2019

# ENERGY CONSERVATION & DEMAND MANAGEMENT PLAN

## The McCausland Hospital

NORTH OF SUPERIOR
HEALTHCARE GROUP

# Executive Summary

The purpose of this Energy Conservation and Demand Management (ECDM) Plan from The McCausland Hospital ("McCausland") 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 McCausland'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.

Through past conservation and demand initiatives, McCausland has achieved the following results:

- 77,240 kwh reduction in electricity use

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

- McCausland's Energy Use Index (EUI) was 66 ekWh/$ft^2$
- Energy-related emissions equaled 697 $tCO_2e$

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

- ~ 13% reduction in electricity consumption
- ~ 29% reduction in propane consumption
- 99 tCO2e carbon equivalent emissions

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# 1 Introduction

The purpose of The McCausland Hospital's Conservation and Demand Management Plan (ECDM) is to promote sustainable stewardship of our environment and community resources. To obtain full value from energy management activities, and to strengthen our conservation initiatives, a strategic approach would be taken. Our organization would strive to fully integrate energy management into our practices by considering indoor environmental quality, operational efficiency, and sustainably sourced resources into financial decision-making.

### *Our Mission*

Our rural hospitals will provide high quality health care services in a learning environment to improve the health of our communities in collaboration with other service providers.

### *Our Vision*

Healthy communities, now, and in the future

### *Our Values*

We are accountable to the communities we serve.

- We will achieve high quality care through the adoption of best practices and innovation.
- We respect the changing and diversifying natures of our communities.
- We value compassion, fairness, integrity and teamwork.

# 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 The McCausland Hospital

*Picture 1. The McCausland Hospital*

The North of Superior Healthcare Group is a three-site facility, which includes The McCausland Hospital, that amalgamated on April 1st, 2016. The McCausland Hospital serves the communities of Terrace Bay, Schreiber, Rossport, Jackfish and Pays Plat. We are committed to quality of care and experience; great care has been taken to provide efficient service to the public.

| Facility Overview | |
|---|---|
| **Facility Name** | The McCausland Hospital |
| **Type of Facility** | Healthcare Services |
| **Address** | 20B Cartier Road, Terrace Bay, ON |
| **Gross Area (ft2)** | 62,000 |

*Table 1. The McCausland 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** |
| **Wilson Memorial General Hospital** | 60 | 51 | 54 | 48 | 63 | 66 |

*Table 2. Historic Energy Intensity*

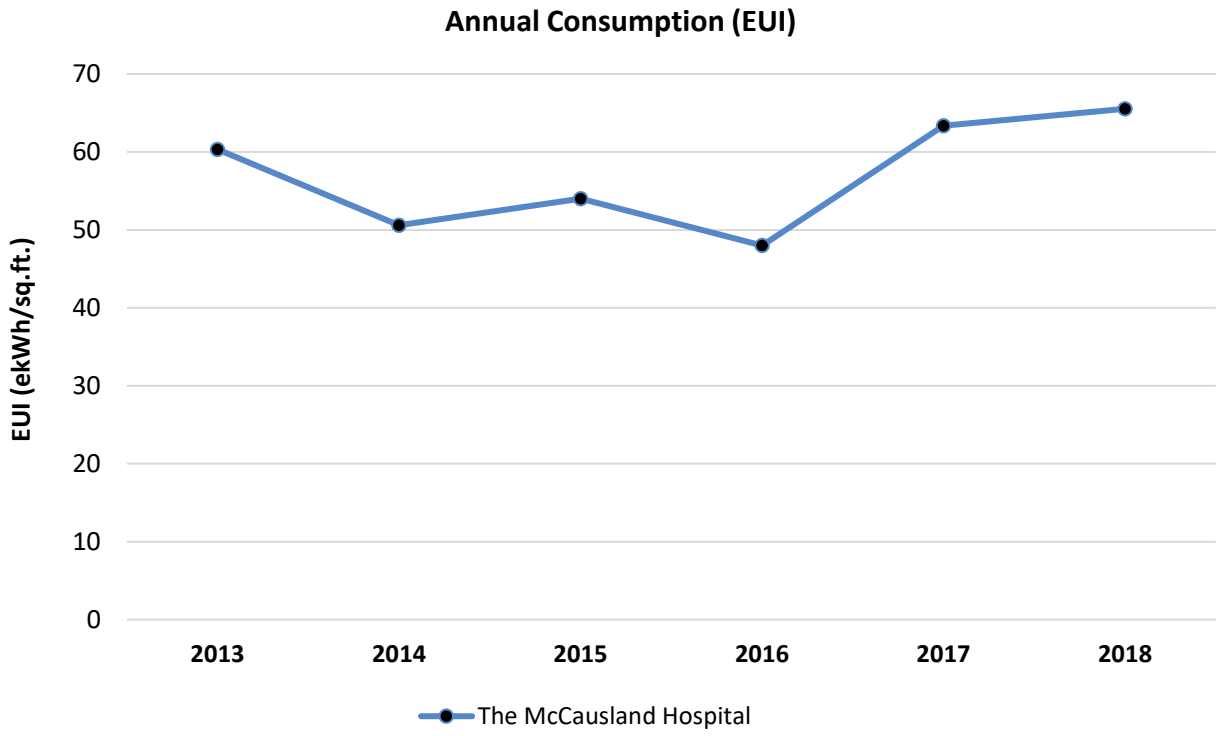


*Figure 1. Historic Energy Intensity*

## 3.2 Sustainability Strategies to Date

McCausland regularly reviews opportunities for operational efficiency and energy conservation. Below is a list of measures that the hospital has completed in the past 5 years.

- The hospital completed an exterior lighting retrofit switching the models to LEDs
- In 2018, 60% of the roof top units (RTUs) and air handling units (AHUs) were replaced

# 4 Site Analysis


*Picture 2. The McCausland Hospital*

The McCausland Hospital delivers health services to Terrace Bay, ON and the surrounding communities of approximately 4,000 residents. Named for the town's first physician, Dr. Michael McCausland, the present structure was built in 1980. We are a modern, fully accredited 45-bed community hospital located on the beautiful North Shore of Lake Superior.

| Facility Information | |
|---|---|
| **Facility Name** | The McCausland Hospital |
| **Address** | 20B Cartier Road, Terrace Bay, ON |
| **Gross Area (Ft.$^2$)** | 62,000 |
| **Average Operational Hours in a Week** | 168 |
| **Number of Beds** | 45 |
| **Number of Floors** | 1 |

*Table 3. The McCausland 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 liter of propane or fuel oil would be converted into the equivalent amount of the energy contained in a kilowatt hour of electricity.

Utilities to the site are electricity, propane, fuel oil and water. 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)** | 1,237,123 | 1,073,531 | 1,029,363 | 1,024,457 | 1,097,867 | 1,159,883 |
| **Propane (L)** | 6,487 | 23,466 | 232,087 | 227,197 | 325,871 | 227,386 |
| **Fuel Oil (L)** | 228,835 | 176,748 | 62,683 | 31,689 | 48,402 | 120,209 |

*Table 4. Historic Annual Utility Consumption*

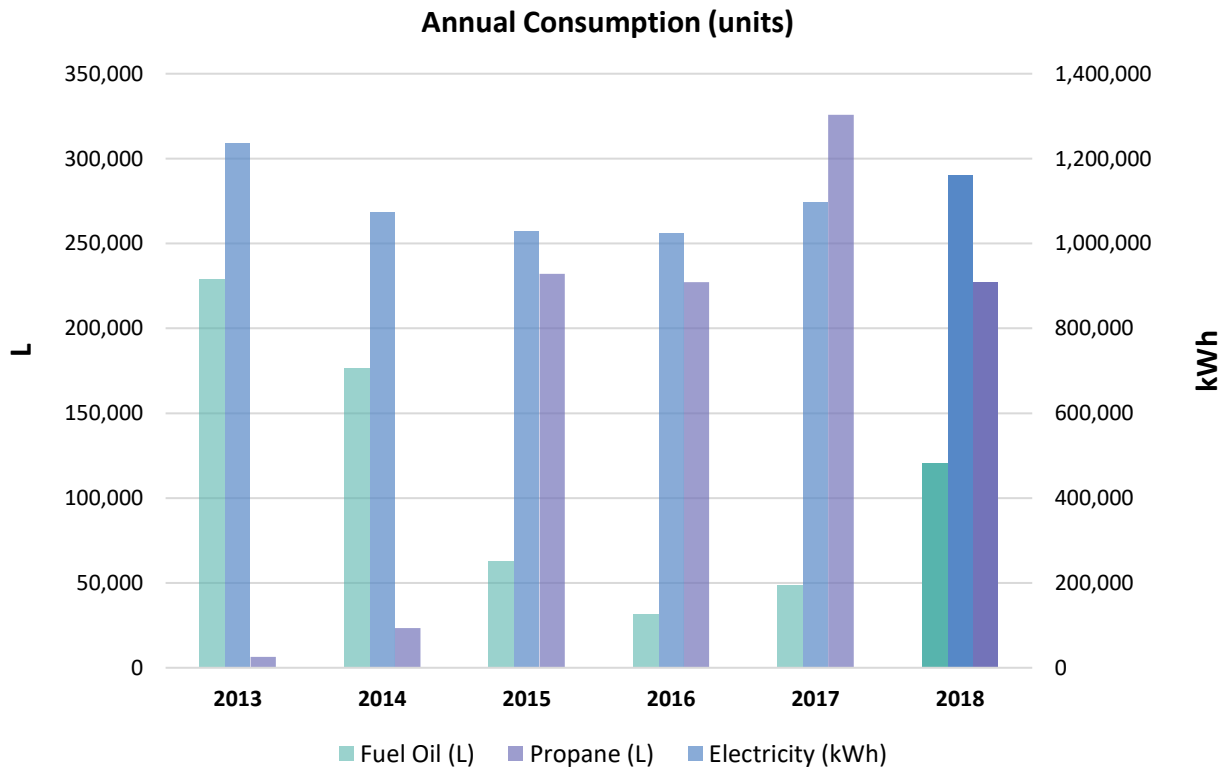


*Figure 2. Historic Annual Utility Consumption*

## 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, propane, fuel) 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.

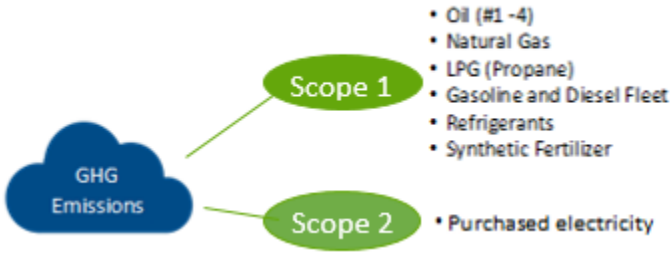


*Figure 3. Examples of Scope 1 and 2*

| GHG Emissions | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|---|---|---|---|---|---|---|
| **Electricity** | 51 | 44 | 42 | 42 | 45 | 48 |
| **Propane & Fuel Use** | 632 | 515 | 499 | 408 | 593 | 649 |
| **Totals** | **683** | **559** | **541** | **450** | **638** | **697** |

*Table 5. Historic Greenhouse Gas Emissions*

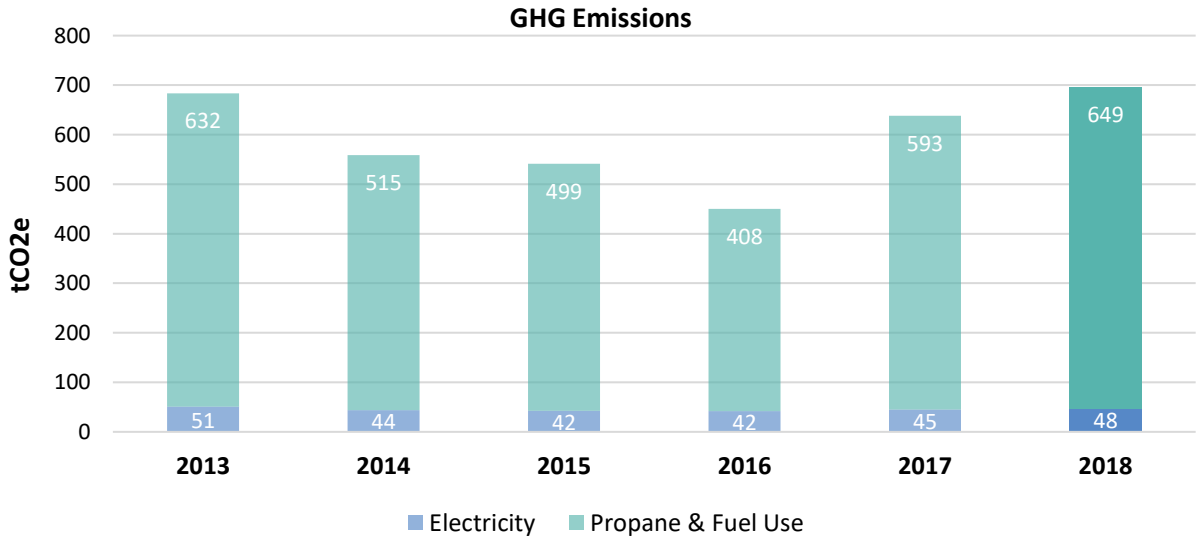


*Figure 4. Historic Greenhouse Gas Emissions*

## 4.3 Proposed Conservation Measures

Our energy analysis has revealed several conservation strategies for the facility. McCausland's proposed energy and propane 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 | L | | |
| **Interior Lighting Retrofit** | Electricity | 140,503 | 0 | 3.50 | 2020 |
| **Boiler Retrofit** | Propane | 0 | 26,586 | 1.73 | 2021 |
| **VSDs on Fans and Pumps** | Electricity | 30,480 | 0 | 2.00 | 2022 |
| **AHU Replacement** | Propane | 0 | 6,135 | 14.75 | 2022 |
| **Roofing Upgrade** | Electricity & Propane | 21,772 | 10,225 | 70.51 | 2023 |
| **Totals** | | **192,755** | **42,946** | | |

*Table 6. Proposed Conservation Measures*

## 4.4 Utility Consumption Forecast

By implementing the energy conservation measures stated in the previous section, the forecasted electricity fuel oil and propane 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) | 1,159,883 | 0% | 1,054,883 | 9% | 1,054,883 | 9% | 1,024,403 | 12% | 1,003,403 | 13% | 1,003,403 | 13% |
| Propane (L) | 227,386 | 0% | 227,386 | 0% | 227,386 | 0% | 187,113 | 18% | 177,820 | 22% | 162,330 | 29% |
| Fuel Oil (L) | 120,209 | 0% | 120,209 | 0% | 120,209 | 0% | 120,209 | 0% | 120,209 | 0% | 120,209 | 0% |

*Table 7. Forecast for Annual Utility Consumption*

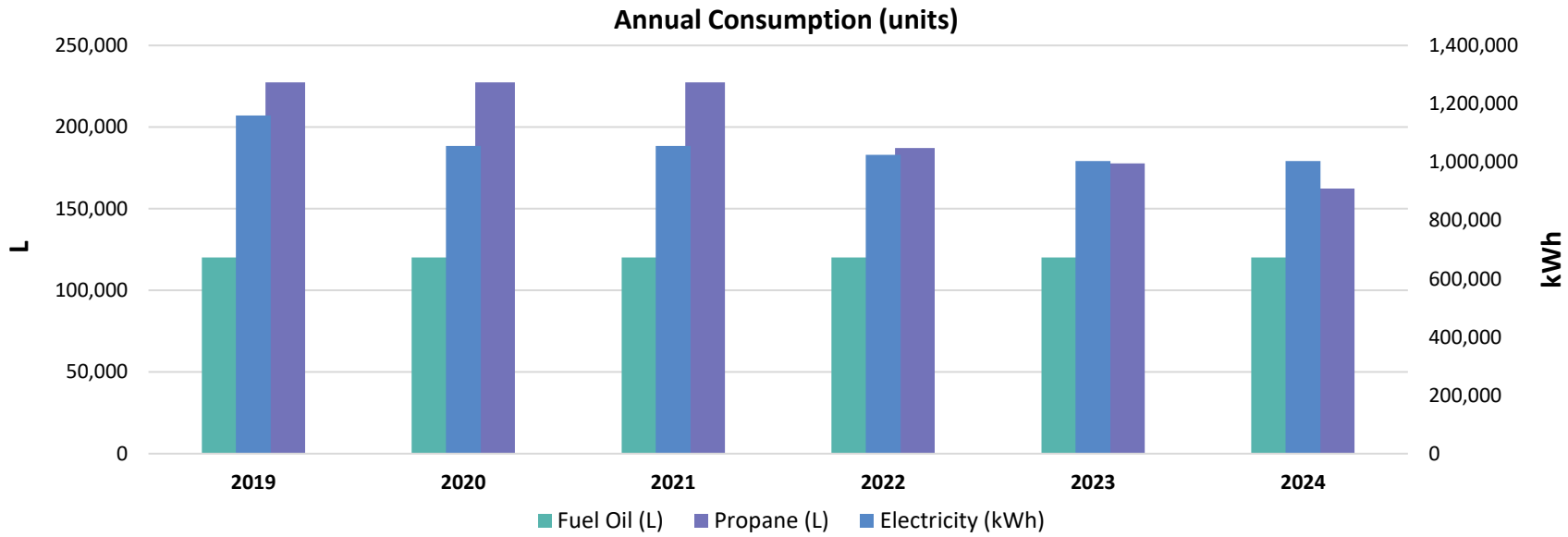


*Figure 5. Forecast for Annual Utility Consumption*

## 4.5 GHG Emissions Forecast

The forecasted greenhouse gas emissions for McCausland Hospital 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** | 48 | 43 | 43 | 42 | 41 | 41 |
| **Propane & Fuel Use** | 649 | 649 | 649 | 592 | 579 | 557 |
| **Totals** | **697** | **693** | **693** | **634** | **620** | **598** |
| **Reduction from Baseline (2018)** | 0.00% | 0.62% | 0.62% | 8.98% | 10.99% | 14.14% |

*Table 8. Forecast for Annual Greenhouse Gas Emissions*

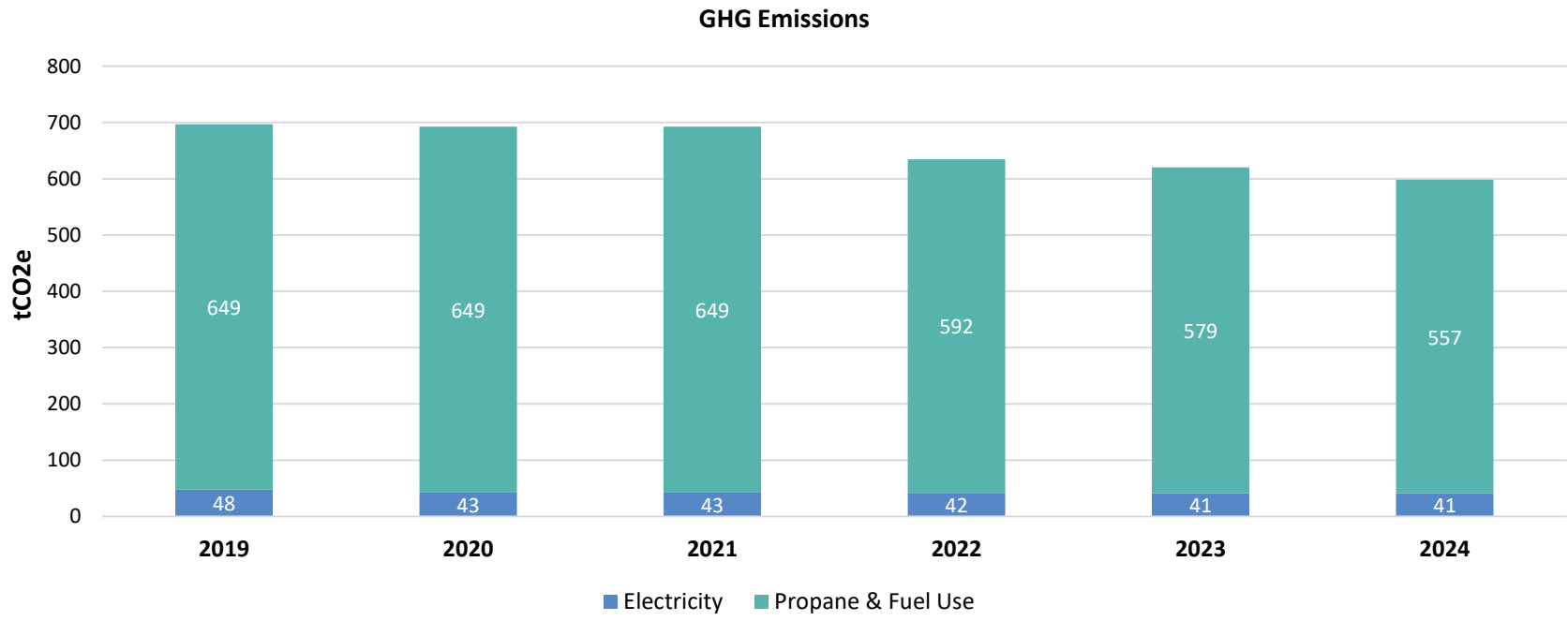


*Figure 6. Forecast for Annual Greenhouse Gas Emissions*

# 5 Closing Comments

Thank you to all who contributed to The McCausland 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 The McCausland Hospital, we approve this Energy Conservation & Demand Management Plan.

This ECDM plan was created through a collaborative effort between The McCausland 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 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. |

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