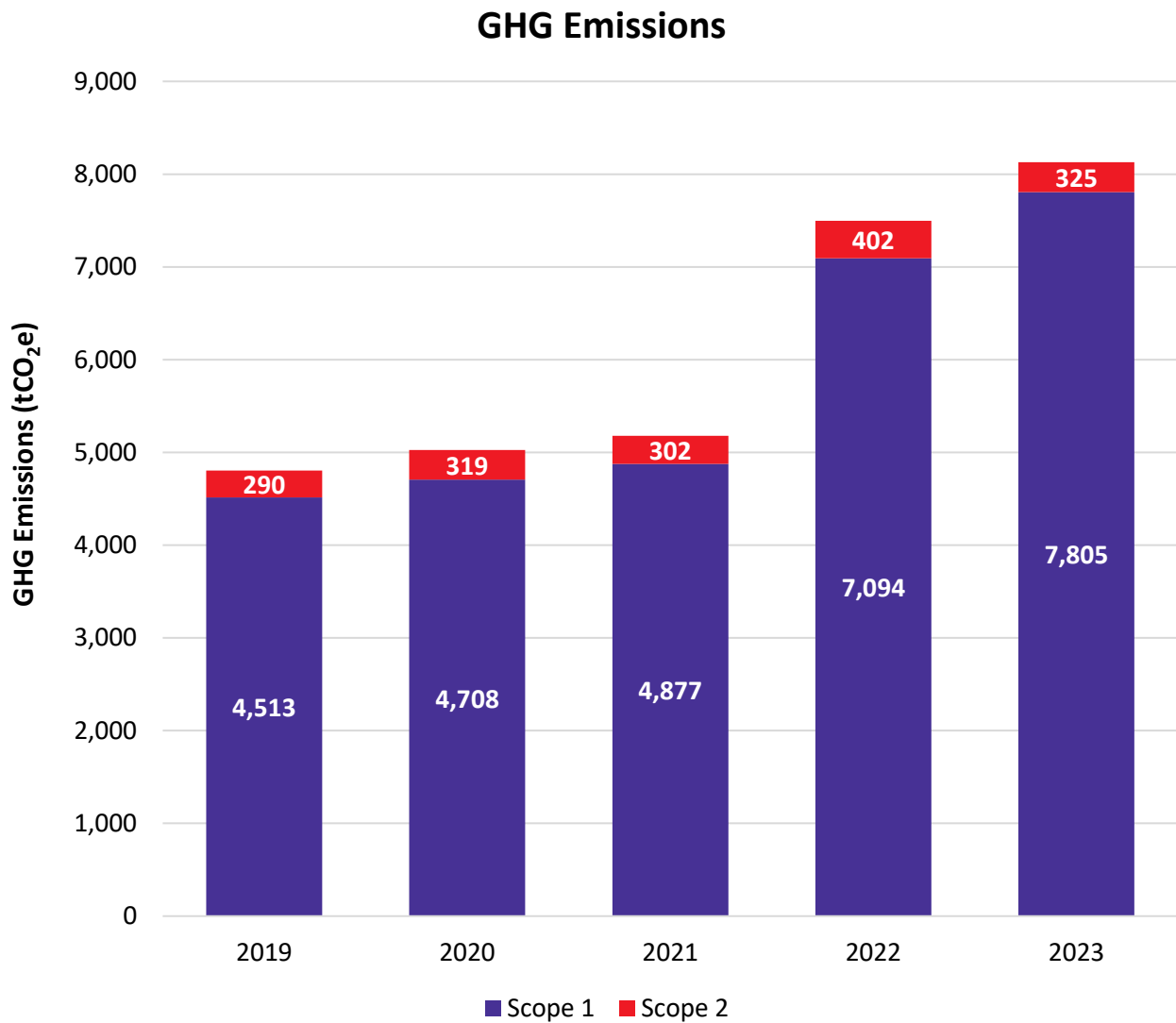


Figure 7. Historical GHG Emissions

# 5. Measures

## 5.1. Energy Conservation and GHG Reduction Strategies to Date

Over the previous years, Cambridge Memorial Hospital has undertaken various energy conservation and demand management measures. The summary of the main activities is shown in the following table.

Measure Name	Scope/Results
Building Section A newly built and in use	Cambridge Memorial Hospital continuously reviews and upgrades their facility as required and has a commitment to energy conservation and demand management.  These measures have resulted in more energy efficient and reliable operations, reductions in GHG emissions and reductions in energy use.
Building Section B major renovation on upgrading the building envelope (complete in 2024)	
Commissioned CHP system with onsite electricity generation and heat recovery	

*Table 5. Previously Implemented Energy Conservation Measures*

## 5.2. Proposed Energy Conservation and GHG Reduction Measures

Our energy analysis has revealed potential for a number of conservation and GHG reduction strategies for the included facilities. Evaluated and proposed initiatives are summarized in the table on the following page outlining savings potential of the targeted utilities and estimated project costs, and a recommended year of implementation for each measure, strategically chosen to maximize Cambridge Memorial Hospital’s energy conservation and GHG reduction benefits.

Measure	Estimated Annual Savings			Project Cost	Simple Payback (Years)	Implementation Year
	Electricity (kWh)	Natural Gas (m <sup>3</sup> )	Cost (\$)			
BAS Recommissioning	392,695	380,822	\$188,265	\$1,050,000	5.6	2027
Lighting Retrofit	245,435	-1,162	\$33,954	\$1,456,765	42.9	2026
Solar Wall Reactivation	0	17,900	\$6,265	\$75,000.00	12.0	2027
Boiler Plant -New Individual Boiler Direct Vent	0	5,000	\$1,750	\$400,000.00	228.6	2027
Air Balance Study for D Wing - Over Pressurization Issue	0	20,000	\$7,000	\$25,000.00	3.6	2025
Steam Trap replacement plus trap insulation	0	89,000	\$31,150	\$100,000.00	3.2	2026
Boiler O2 Trim plus Blowdown Heat Recovery	0	61,900	\$21,665	\$100,000.00	4.6	2025
<b>Total</b>	<b>638,130</b>	<b>511,560</b>	<b>\$268,384</b>	<b>\$3,106,765</b>	<b>11.6</b>	<b>-</b>

*Table 6. Proposed Measures*

## 6. Cambridge Memorial Hospital Outlook

### 6.1. Utility Consumption Forecast

By implementing the recommended measures stated in the previous section, in each respective site, Cambridge Memorial Hospital’s projected electricity and natural gas use could be forecasted based on the utility savings generated from individual measures. The forecasted utility consumption is tabulated below. The percentage of change is based on the data from the baseline year of 2023.

Fuel	2024		2025		2026		2027		2028		2029	
	Units	% Change	Units	% Change	Units	% Change	Units	% Change	Units	% Change	Units	% Change
Natural Gas (m <sup>3</sup> )	4,062,944	0%	3,658,324	10%	3,570,486	12%	3,293,705	19%	3,293,705	19%	3,293,705	19%
Electricity (kWh)	3,926,953	0%	3,926,953	0%	3,681,519	6%	3,288,823	16%	3,288,823	16%	3,288,823	16%

Table 7. Forecast of Annual Utility Consumption Forecast

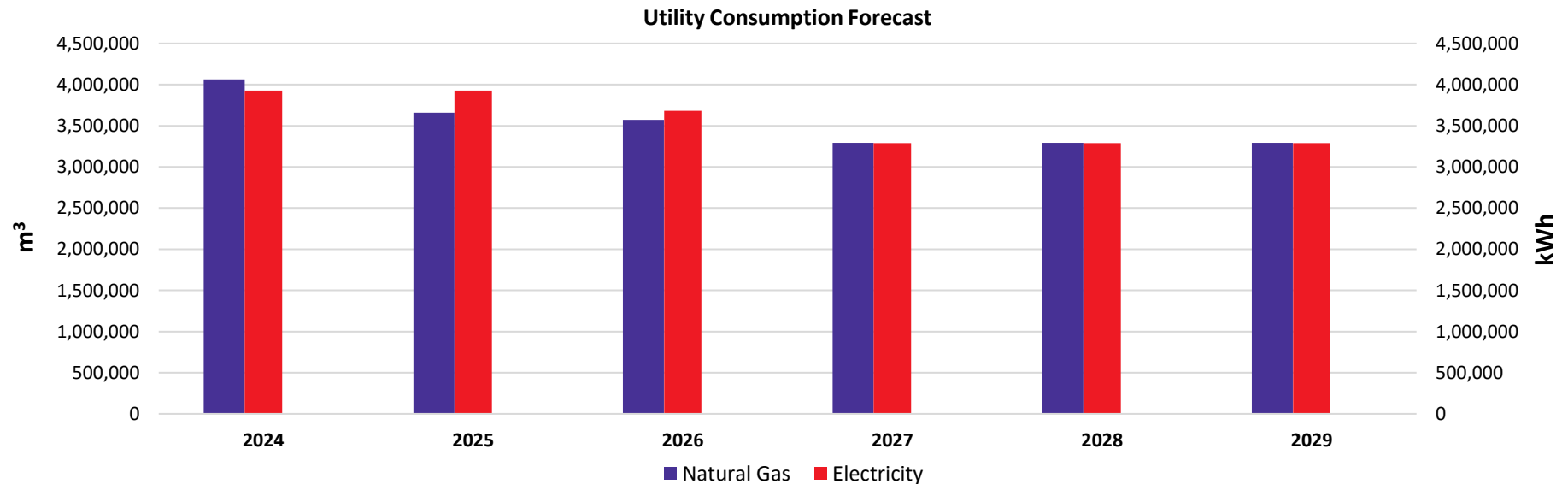


Figure 8. Forecast of Annual Energy Consumption

## 6.2. GHG Emissions Forecast

The organizational GHG emissions for Cambridge Memorial Hospital are calculated based on the forecasted energy consumption data analyzed in the previous section and are tabulated in the following table. The percentage reduction is based on the baseline year of 2023.

Utility Source (tCO <sub>2</sub> e)	2024	2025	2026	2027	2028	2029
Natural Gas (scope 1)	7,805	7,028	6,859	6,327	6,327	6,327
Electricity (scope 2)	257	345	282	286	248	228
<b>Totals</b>	<b>8,062</b>	<b>7,372</b>	<b>7,141</b>	<b>6,614</b>	<b>6,575</b>	<b>6,555</b>
Reduction from Baseline Year	1%	9%	12%	19%	19%	19%

Table 8. Forecast of Annual Greenhouse Gas Emissions from 2023 to 2029

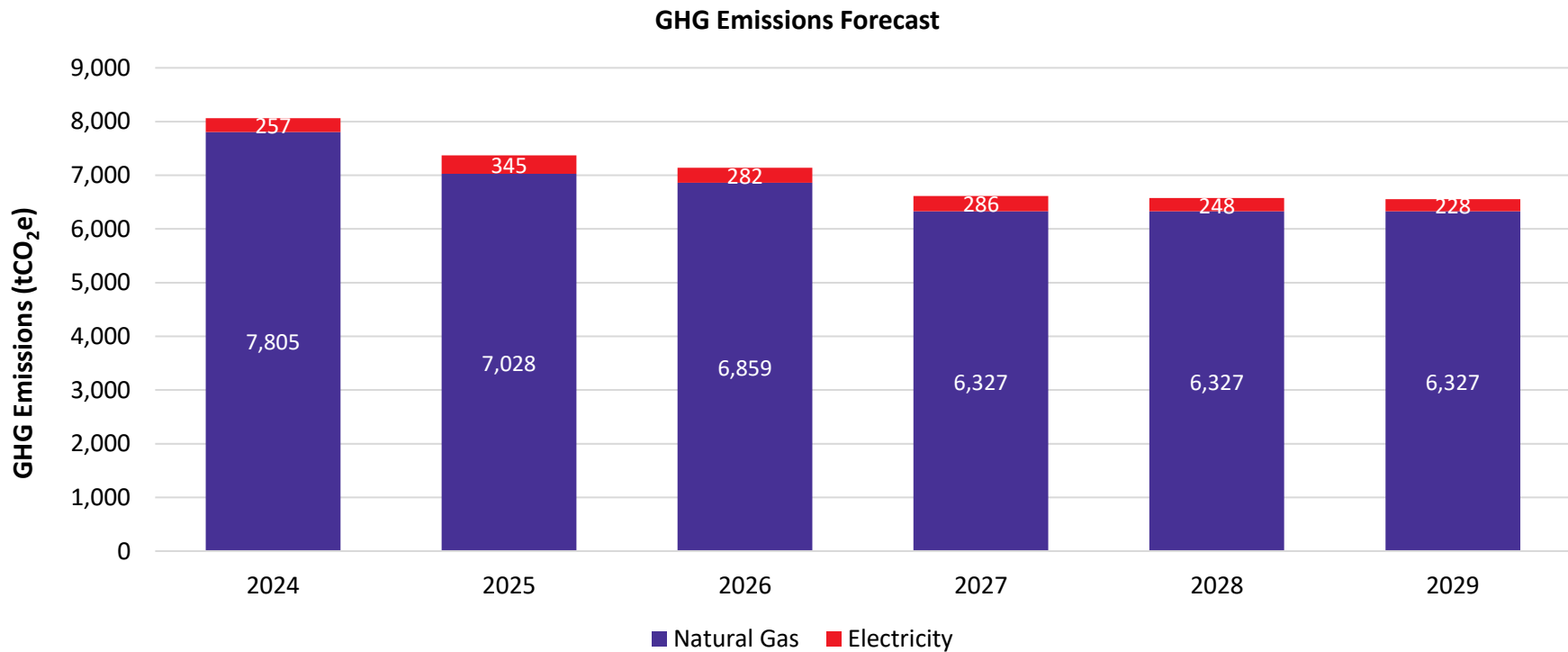


Figure 9. Forecast of Annual Greenhouse Gas Emissions

### 6.3. EUI Forecast

Based on the above measures, utility consumption forecasting and GHG emissions forecasting, the forecasting EUI is provided below. In this case, we are comparing the facility to the industry average for Ontario hospitals (derived from Natural Resources Canada’s Commercial and Institutional Consumption of Energy Survey), which was found to be 56.77 ekWh/sq. ft. Based on the proposed energy conservation measures CMH is able to drop their EUI down to 63.24 which is still above the industry average, but significantly lower than the 2023 EUI.

Year	2024	2025	2026	2027	2028
<b>Total</b>	73.78	72.42	70.57	63.24	63.24

Table 9. EUI Forecast

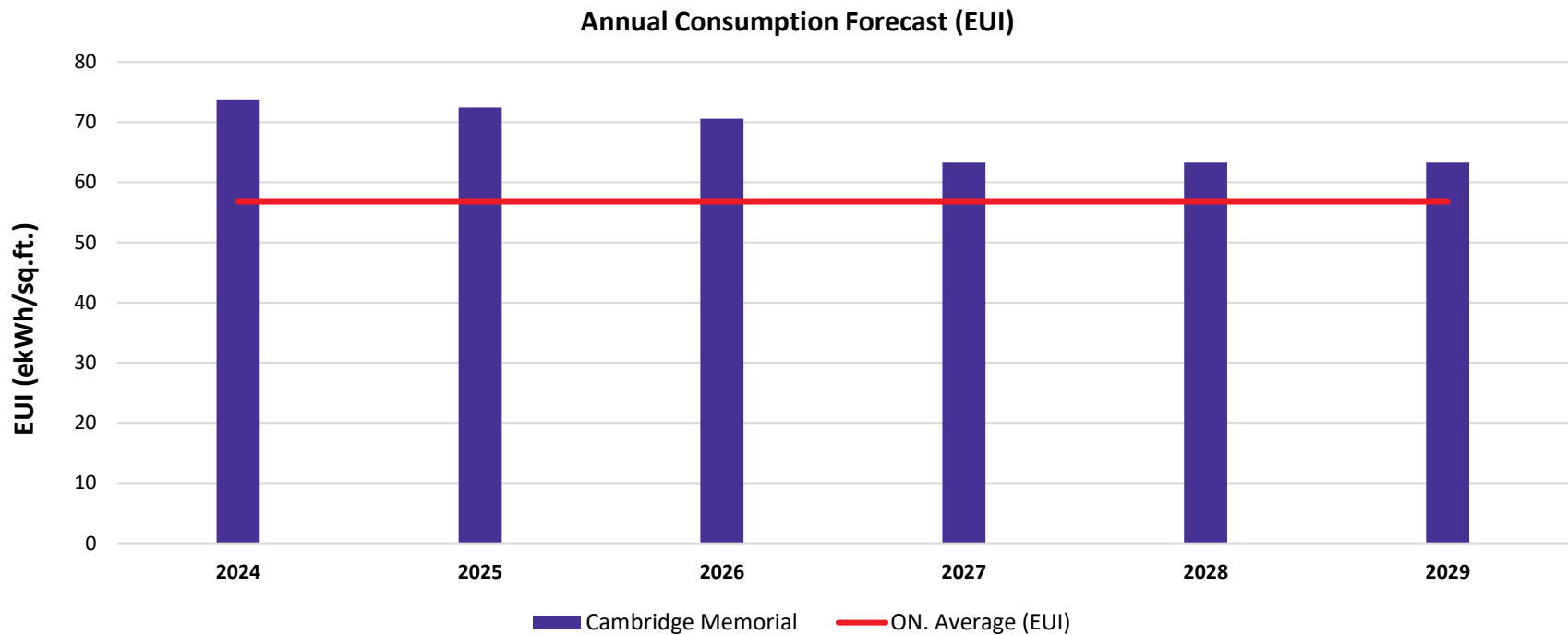


Figure 10. EUI Forecast



## 7. Closing Comments

Thank you to all who contributed to Cambridge Memorial Hospital's Energy Conservation & Demand Management Plan. We consider our facilities an integral part of the local community. The key to this relationship is being able to use our facilities efficiently and effectively to maximize our ability to provide the highest quality of healthcare services while integrating environmental stewardship into all aspects of facility operations.

On behalf of the Senior Management Team here at Cambridge Memorial Hospital, we approve this Energy Conservation & Demand Management Plan.

X Signed by Patrick Gaskin, President & CEO on June 25, 2024

*This ECDM plan was created through a collaborative effort between Cambridge Memorial Hospital and Blackstone Energy Services.*

## 8. Appendix

### 8.1. Glossary

Word	Abbreviation	Meaning
Baseline Year		A baseline is a benchmark that is used as a foundation for measuring or comparing current and past values.
Building Automation System	BAS	<i>Building automation</i> is the automatic centralized <i>control</i> of a <i>building's</i> heating, ventilation and air conditioning, lighting and other <i>systems</i> through a <i>building management system</i> or <i>building automation system</i> (BAS)
Carbon Dioxide	CO2	Carbon dioxide is a commonly referred to greenhouse gas that results, in part, from the combustion of fossil fuels.
Energy Usage Intensity	EUI	Energy usage intensity means the amount of energy relative to a buildings physical size typically measured in square feet.
Equivalent Carbon Dioxide	CO2e	CO2e provides a common means of measurement when comparing different greenhouse gases.
Greenhouse Gas	GHG	Greenhouse gas means a gas that contributes to the greenhouse effect by absorbing infrared radiation, e.g., carbon dioxide and chlorofluorocarbons.
Metric Tonnes	t	Metric tonnes are a unit of measurement. 1 metric tonne = 1000 kilograms
Net Zero		A net-zero energy building, is a <a href="#">building</a> with zero net <a href="#">energy consumption</a> , meaning the total amount of energy used by the building on an annual basis is roughly equal to the amount of <a href="#">renewable energy</a> created on the site,
Variable Frequency Drive	VFD	A variable frequency drive is a device that allows for the modulation of an electrical or mechanical piece of equipment.

# 8.2. Tables and Figures

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