



Energy Conservation & Demand Management Plan 2024

Contents

1.	Regulatory Update	3
2.	Executive Summary.....	4
3.	About St. Thomas Elgin 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.....	10
5.	Measures.....	12
5.1.	Energy Conservation and GHG Reduction Strategies to Date	12
5.2.	Proposed Energy Conservation and GHG Reduction Measures.....	13
6.	St. Thomas Elgin General Hospital Outlook	15
6.1.	Utility Consumption Forecast	15
6.2.	Site-Wide GHG Emissions Forecast	17
7.	Closing Comments	19
8.	Appendix	20
8.1.	Glossary of Terms	20
8.2.	List of Tables, Figures, and Pictures.....	21

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 The Bill repealed the GEA and all its underlying Regulations, including O. Reg. 397/11.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. Thomas Elgin General 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 St. Thomas Elgin General Hospital core values of respect for our environment, accountability to be good environmental stewards and collaboration with industry experts like Blackstone, to create an innovative path forward, this ECDM Plan outlines how St. Thomas Elgin General 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.

Today, utility and energy related costs are a significant part of overall operating costs. St. Thomas Elgin 2023 data is provided below:

- Energy Use Intensity (EUI) Index for included facilities was 48.68 – industry standard is 56.77
- Energy-related emissions equaled 3,924 tCO₂e

To obtain full value from energy management activities, St. Thomas Elgin General 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, St. Thomas Elgin can expect to achieve the following targets by 2029, compared with 2019:

- 29% reduction in electricity consumption
- 33% reduction in natural gas consumption
- 25% reduction in GHG emissions

St. Thomas Elgin General Hospital is committed to preparing a new plan in 2029 using the PDSA framework Plan, Do, Study, Act.

The results and the progress of the past ten years, and the projected impact of the new ECDM Plan is presented in the graph below. In order to compare different energy sources, energy is expressed in units of ekWh – equivalent kilowatt-hours. The energy contained in a cubic meter of natural gas would be converted into the equivalent amount of the energy contained in a kilowatt hour of electricity.

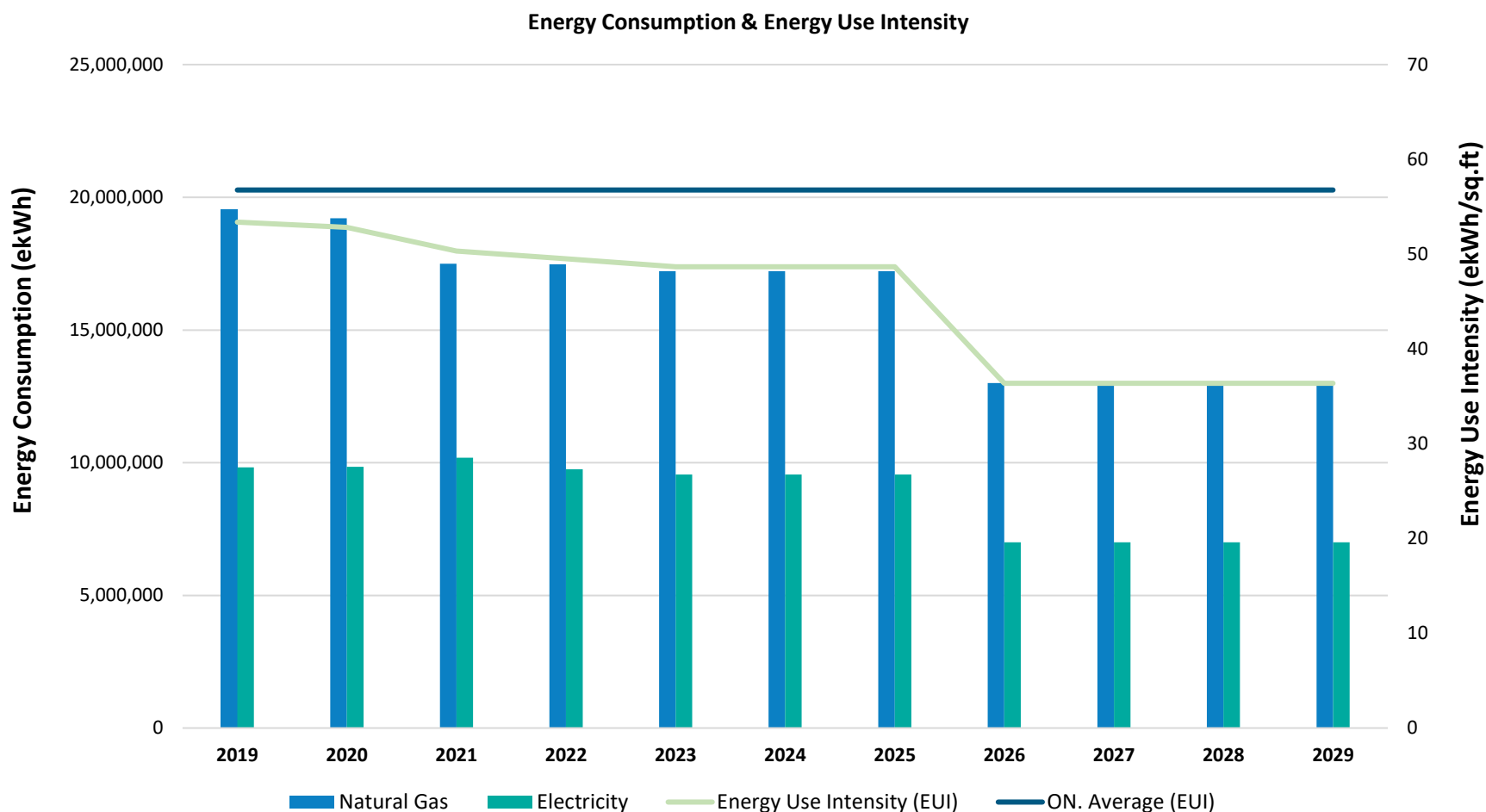


Figure 1. Site-Wide Energy Consumption Trends & Projections

3. About St. Thomas Elgin General Hospital



Figure 2. St. Thomas Elgin General Hospital

St. Thomas Elgin General Hospital (STEGH) is a fully accredited hospital serving the City of St. Thomas and all seven municipalities within the County of Elgin. We have a proud history and legacy in the community with over 68 years of service. STEGH offers a full range of services, including: outpatient care, diagnostic imaging, inpatient acute care, emergency services, post-acute care, and regional satellite services.

St. Thomas Elgin General Hospital	
Facility Name	St. Thomas Elgin General Hospital
Type of Facility	Public Hospital
Address	189 Elm St, St Thomas, ON N5R 5C4
Gross Area (Sq. Ft)	550,000
Average Operational Hours in a Week	168 hours
Number of Floors	6
Number of Beds	179 beds

Table 1. St. Thomas Elgin General Hospital Facility Information

To achieve the best health outcomes for patients, STEGH continually seeks innovative ways to deliver services, engage with patients and the community, invest in its people, and collaborate with health care partners.

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

Together, creating health care excellence for our community.

Our Mission

Caring. Healing. Connecting.

Our Values

Compassion, Accountability, Respect, Innovation, Collaboration



Figure 3. STEGH Mission, Vision, Values

4. Historical Site Analysis

4.1. Historical Energy Intensity

Energy Utilization Index (EUI) is a measure of how much energy a facility uses per square foot in a year. 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 Hospital's (derived from Natural Resources Canada), which was found to be 56.77 kWh/sq.ft.

The following charts depicts St. Thomas Elgin General Hospital's facilities included in the energy utilization index analysis and overall energy intensity of St. Thomas Elgin General Hospital's buildings for the period of 5 years. As mentioned previously, these EUIs are compiled for the facilities included in this ECDM Plan.

Total Energy Utilization Index (EUI)					
Year	2019	2020	2021	2022	2023
Total (ekWh/sq.ft)	53.38	52.83	50.34	49.51	48.68

Table 2. Historic Energy Use Intensity

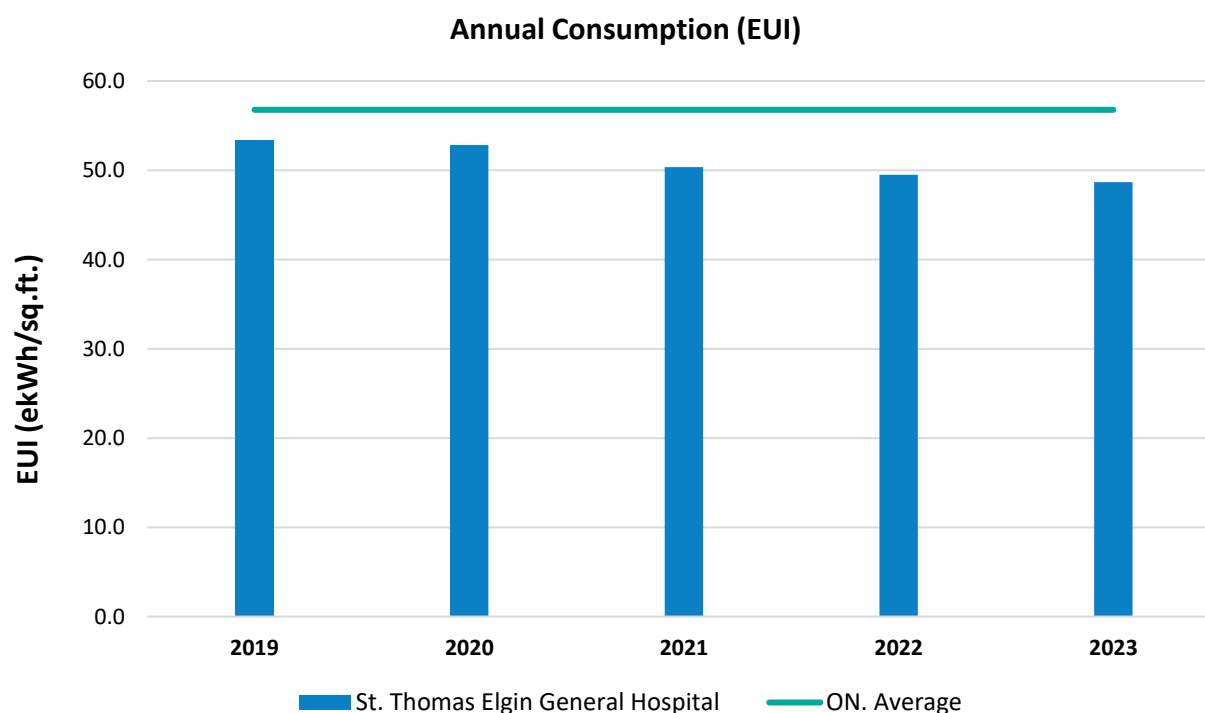


Figure 4. Historic Annual Energy Utilization Indices

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).

Annual Consumption					
Year	2019	2020	2021	2022	2023
Electricity (kWh)	9,818,921	9,844,077	10,186,651	9,754,675	9,552,276
Natural Gas (m³)	1,850,618	1,819,425	1,657,181	1,654,902	1,630,832

Table 3. Historic Annual Consumption

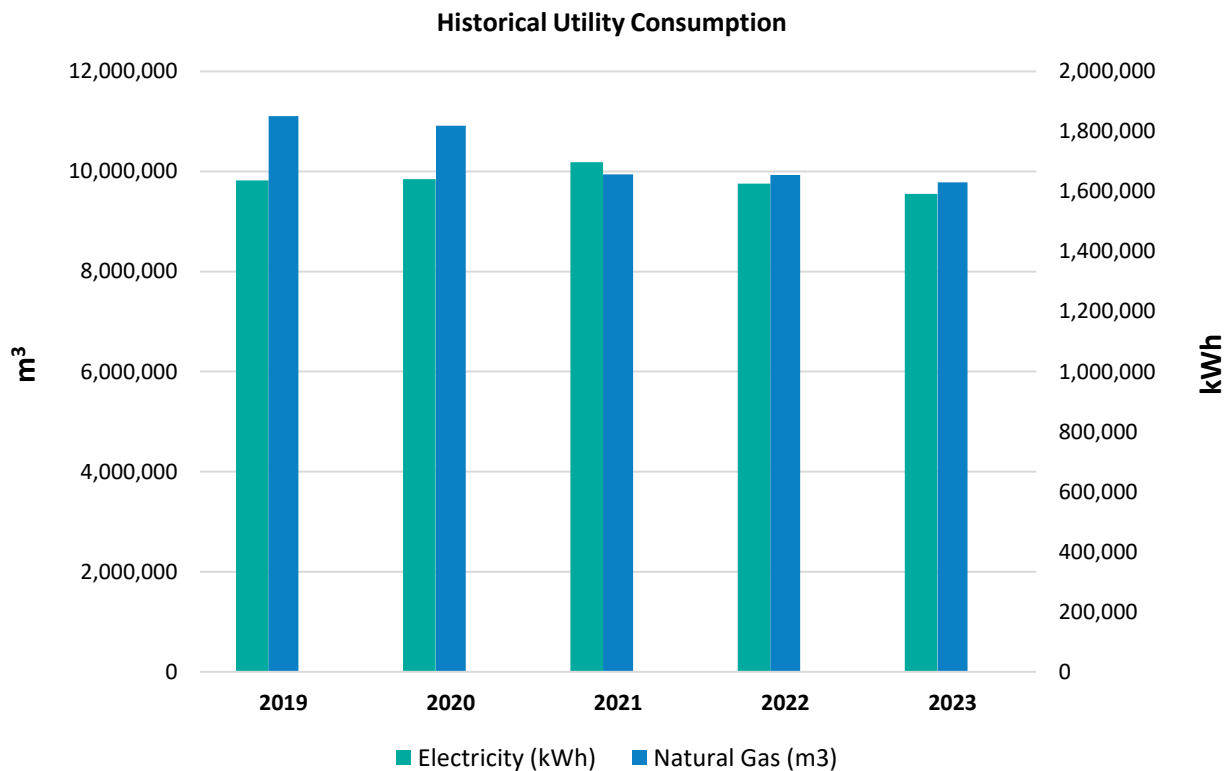


Figure 5. Historic Annual Consumption

4.3. Historical GHG Emissions

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 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.

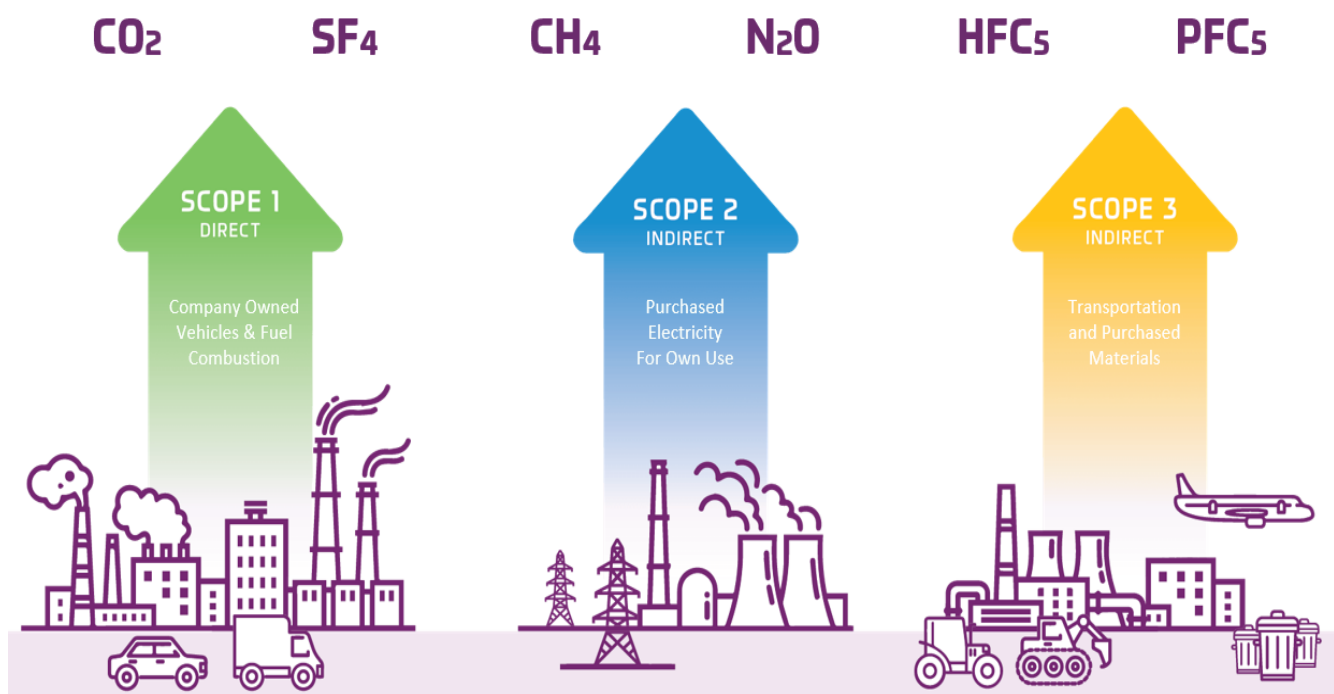


Figure 6. Examples of Scope 1 and 2

The greenhouse gas emissions for St. Thomas Elgin General Hospital have been tabulated and are represented in the table and graph below.

GHG Emissions (tCO ₂ e)	2019	2020	2021	2022	2023
Scope 1 (Natural Gas)	3,555	3,495	3,183	3,179	3,133
Scope 2 (Electricity)	245	254	267	689	791
Total Scope 1 & 2 Emissions	3,801	3,749	3,450	3,868	3,924

Table 4. Historic Greenhouse Gas Emissions

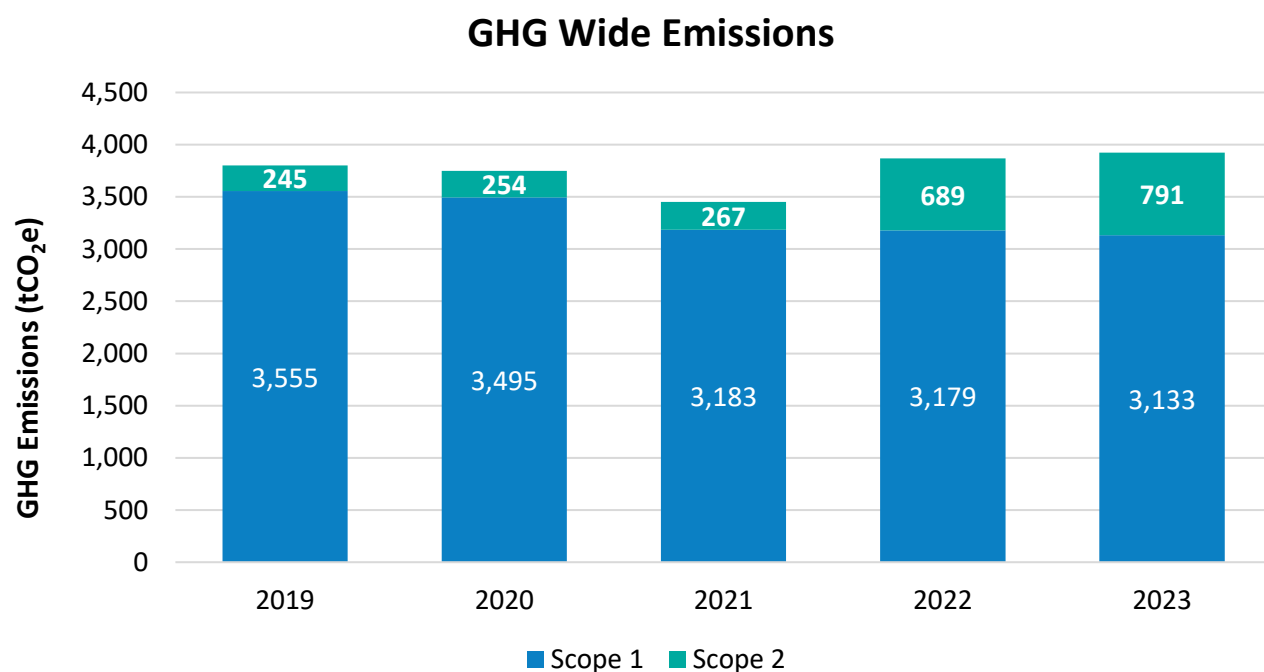


Figure 7. Historic GHG Emissions

5. Measures

5.1. Energy Conservation and GHG Reduction Strategies to Date

Over the previous years, St. Thomas Elgin General 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
LED Lighting RetroFit	St. Thomas Elgin General Hospital has achieved a 422 tCO ₂ e reduction of scope 1 emissions in the last five years. LED Lighting retrofits and a modern steam boiler project have both been significant contributors to these savings. In addition to those significant measures these additional measures have all contributed to the reduction of scope 1 emissions.
New Steam Boilers and Related Heat Exchangers and Equipment	
Upgraded Select Air Handling Units	
Replaced Select Old Roof Surfaces	
Building Envelope Repairs	

Table 5. Previously Implemented Energy Conservation and GHG Reduction Measures and Initiatives



Figure 8. St. Thomas Elgin General Hospital

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. Table 5 also lists a recommended year of implementation for each measure, strategically chosen to maximize St. Thomas Elgin General Hospital's energy conservation and GHG reduction benefits. Brief measure descriptions and scope of work is provided below.

Measure	Estimated Annual Savings			Project Cost	Simple Payback (Years)	Implementation Year
	kWh	m ³	\$			
LED RetroFit	207,446	-786	\$13,399	\$304,428	22.7	2026
Building Automation RCx and BlackPAC AI	1,024,389	262,892	\$169,521	\$533,862	3.1	2026
Installation of Variable Frequency Drives	235,898	0	\$11,795	\$263,340	22.3	2026
Install Rooftop Solar PV	447,800	0	22390	\$587,520	26.2	2026
Install Solar PV Carport	581,800	0	\$29,090	\$1,468,800	50.5	2026
Artium Building Envelope Improvements	52,500	45,902	\$23,281	\$0	0.0	2026
Steam Boiler Plant Improvements	0	91,356	\$41,110	\$0	0.0	2026
Total	2,549,832	399,364	\$310,586	\$3,157,950	10.2	-

Table 6. Proposed Measures

LED RetroFit

The illumination for the hospital is mainly provided by a mix LED and non-LED fixtures. During the site visits, a lighting audit was conducted to identify the areas that require upgrades. It is recommended to replace the existing non-LED fixtures with LED fixtures, by removing the existing fixtures and installing and re-wiring the new fixtures for indoor lighting.

Building Automation RCx and BlackPAC AI

The existing Hospital BAS system, make Delta, was originally installed in late 1960s and through many years of service and modifications, changes in the building systems has become inefficient surmounted by an outdated Delta graphics package. There is equipment on the BAS system that are not operational or don't exist anymore. As a result, recommissioning efforts will be undertaken to the Building Automation System.

Installation of Variable Frequency Drives

During the site audit, many supply fan, return fan and pump motors of selected equipment were found to be operating in constant speed mode. In the retro commissioning process, the static pressure sensors' location and calibration will be verified as well as set points. As part of this measure variable frequency drives (VFDs) will be installed on the equipment listed below. VFDs have the capability of starting motors at zero voltage and frequency, which is healthy in terms of motor winding flexing and heat generation leading to extended motor life. They can also help in eliminating voltage sag caused in the power line that can impact voltage sensitive devices such as proximity switches, sensors, and computers adversely. VFDs reduce the power required to start an AC motor across the line is substantially aiding in the reduction of peak demand of a facility.

Install Rooftop Solar PV/Install Solar PV Carport

It is recommended to install maximum capacity of solar photovoltaic system (PV) panels on the roofs of North Tower and Atrium building to generate electricity onsite. For Phase 1 only North Tower and Atrium Building have been chosen for Solar PV Installation. These buildings have also been chosen to develop solar PV carport systems. St. Thomas Elgin General Hospital is committed to investigating this potential solution as well as seeking funding opportunities that would enable us to move this installation forward.

Artium Building Envelope Improvements

The hospital was originally built in 1954 and will be turning 70 years in 2024. The original building requires several physical upgrades to bring to present day standards and improve patient safety and services. The scope of work could include resealing of the building to prevent unwanted air leakage. The work would include caulking around windows, doors, sealing around walls and ceiling penetrations. This would make sure the building envelope is properly sealed. The building will also undergo refurbishment which could include replacement of doors and windows with high performance ones.

Steam Boiler Plant Improvements

The original steam boiler plant was originally installed in 1954 and has undergone changes and modifications throughout the years. The old Miura steam boilers were installed late 1990's to early 2000's and two (2) of them are being replaced with new, more efficient Miura steam boilers. This also includes replacement of heat exchangers throughout the facility.

6. St. Thomas Elgin General Hospital Outlook

6.1. Utility Consumption Forecast

By implementing the recommended measures stated in the previous section, in each respective site, St. Thomas Elgin General 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 2019.

Utility	2024		2025		2026		2027		2028		2029	
	Units	% Change	Units	% Change	Units	% Change	Units	% Change	Units	% Change	Units	% Change
Natural Gas (m ³)	1,630,832	12%	1,630,832	12%	1,231,467	33%	1,231,467	33%	1,231,467	33%	1,231,467	33%
Electricity (kWh)	9,552,276	3%	9,552,276	3%	7,002,444	29%	7,002,444	29%	7,002,444	29%	7,002,444	29%

Table 7. Forecast of Annual Utility Consumption from 2024 to 2029

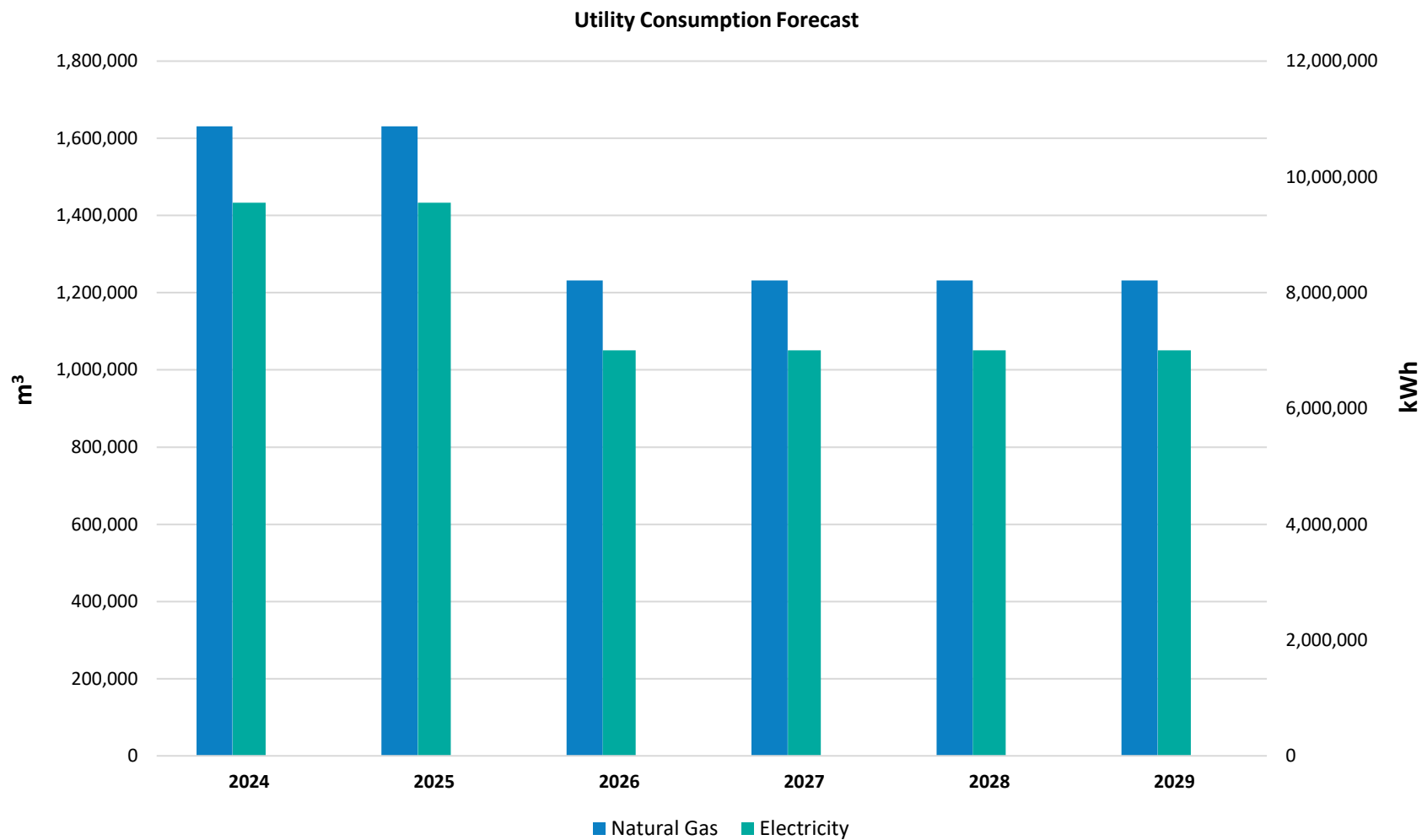


Figure 9. Forecast of Annual Utility Consumption

6.2. Site-Wide GHG Emissions Forecast

The organizational GHG emissions for St. Thomas Elgin General Hospital are calculated based on the forecasted Site-wide energy consumption data analyzed in the previous section and are tabulated in the following table. The percent of reduction is based on the baseline year of 2019.

GHG Emissions (tCO ₂ e)	2024	2025	2026	2027	2028	2029
Scope 1 (Natural Gas)	3,133	3,133	2,366	2,366	2,366	2,366
Scope 2 (Electricity)	626	839	537	610	528	485
Totals	3,759	3,972	2,903	2,976	2,894	2,851
Reduction from Baseline Year (2019)	1%	-4%	24%	22%	24%	25%

Table 8. Forecast of Annual Greenhouse Gas Emissions from 2024 to 2029

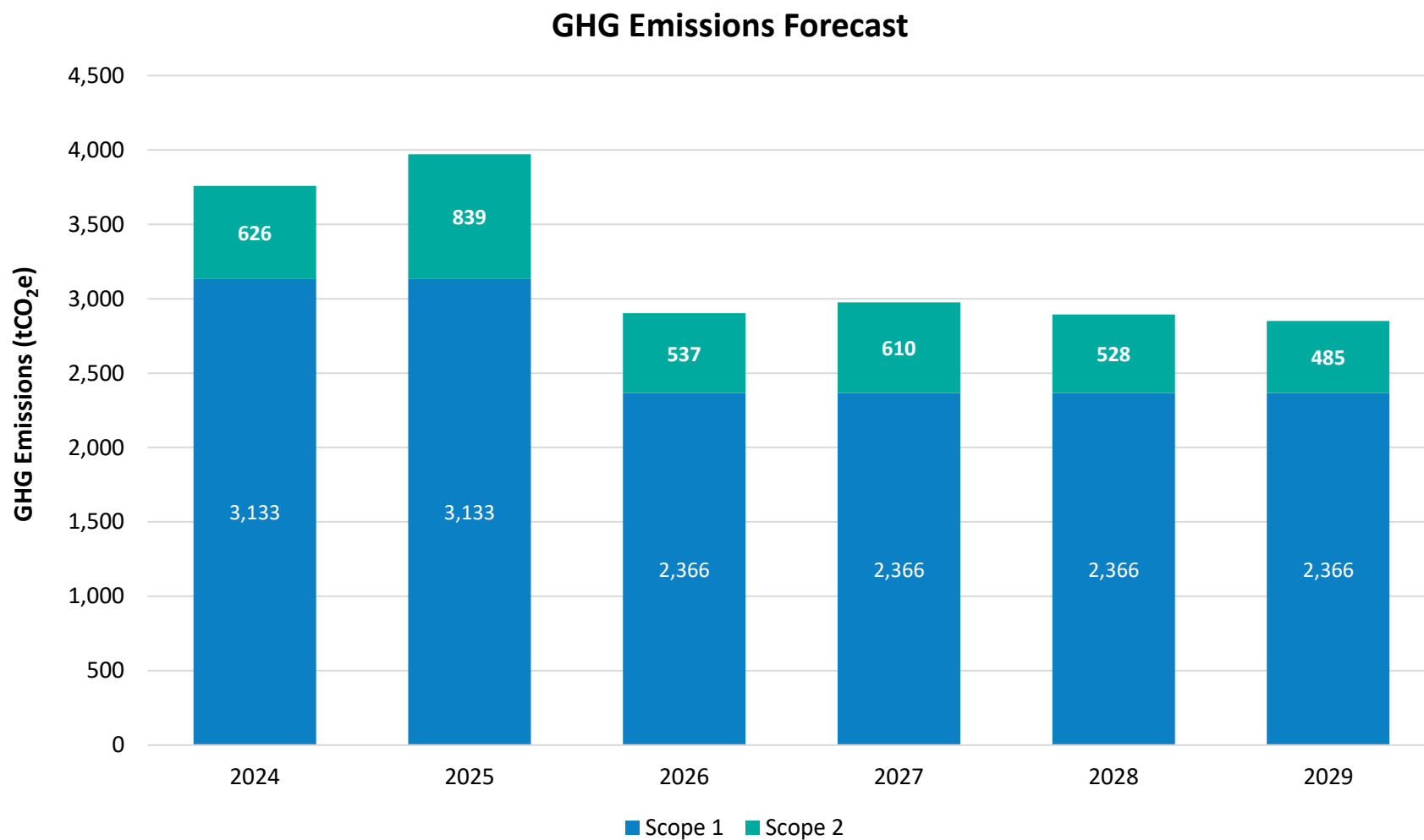


Figure 10. Forecast of Annual Greenhouse Gas Emissions

7. Closing Comments

Thank you to all who contributed to St. Thomas Elgin General 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 municipal services while integrating environmental stewardship into all aspects of facility operations.

On behalf of the Senior Management Team here at St. Thomas Elgin General Hospital, we approve this Energy Conservation & Demand Management Plan.

X _____

This ECDM plan was created through a collaborative effort between St. Thomas Elgin 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	<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 building with zero net energy consumption , meaning the total amount of energy used by the building on an annual basis is roughly equal to the amount of renewable energy 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, and Pictures

Tables

Table 1. St. Thomas Elgin General Hospital Facility Information.....	6
Table 2. Historic Energy Use Intensity	8
Table 3. Historic Annual Consumption	9
Table 4. Historic Greenhouse Gas Emissions.....	11
Table 5. Previously Implemented Energy Conservation and GHG Reduction Measures and Initiatives....	12
Table 6. Proposed Measures	13
Table 7. Forecast of Annual Utility Consumption from 2024 to 2029.....	15
Table 8. Forecast of Annual Greenhouse Gas Emissions from 2024 to 2029.....	17

Figures

Figure 1. Site-Wide Energy Consumption Trends & Projections	0
Figure 2. St. Thomas Elgin General Hospital	6
Figure 3. STEGH Mission, Vision, Values.....	7
Figure 4. Historic Annual Energy Utilization Indices.....	8
Figure 5. Historic Annual Consumption	9
Figure 6. Examples of Scope 1 and 2	10
Figure 7. Historic GHG Emissions.....	11
Figure 8. St. Thomas Elgin General Hospital.....	12
Figure 9. Forecast of Annual Utility Consumption.....	16
Figure 10. Forecast of Annual Greenhouse Gas Emissions.....	18