

**ENERGY CONSERVATION &
DEMAND MANAGEMENT PLAN
2024**

Contents

- 1 Regulatory Update 3
- 2 Executive Summary..... 4
- 3 About St. Mary’s General Hospital..... 6
- 4 Historical Site Analysis 8
 - 4.1 Historical Energy Intensity 8
 - 4.2 Historical Utility Consumption Analysis..... 9
 - 4.3 Historical GHG Emissions Analysis..... 10
- 5 Measures..... 12
 - 5.1 Energy Conservation and GHG Reduction Strategies to Date 12
 - 5.2 Proposed Energy Conservation and GHG Measures 13
- 6 St. Mary’s General Hospital Outlook..... 14
 - 6.1 Utility Consumption Forecast 14
 - 6.2 GHG Emissions Forecast 15
- 7 Closing Comments 16
- 8 Appendix 17
 - 8.1 Glossary of Terms 17
 - 8.2 List of Tables & Figures..... 18

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 The Bill repealed the GEA and all its underlying Regulations, including O. Reg. 397/11.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 St. Mary's General Hospital ("SMGH") 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 SMGH's core values of efficiency, environmental sustainability and sustainable financial stability and growth, this ECDM outlines how the 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 provide compassionate service to more people in the community. 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, SMGH has achieved the following results:

- 1,475,017 kwh reduction in electricity use
- 220,598 m3 reduction in natural gas use

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

- Energy Use Index (EUI) was 54 ekWh/ft²
- Energy-related emissions equaled 3,166 tCO₂e

To obtain full value from energy management activities, SMGH 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, SMGH can expect to achieve the following targets by 2029, compared with 2023:

- ~ 52% reduction in natural gas consumption
- ~ 42% carbon equivalent emissions

St. Mary's General Hospital's Energy Performance and Path Forward

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

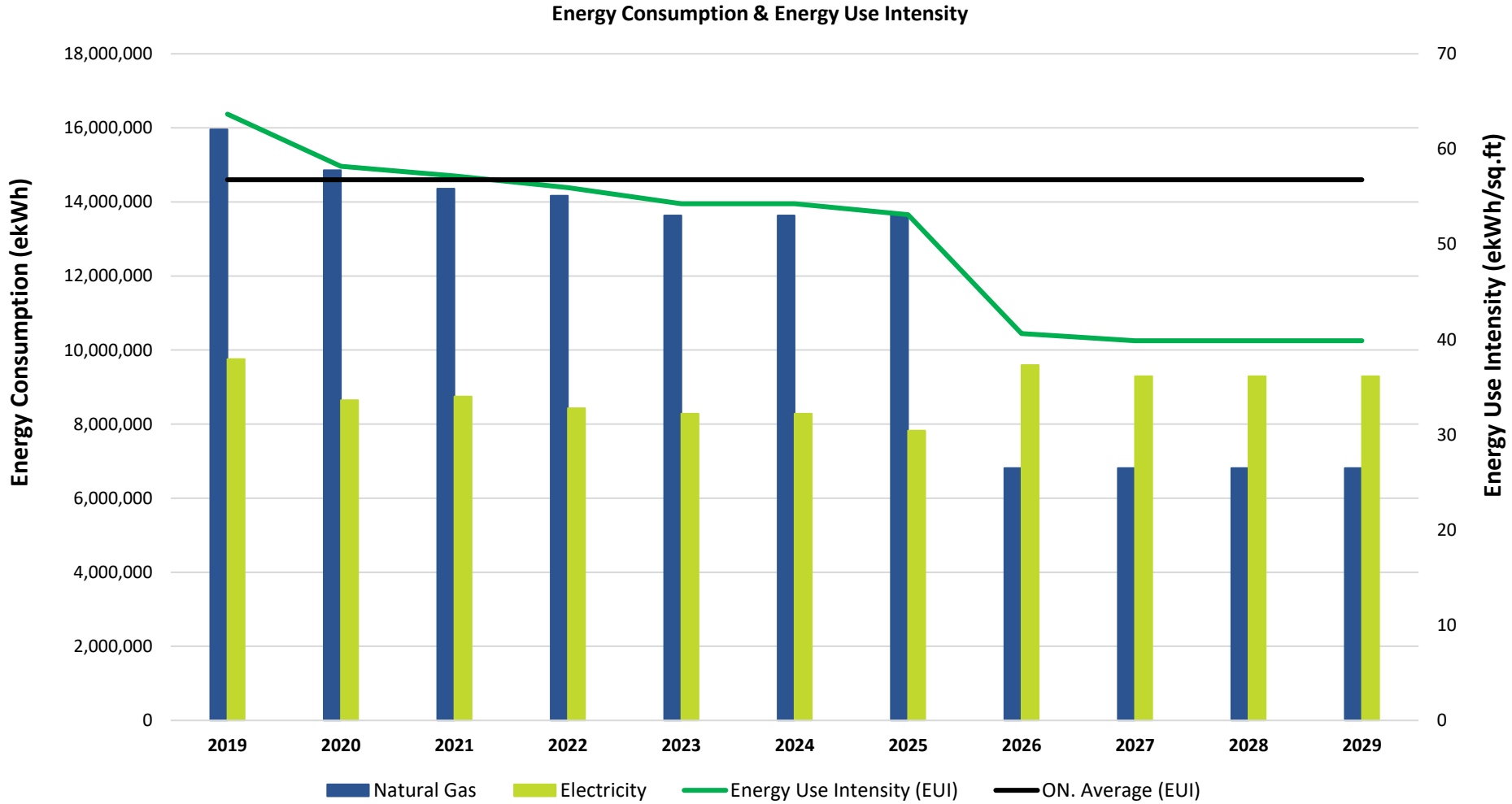


Figure 1. Energy Consumption Trends and Projections

3 About St. Mary’s General Hospital



Figure 2. St. Mary’s General Hospital

St. Mary’s General Hospital is located in the heart of Kitchener, Ontario and has been a cornerstone of the community since opening in 1924. We proudly serve the residents of Waterloo, Wellington County, and extend our reach to Dufferin, Grey-Bruce and beyond. We have more than 2,000 staff, physicians and volunteers and who care for hundreds of thousands of patients a year in our core clinical programs. We are committed to serving our community and our physicians and staff are constantly striving to advance their care.

St. Mary’s General Hospital is a 197-bed hospital operating 24/7 or 168 hours a week. The facility has 404,000 square feet of space with nine operating rooms. St. Mary’s also achieved an Energy Utilization Index (EUI) of 54 kWh/sq. ft in 2023. We have 5 core areas of clinical focus: Cardiac Care (Regional Cardiac Centre), Respiratory Care (Level 1 Thoracic Surgery Centre), Outpatient (Day) Surgery, General Medicine, 24/7 Emergency Care.

Facility Overview	
Facility Name	St Mary's General Hospital
Type of Facility	Healthcare Services
Address	911 Queen's Boulevard, Kitchener, ON
Gross Area (ft2)	404,000
Average Operational Hours	168
Number of Beds	197
Number of Floors	Administration Building: 4 Floors Central Wing: 4 Floors Physio Building: 1 Floor Tower Wing: 11 Floors

Table 1. St. Mary's General Hospital Overview

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.

For 100 years, the Sisters of St. Joseph have maintained their tradition of ministering to the sick – an honor which dates back over two and a half centuries. The staff, physicians, and volunteers at St. Mary’s General Hospital strive to carry forward the legacy of the Sisters by providing the finest possible health care. Their caring skills and insistence on excellence are a testament to the leadership and vision of the Sisters, and it is a privilege to continue their legacy by living the Mission and Values they held in such high regard.

Our Mission

Living the Legacy: Compassionate care. Faith. Discovery

Our Vision

Inspiring Excellence. Healthier Together

Our Values

Compassion. Respect. Inclusion. Integrity. Collaboration. Innovation

We are committed to:

- Heal, comfort, teach and promote health for the whole person – body, mind and spirit
- Encouraging independence and self-responsibility
- Serving those in need especially the poor and vulnerable
- Being a responsible corporate citizen and neighbor
- Use our resources wisely
- Excellence, innovation and compassion in all we do
- Promoting an organizational spirit by encouraging participation, responsibility, continued learning and mutual respect

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
St Mary's Hospital	63.66	58.17	57.17	55.94	54.25

Table 2. Historic Energy Intensity

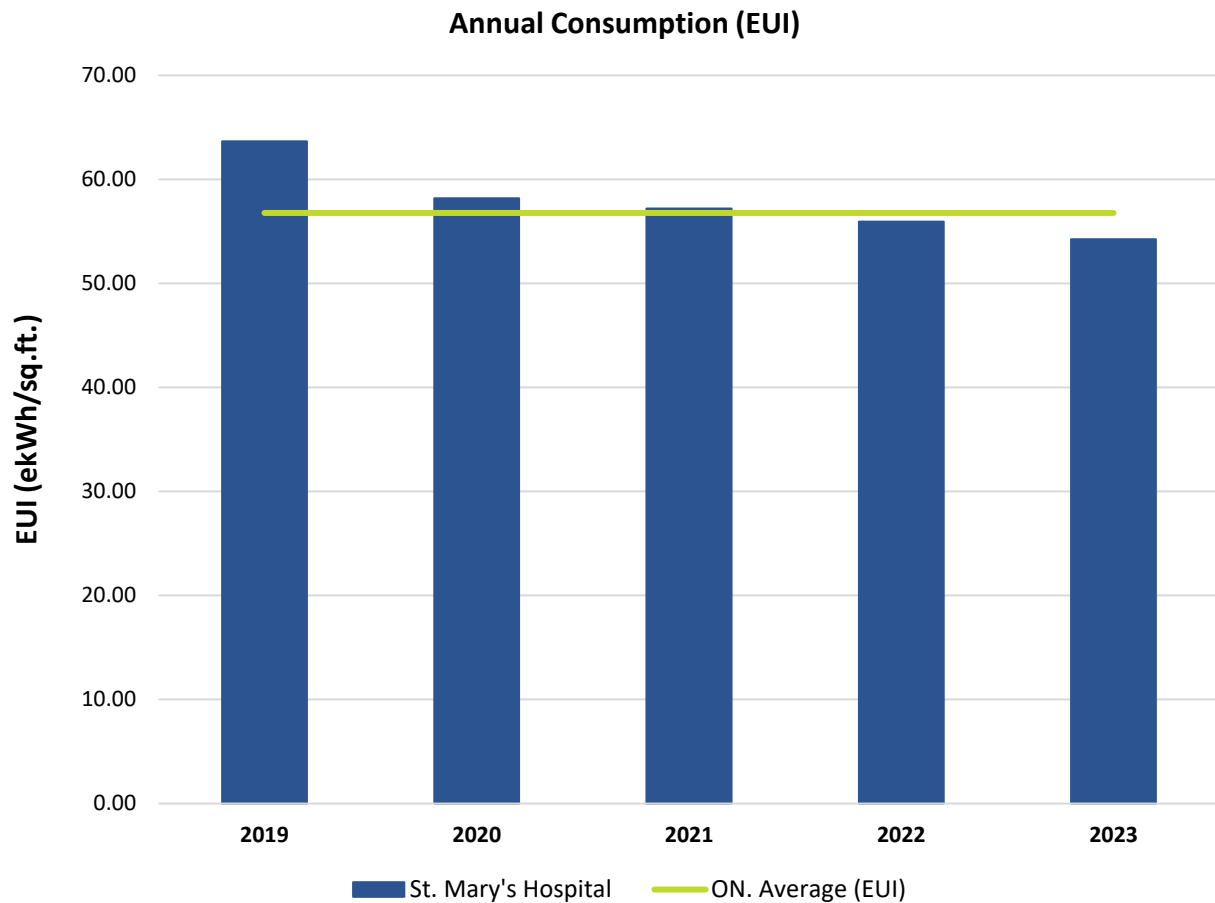


Figure 3. Historic Energy Intensity

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
Electricity (kWh)	9,757,581	8,644,564	8,744,562	8,432,949	8,282,564
Natural Gas (m ³)	1,511,646	1,407,011	1,359,685	1,341,699	1,291,048

Table 3. Historic Annual Utility Consumption

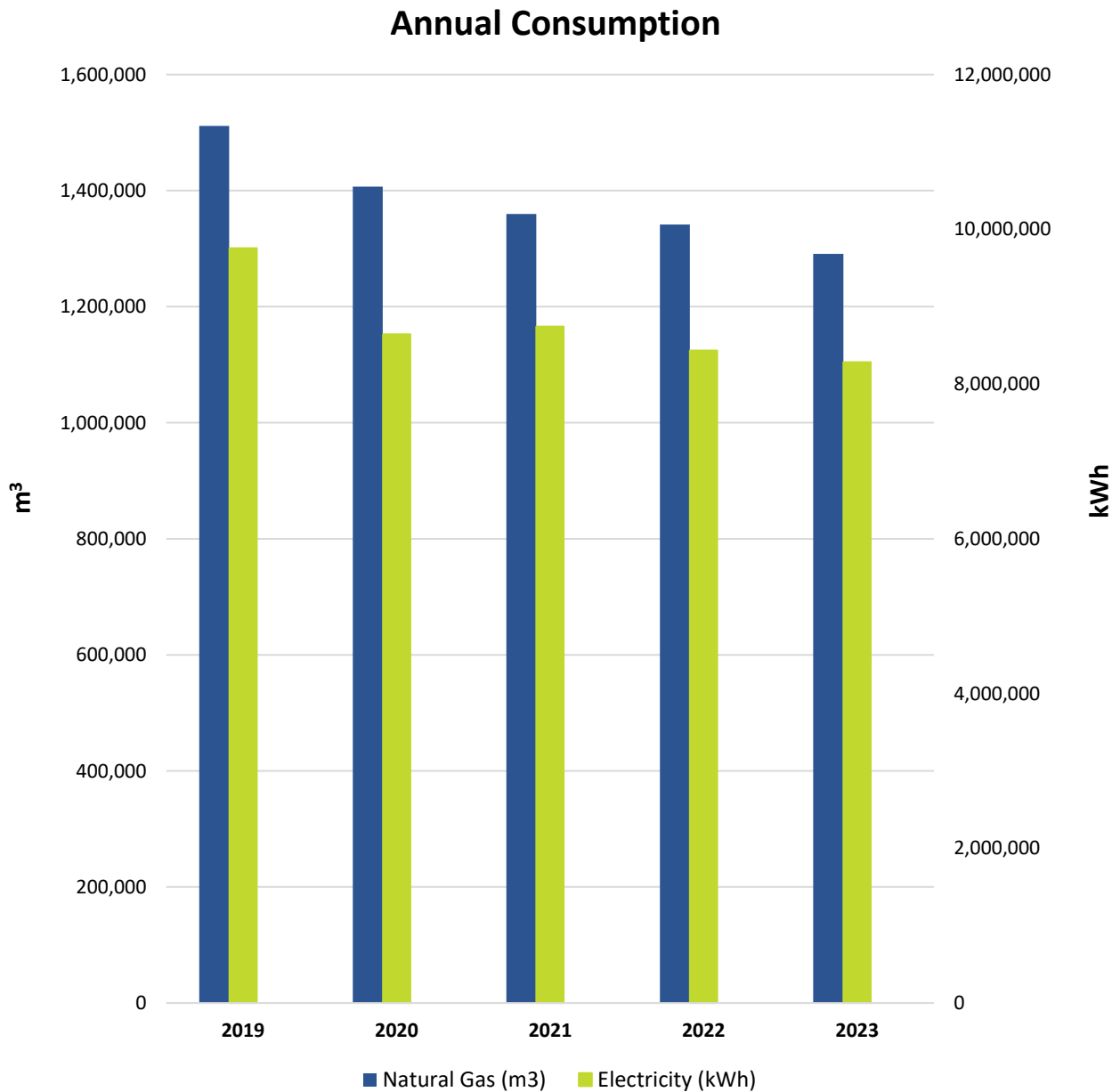


Figure 4. Historic Annual Utility Consumption

4.3 Historical GHG Emissions Analysis

Greenhouse gas (GHG) emissions are expressed in terms of equivalent tonnes of Carbon Dioxide (tCO₂e). 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 (natural gas) and Scope 2 (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.

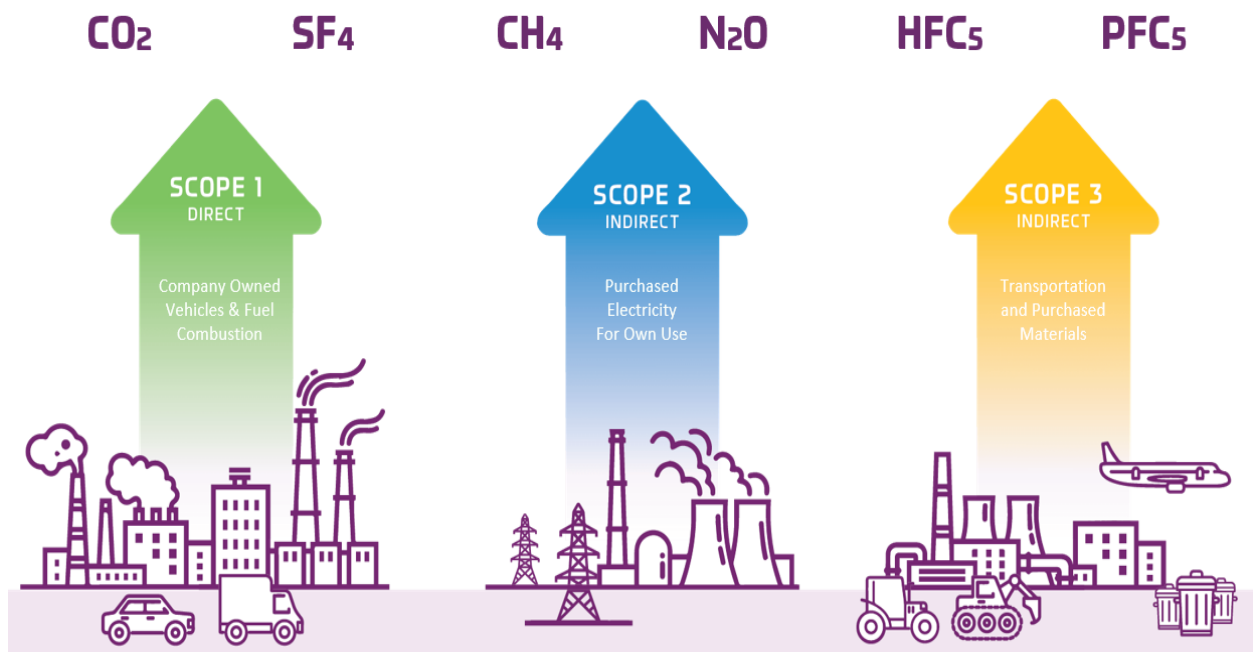


Figure 5. Examples of Scope 1 and 2

GHG Emissions (tCO ₂ e)	2019	2020	2021	2022	2023
Natural Gas (scope 1)	2,904	2,703	2,612	2,577	2,480
Electricity (scope 2)	244	223	229	595	686
Totals	3,148	2,926	2,841	3,173	3,166

Table 4. Historic Greenhouse Gas Emission

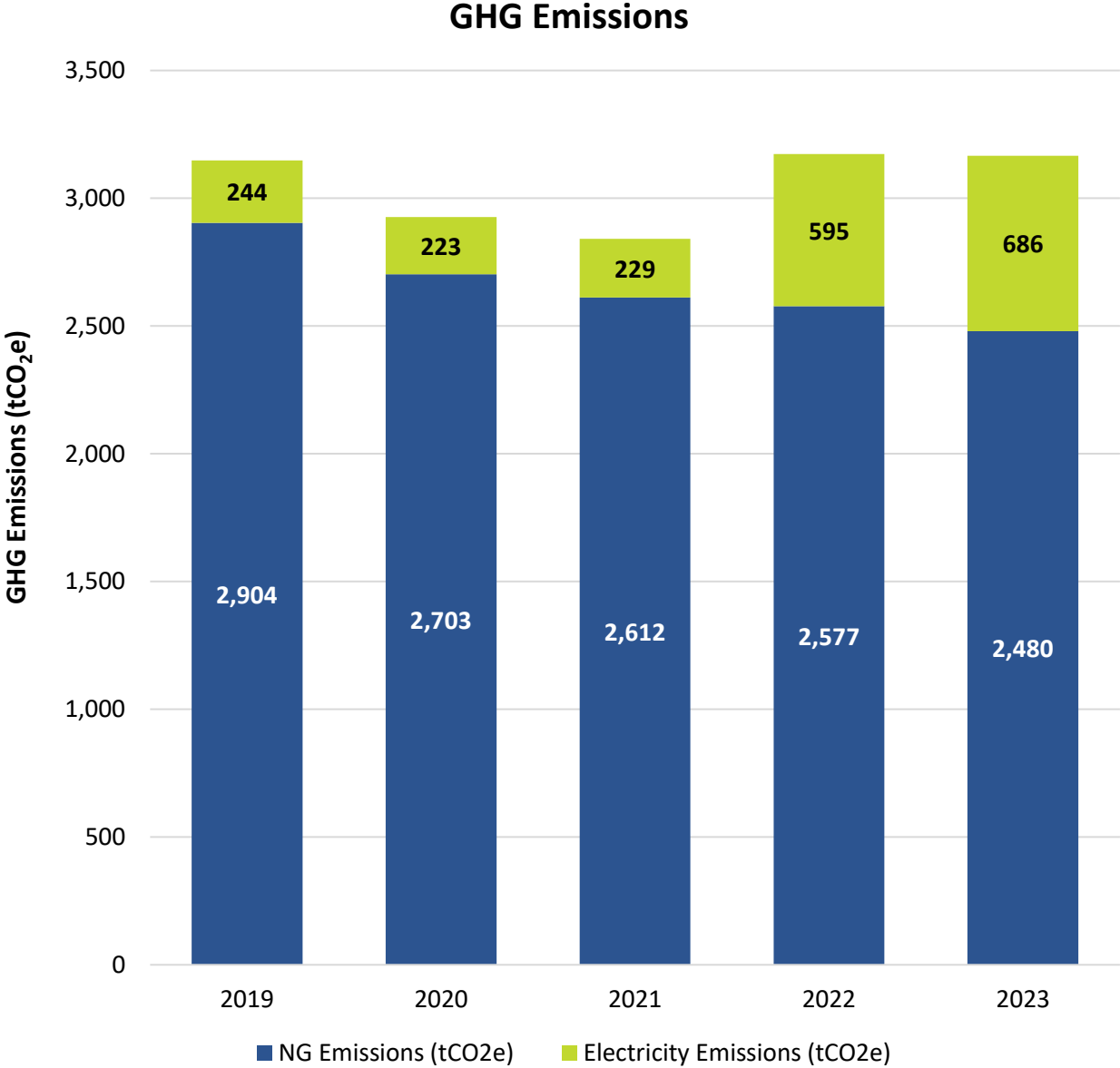


Figure 6. Historic Greenhouse Gas Emissions

5 Measures

5.1 Energy Conservation and GHG Reduction Strategies to Date

Over the previous years, St. Mary’s General Hospital has undertaken various energy conservation and demand management measures. The summary of the main activities is shown in the following table.

St. Mary’s General Hospital has also recently implemented a Green Team that meets monthly and reviews opportunities for waste reduction including receiving, shipping, lights, waste and awareness programs to support the Sustainability Culture Program.

Sustainable Measures	Impacted Utility
Interior Lighting Retrofit	<p data-bbox="1094 802 1881 899">SMGH continuously reviews and upgrades their facility as required and has a commitment to energy conservation and demand management.</p> <p data-bbox="1115 948 1860 1078">Over the past 5 years, through multiple conservation measures SMGH has achieved a 1,475,017 ekWh reduction in electricity consumption, and a 220,598m3 reduction in natural gas consumption.</p>
Chiller Plant Optimization	
Building Automation System Upgrade	
VFDs on Fans and Pumps	
Domestic Water Fixture Retrofit	
Boiler Staging Control	
Steam System - Heat Exchanger	
Removable Insulated Jackets on Steam Valves	
Steam Trap Repair	

Table 5. Current Sustainability Strategies

5.2 Proposed Energy Conservation and GHG Measures

Our energy analysis has revealed several conservation strategies for the facility. SMGH’s proposed energy saving initiatives are summarized in the table below outlining the targeted utilities. These measures will remain in place until a more efficient and cost-effective technology is found.

SMGH has identified a number of opportunities and is committed to further investigating them over the next few years. Implementation of the measures will occur as funding is made available, therefore the implementation year has been marked as TBD.

Measure	Estimated Savings			Project Cost	Simple Payback (Years)	Implementation Year
	Electricity (KWh)	Natural Gas (m ³)	Cost (\$)			
Solar Rooftop 253.2 KWp DC/ 200.0 KW AC	303,670	0	\$39,477	\$861,000	21.8	TBD
Solar Carport 114.0 KWp DC / 100.0 KW AC	136,730	0	\$17,775	\$570,000	32.1	TBD
Heat Recovery Chiller	-1,910,288	646,026	\$336,144	\$3,204,936	9.5	TBD
Old Chiller replacement (Chiller1/2)	456,742	0	\$45,674	\$1,453,930	31.8	TBD
Steam trap audit and repair	0	28,444	\$10,837	\$7,269	0.67	ongoing
Sustainability Culture Program	0	0	TBD	TBD	TBD	ongoing
Total	-1,013,146	674,470	\$449,907	\$6,097,135	13.6	-

Table 6. Proposed Conservation Measures

6 St. Mary's General Hospital Outlook

6.1 Utility Consumption Forecast

By implementing the energy conservation measures stated in the previous section, the forecasted electricity and natural gas use could be estimated based on the utility savings generated from individual measures. The forecasted utility consumption is tabulated below based on SMGH implementing all proposed measures by 2029. The percentage of change is based off the data from the baseline year of 2023.

Year	2029	
	Units	% Change
Natural Gas (m ³)	616,578	52%
Electricity (kWh)	9,295,709	-12%

Table 7. Forecast for 2029 Utility Consumption

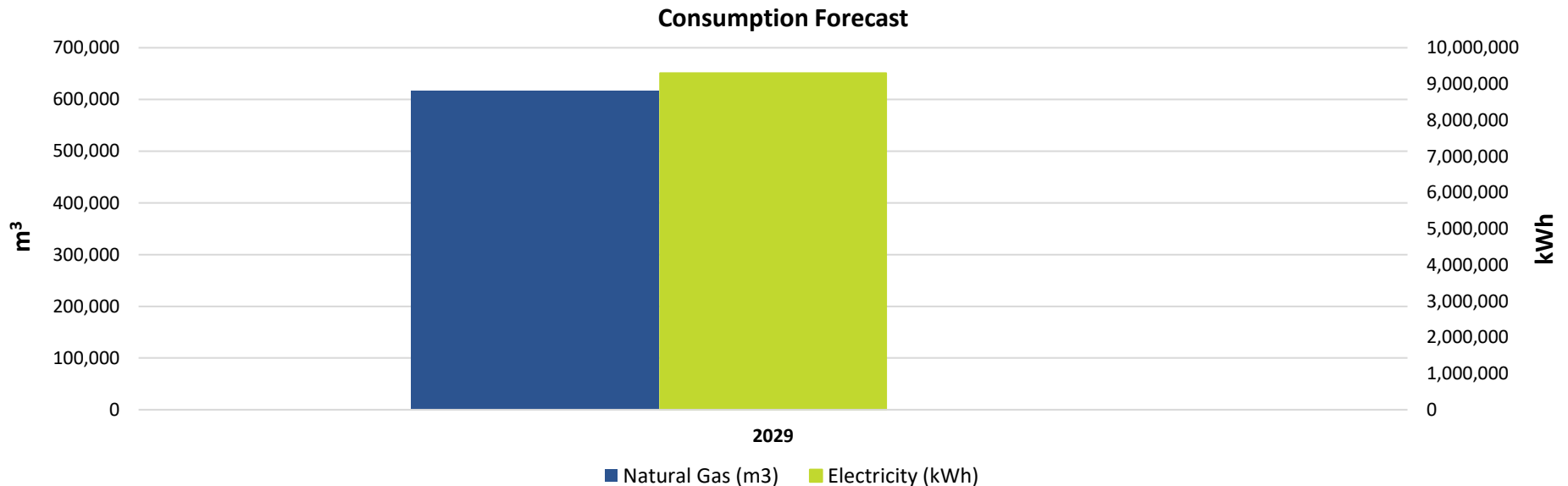


Figure 7. Forecast for 2029 Utility Consumption

6.2 GHG Emissions Forecast

The forecasted greenhouse gas emissions are calculated based on the forecasted energy consumption data analyzed in the previous section and are tabulated in the following table. The percentage of reduction is based off the data from the baseline year of 2023.

Utility Source (tco2e)	2029
Natural Gas (scope 1)	1,184
Electricity (scope 2)	644
Totals	1,829
Reduction from Baseline Year	42%

Table 8. Forecast for 2029 Greenhouse Gas Emissions

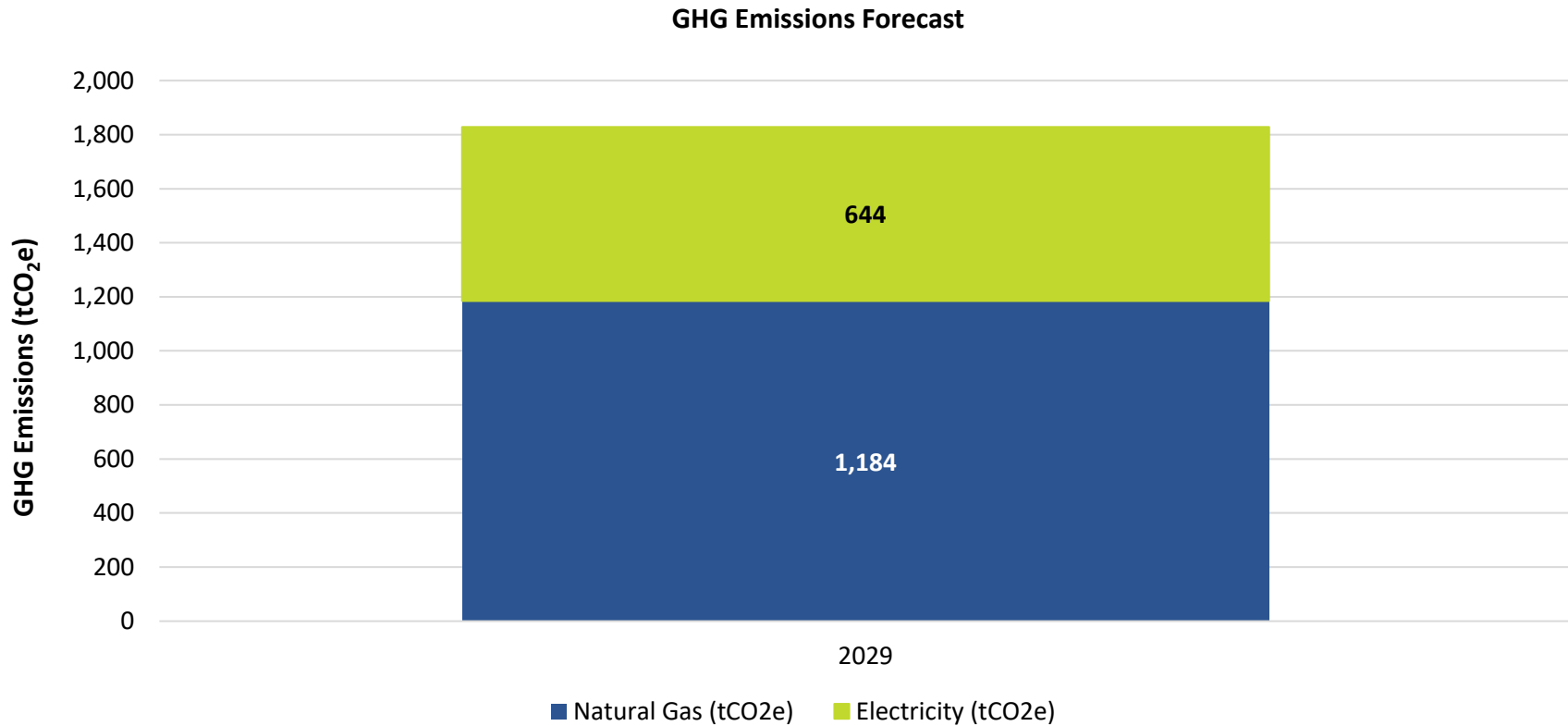


Figure 8. Forecast for 2029 Greenhouse Gas Emissions

7 Closing Comments

Thank you to all who contributed to St. Mary's General Hospital's Energy Conservation & Demand Management Plan. We consider our facility a primary source of care, and 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 St. Mary's General Hospital, we approve this Energy Conservation & Demand Management Plan.

X 

This ECDM plan was created through a collaborative effort between St. Mary's General Hospital and Blackstone Energy Services.

8 Appendix

8.1 Glossary of Terms

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	Building automation is the automatic centralized control of a building's heating, ventilation and air conditioning, lighting and other systems through a building management system or building automation system (BAS)
Carbon Dioxide	CO ₂	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 relative to a buildings physical size typically measured in square feet.
Equivalent Carbon Dioxide	CO ₂ e	CO ₂ e 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 <u>building</u> with zero net <u>energy consumption</u> , meaning the total amount of energy used by the building on an annual basis is roughly equal to the amount of <u>renewable energy</u> 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 List of Tables & Figures

Tables

- Table 1. St. Mary's General Hospital Overview..... 6
- Table 2. Historic Energy Intensity 8
- Table 3. Historic Annual Utility Consumption..... 9
- Table 4. Historic Greenhouse Gas Emission..... 11
- Table 5. Current Sustainability Strategies..... 12
- Table 6. Proposed Conservation Measures 13
- Table 7. Forecast for Annual Utility Consumption..... 14
- Table 8. Forecast for Annual Greenhouse Gas Emissions..... 15

Figures

- Figure 1. Energy Consumption Trends and Projections..... 5
- Figure 2. St. Mary's General Hospital 6
- Figure 3. Historic Energy Intensity 8
- Figure 4. Historic Annual Utility Consumption..... 9
- Figure 5. Examples of Scope 1 and 2..... 10
- Figure 6. Historic Greenhouse Gas Emissions..... 11
- Figure 7. Forecast for Annual Utility Consumption..... 14
- Figure 8. Forecast for Annual Greenhouse Gas Emissions 15