
# Energy Conservation & Demand Management Plan

# 2019-2024

Haldimand War Memorial Hospital

# Executive Summary

The purpose of this Energy Conservation and Demand Management (ECDM) Plan from Haldimand War memorial Hospital ("HWMH") 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 HWMH's core values of efficiency, concern for the environment and financial responsibility, 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 sections 4, 5, and 6 of the recently amended Electricity Act, 1998, O. Reg. 507/18.

Today, utility and energy related costs are a significant part of overall operating costs. In 2018:

- Energy Use Index (EUI) was 54 ekWh/sq.ft which is lower than the Ontario average of 63.23 ekWh/sq.ft
- Energy-related emissions equaled 790 $tCO_2e$

To obtain full value from energy management activities, HWMH 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, HWMH can expect to achieve the following targets by 2024:

- ~ 7% reduction in electricity consumption
- ~ 21% reduction in natural gas consumption
- 155 $tCO_2e$ reduction of carbon equivalent emissions

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# 1 Introduction

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***

Best care, every person, every time.

***Our Mission***

Our excellence in health care is guided by our patients and residents, their families, research, and our highly skilled team of professionals. We provide that care in a safe and supportive environment, within a vibrant, rural community.

***Our Values***

- **Compassion:** we are known for exceptional caring and compassion.
- **Respect:** we respect the dignity of every person under our care and with whom we work.
- **Honesty:** we act with honesty, integrity, and transparency.
- **Teamwork:** we value the knowledge, opinions, and diversity of our team.

# 2 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.

# 3 About Haldimand War Memorial Hospital


*Picture 1. Haldimand War Memorial Hospital*

Haldimand War Memorial Hospital was established to commemorate the soldiers who had fought overseas during the First World War. We strive to provide the best possible care for our residents and provide a complete range of care for our community. We would like to acknowledge that our is on the Haldimand Tract, the traditional territory of the Anishinaabeg, Haudenosaunee, and Neutral peoples. We proudly serve the residents of Dunnville.

| Facility Overview | |
|---|---|
| **Facility Name** | **Haldimand War Memorial Hospital** |
| **Type of Facility** | Healthcare Services |
| **Address** | 400 Broad Street W., Dunnville, ON |
| **Gross Area (sq.ft)** | 113,440 |

*Table 1. Haldimand War Memorial Hospital Overview*

## 3.1 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 **63.23 ekWh/sq. ft**.

| Annual Consumption (EUI) | | | | | | |
|---|---|---|---|---|---|---|
| **Year** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** |
| **Haldimand War Memorial Hospital** | 39 | 51 | 57 | 41 | 58 | 54 |

*Table 2. Historic Energy Intensity*

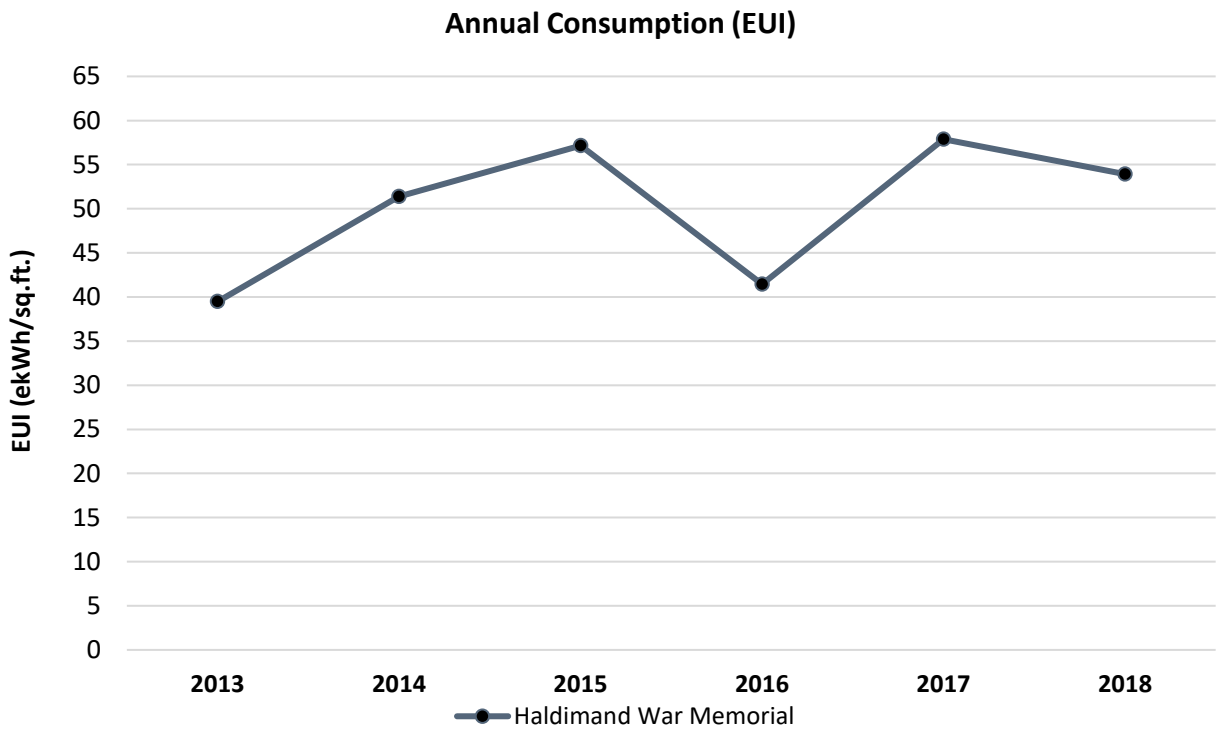


*Figure 1. Historic Energy Intensity*

## 3.2 Sustainability Strategies to Date

HWMH's is continuously reviewing opportunities to improve energy conservation and facility operation. Recently completed energy and water saving initiatives are summarized in the table below:

| Measure | Impacted Utility |
|---|---|
| LED Lighting Retrofit | Electricity |
| Water cooled compressors upgraded to energy efficient air-cooled models. | Electricity |
| Significant boiler room retrofit project including steam trap replacement, re-insulation of all piping, VFD booster system. | Natural Gas |
| Installed high-efficiency boilers and controls for the Emergency Room. | Natural Gas |
| Motion sensing lighting controls in all applicable areas of the hospital. | Electricity |
| Installation of capacitor bank onsite to correct power factor. | Electricity |

*Table 3. Current Sustainability Strategies*

# 4 Site Analysis


*Picture 2. Haldimand War Memorial Hospital*

Haldimand War Memorial Hospital opened in 1920 and has grown substantially with the community. We are a 36-bed facility; we have 12 Complex Care beds, 22 Acute Care beds, and 2 Respite Care beds. We provide surgical services, diagnostic imaging services, and visiting specialists. Our goal is always to provide the best possible care for our community, and that will never change.

| Facility Information | |
|---|---|
| **Facility Name** | **Haldimand War Memorial Hospital** |
| **Address** | 400 Broad Street W., Dunnville, ON |
| **Gross Area (sq.ft)** | 113,440 |
| **Average Operational Hours in a Week** | 168 |
| **Number of Beds** | 36 |

*Table 4. Haldimand War Memorial Hospital Facility Information*

## 4.1 Utility Consumption Analysis

In order to compare different energy sources within this report, energy will be expressed in units of ekWh – equivalent kilowatt-hours. The energy contained in a cubic metre of natural gas would be converted into the equivalent amount of the energy contained in a kilowatt hour of electricity.

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 (units) | | | | | | |
|---|---|---|---|---|---|---|
| **Year** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** |
| **Electricity (kWh)** | 2,086,333 | 2,078,858 | 2,270,373 | 948,720 | 2,434,842 | 2,320,191 |
| **Natural Gas ($m^3$)** | 231,538 | 363,005 | 407,918 | 363,517 | 399,915 | 367,405 |

*Table 5. Historic Annual Utility Consumption*

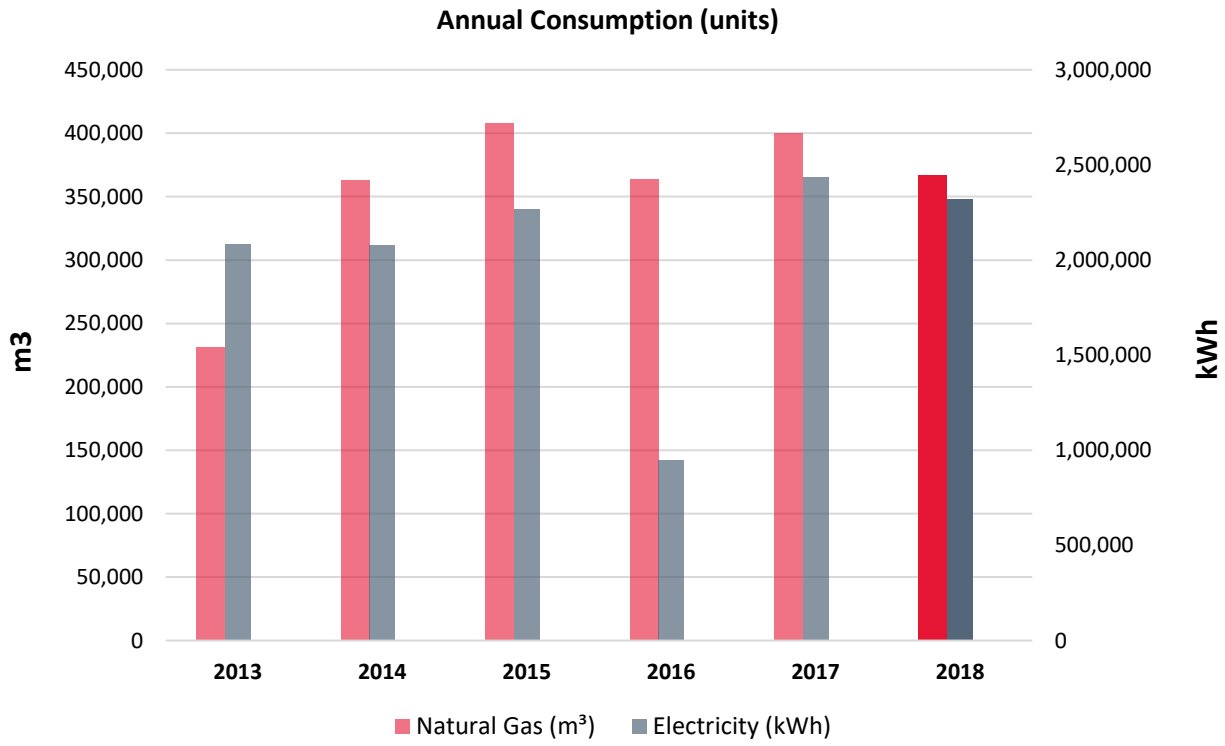


*Figure 2. Historic Annual Utility Consumption*

## 4.2 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 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.

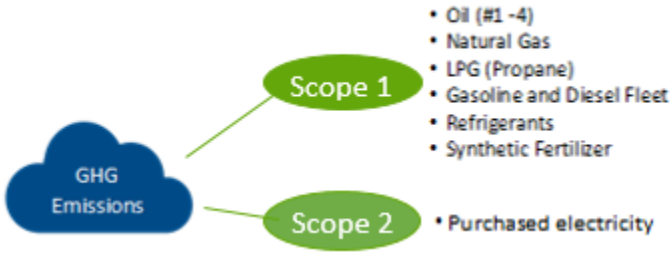


*Figure 3. Examples of Scope 1 and 2*

| GHG Emissions | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|
| **Electricity (scope 2)** | 86 | 85 | 93 | 39 | 100 | 95 |
| **Natural Gas (scope 1)** | 438 | 686 | 771 | 687 | 756 | 694 |
| **Totals** | **523** | **771** | **864** | **726** | **856** | **790** |

*Table 6. Historic Greenhouse Gas Emissions*

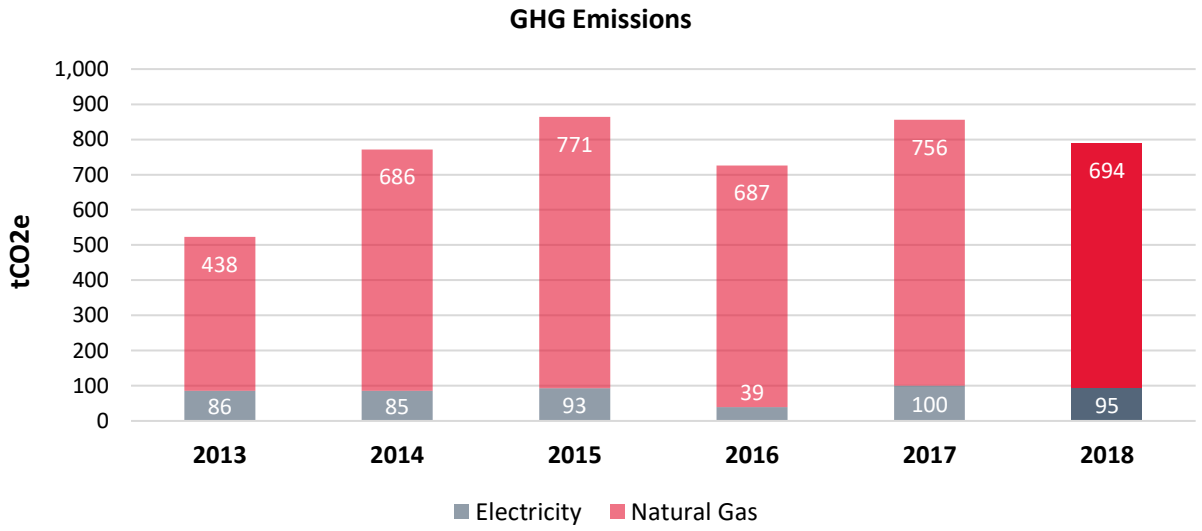


*Figure 4. Historic Greenhouse Gas Emissions*

## 4.3 Proposed Conservation Measures

Our energy analysis has revealed several conservation strategies for the facility. HWMH's proposed energy and water 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.

| Measure | Impacted Utility | Estimated Annual Savings | | Simple Payback (years) | Year of Implementation |
|---|---|---|---|---|---|
| | | kWh | m3 | | |
| **Motion Sensing Lighting Controls** | Electricity | 41,435 | 0 | 7.61 | 2022 |
| **Building Automation Upgrade & HVAC Scheduling Adjustments** | Electricity & Natural Gas | 64,957 | 11,163 | 13.51 | 2023 |
| **VFD Installation of Various Pumps & Fans** | Electricity | 34,529 | 0 | 4.93 | 2024 |
| **Chiller to Rooftop HVAC Conversion** | | TBD | TBD | TBD | 2021 |
| **Upgrade All Motors to Premium Efficiency** | Electricity | 12,500 | 0 | 8.53 | 2021 |
| **Steam Trap Audit & Replacement** | Natural Gas | 0 | 2,849 | 2.86 | 2022 |
| **Installation of Linkageless Controls for Large Burners** | Natural Gas | 0 | 4,041 | 2.02 | 2022 |
| **Installation of Removable Insulation & Insulation Upgrades** | Natural Gas | 0 | 26,702 | 7.76 | 2019 |
| **Steam Piping & Condensate System Upgrades** | Electricity & Natural Gas | 12,319 | 33,592 | 14.81 | 2019 |
| **Totals** | | **165,740** | **78,347** | | |

*Table 7. Proposed Conservation Measures*

## 4.4 Utility Consumption Forecast

By implementing the energy conservation measures stated in the previous section, the forecasted 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 off the data from the baseline year of 2018.

| | Annual Consumption Forecast (units) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 2019 | | 2020 | | 2021 | | 2022 | | 2023 | | 2024 | |
| | Units | % Change | Units | % Change | Units | % Change | Units | % Change | Units | % Change | Units | % Change |
| Electricity (kWh) | 2,320,191 | 0% | 2,307,872 | 1% | 2,295,372 | 1% | 2,253,936 | 3% | 2,188,979 | 6% | 2,154,450 | 7% |
| Natural Gas ($m^3$) | 367,405 | 0% | 307,111 | 16% | 307,111 | 16% | 300,221 | 18% | 289,058 | 21% | 289,058 | 21% |

*Table 8. Forecast for Annual Utility Consumption*

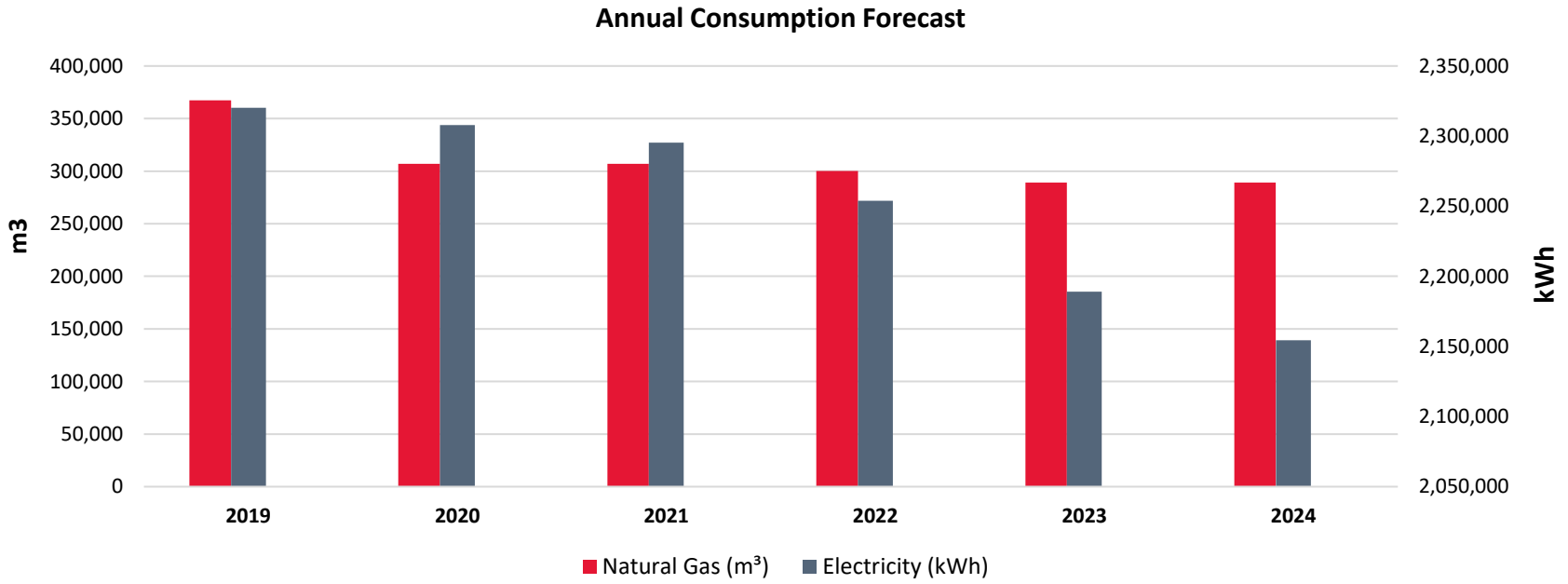


*Figure 5. Forecast for Annual Utility Consumption*

## 4.5 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 2018.

| Annual Emissions Forecast (units) | | | | | | |
|---|---|---|---|---|---|---|
| **Utility Source** | **2019** | **2020** | **2021** | **2022** | **2023** | **2024** |
| **Electricity** | 95 | 95 | 94 | 92 | 90 | 88 |
| **Natural Gas** | 694 | 580 | 580 | 567 | 546 | 546 |
| **Totals** | **790** | **675** | **675** | **660** | **636** | **635** |
| **Reduction from Baseline Year (2018)** | **0%** | **14%** | **15%** | **16%** | **19%** | **20%** |

*Table 9. Forecast for Annual Greenhouse Gas Emissions*

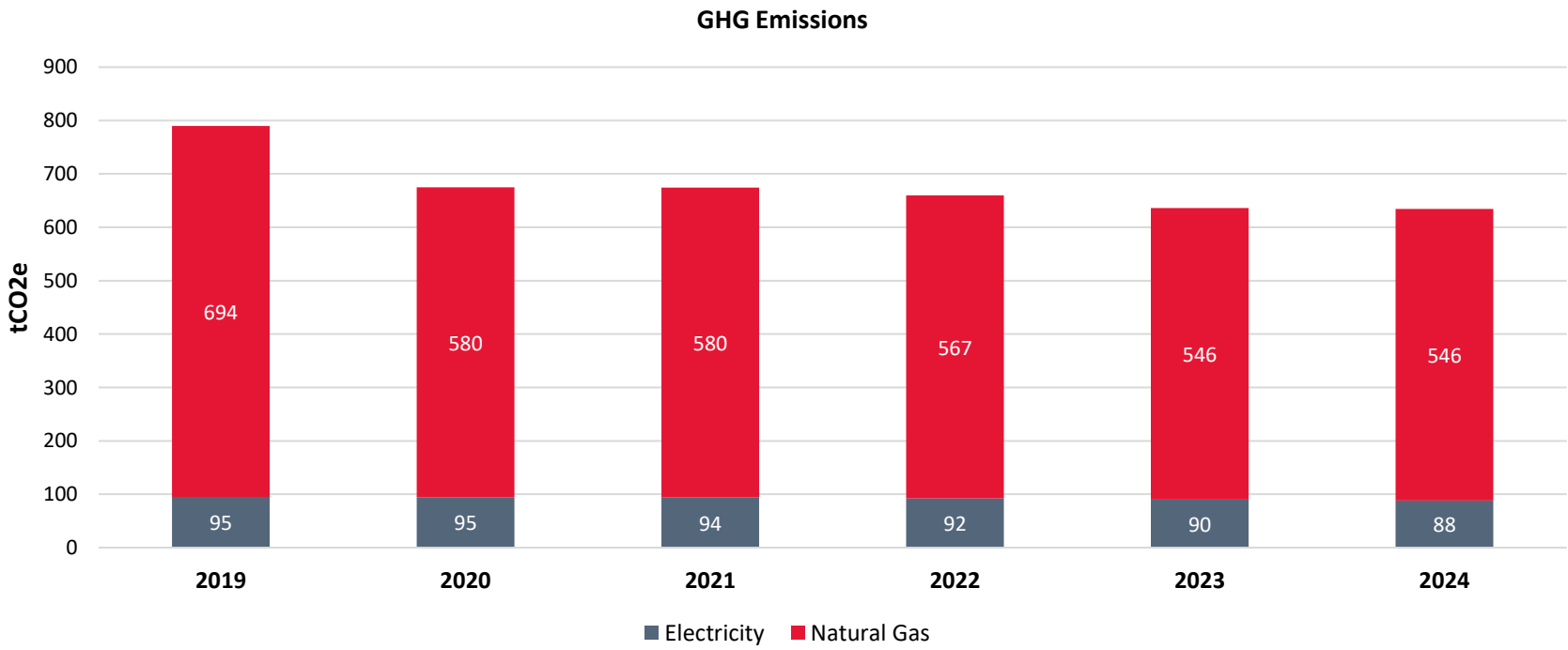


*Figure 6. Forecast for Annual Greenhouse Gas Emissions*

# 5 Closing Comments

Thank you to all who contributed to Haldimand War Memorial 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 Haldimand War Memorial Hospital, we approve this Energy Conservation & Demand Management Plan.

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

# 6 Appendix

## 6.1 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 | 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 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. |

## 6.2 List of Pictures, Tables and Figures

### Pictures



### Tables



### Figures