2019

ENERGY CONSERVATION & DEMAND MANAGEMENT PLAN

Executive Summary

The purpose of this Energy Conservation and Demand Management (ECDM) Plan from Nipigon District Memorial Hospital (NDMH) 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 NDMH'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, NDMH has achieved the following results:

- 134,280 m3 reduction in natural gas use
- 9% reduction in the hospital's total energy use since 2013

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

- NDMH's Energy Use Index (EUI) was 77 ekWh/ft^2
- Energy-related emissions equaled 638 tCO_2e

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

- 8% reduction in electricity consumption
- 2% reduction in facility energy utilization
- 96 tCO2e reduction in 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.

Nipigon District Memorial Hospital is committed to proving excellent healthcare and wellness promotion services in order to improve the health of the population and the quality of life for all residents in our communities. We are committed to changing and growing with the community and continue to build a sustainable, high quality, health system.

Our Vision
Partnering for a Healthier Tomorrow.

Our Mission
The Hospital delivers excellence in rural health care with our partners for all residents in our communities.

Our Values
Patient and Resident Centered, Integrity, Respect, Responsible.

Our Philosophy
Patients, residents and their families are at the centre of everything we do.

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.

Through conservation, Ontario homeowners, businesses and industry have saved more than 1,900 megawatts (MW) of peak demand electricity since 2005 – the equivalent of more than 600,000 homes being taken off the grid.

3. About Nipigon District Memorial Hospital

Picture 1. *Nipigon District Memorial Hospital*

Nipigon District Memorial Hospital (NDMH) is an integral part of the Nipigon community in health promotion, prevention, diagnosis, treatment and patient care. The facility provides a unique component of health care services to the Ontario's north western communities. As a small hospital in a rural area we believe we have a role beyond caring for the sick, our opportunities expand through integrative and collaborative partnerships with local and regional health care providers, the communities and the public.

Facility Overview	
Facility Name	**Nipigon District Memorial Hospital**
Type of Facility	Healthcare Services
Address	125 Hogan Road, Nipigon, ON
Gross Area (ft2)	56,215

Table 1. *Nipigon District 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**
Nipigon District Memorial Hospital	85	87	88	77	86	77

Table 2. *Historic Energy Intensity*

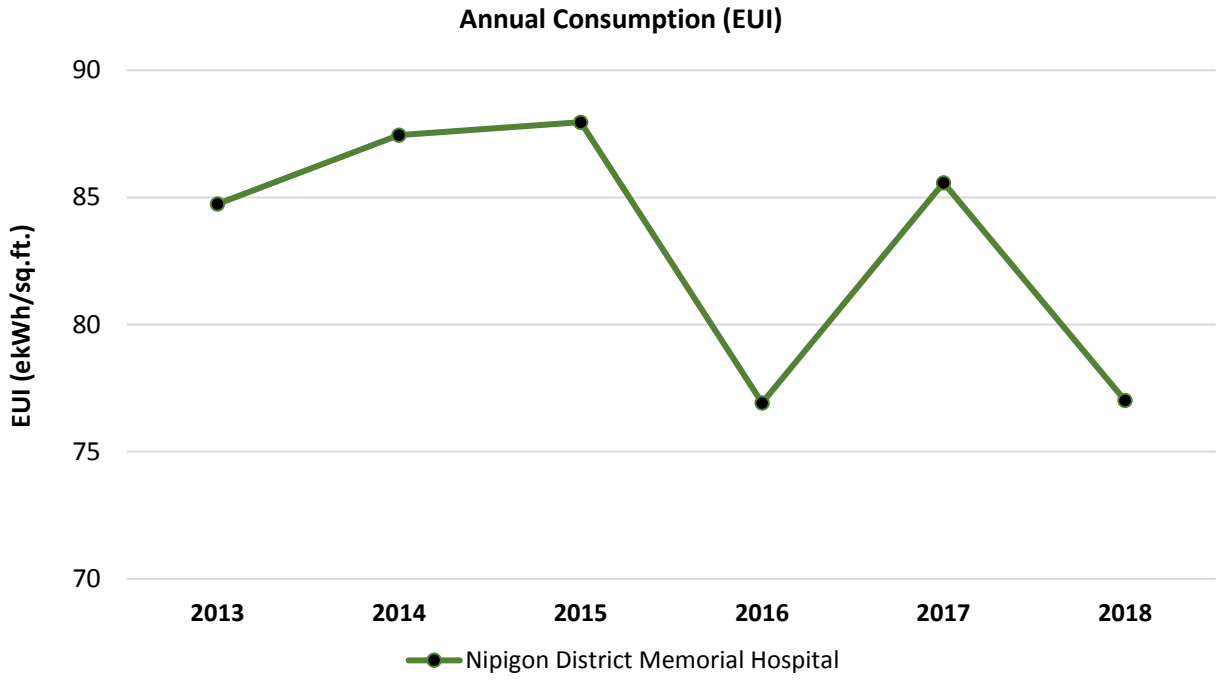

Figure 1. *Historic Energy Intensity*

3.2 Sustainability Strategies to Date

NDMH's continuously reviews opportunities to conserve the facilities energy use. The chart below provides a brief description of the conservation measures completed in the past 5 years.

Completed Energy Conservation Measures	
Measure Name	**Description**
LED Lighting Retrofit	The hospital converted all fluorescent T8 lamps to LED equivalents throughout their main building, maintenance garage, clinic, and two ambulance bases.
Building Automation System Upgrade	The facility underwent a full conversion of their pneumatic control system to digital controls on all major mechanical systems including new front-end graphics.

Table 3. *Current Sustainability Strategies*

4. Site Analysis

Picture 2. Nipigon District Memorial Hospital

Nipigon District Memorial Hospital is an integral part of Nipigon community. The facility provides a unique component of health care services to the Ontario's north western communities. We are a 37-bed facility that provides services through in-patient and out-patient programs. The Hospital site has 15 acute care beds, 15 long term care beds, and 7 chronic care beds. We are dedicated to delivering quality healthcare to this northern community.

Facility Information	
Facility Name	Nipigon District Memorial Hospital
Facility Type	Healthcare Services
Address	125 Hogan Road, Nipigon, ON
Gross Area (Ft.^{2})	56,125
Average Operational Hours in a Week	168
Number of Beds	37
Number of Floors	1

Table 4. Nipigon District 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 meter 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)	1,666,925	1,641,610	1,625,640	1,736,793	1,808,893	1,724,225
Natural Gas (m^3)	265,205	281,291	285,397	250,455	290,555	252,206

Table 5. Historic Annual Utility Consumption

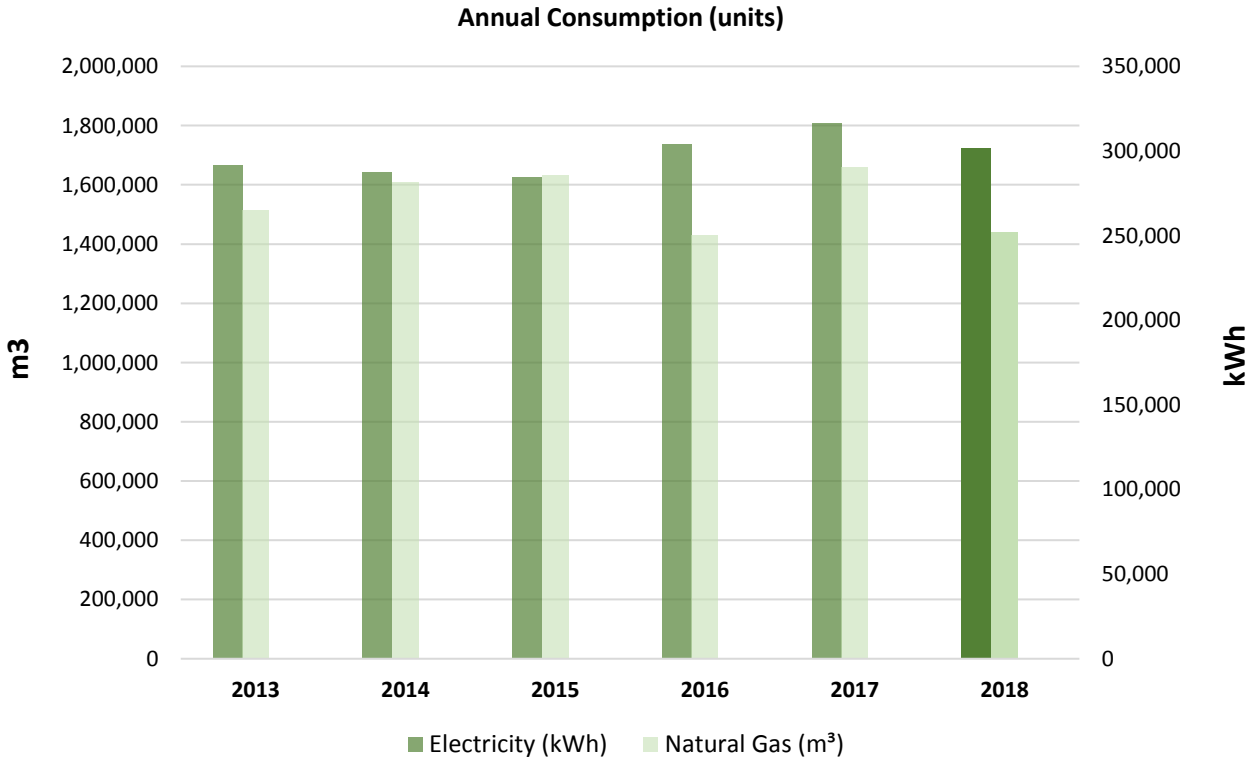

Figure 2. Historic Annual Utility Consumption

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.

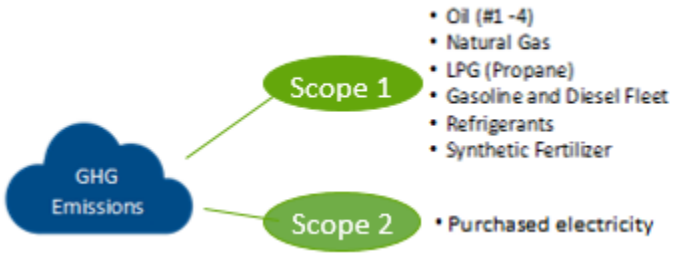

Figure 3. Examples of Scope 1 and 2

GHG Emissions	2013	2014	2015	2016	2017	2018
Electricity	68	67	67	71	74	71
Natural Gas	597	633	642	564	654	567
Totals	**665**	**700**	**709**	**635**	**728**	**638**

Table 6. Historic Greenhouse Gas Emissions

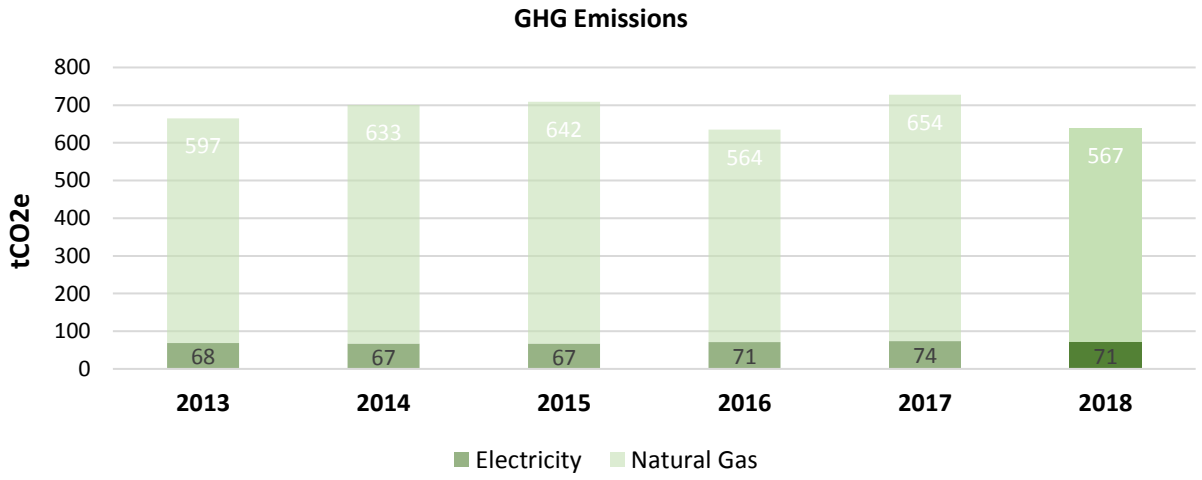

Figure 4. Historic Greenhouse Gas Emissions

4.3 Proposed Conservation Measures

Our energy analysis has revealed several conservation strategies for the facility. NDMH'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.

Measure	Impacted Utility	Estimated Annual Savings		Simple Payback (years)	Year of Implementation
		kWh	m3		
Power Factor Correction	Electricity	95,683	0	1.74	2022
Canopy Lights Retrofit	Electricity	41,400	0	1.69	2021
Street lights Retrofit	Electricity	22,338	0	2.54	2021
Wall Packs Retrofit	Electricity	5,834	0	2.57	2020
Totals		**123,855**	**0**		

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)	1,724,225	0%	1,724,225	0%	1,697,747	2%	1,602,064	7%	1,602,064	7%	1,602,064	7%
Natural Gas (m^3)	252,206	0%	252,206	0%	252,206	0%	252,206	0%	252,206	0%	252,206	0%

Table 8. Forecast for Annual Utility Consumption

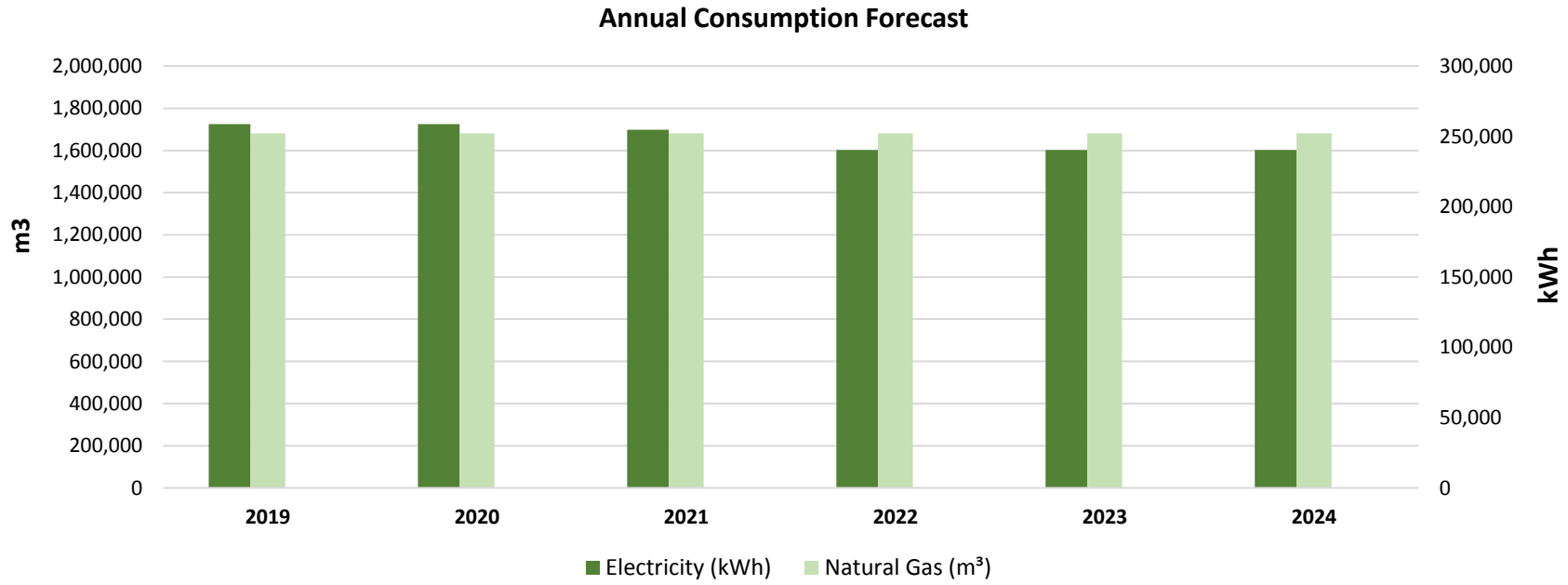

Figure 5. Forecast for Annual Utility Consumption

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	71	71	70	66	66	66
Natural Gas	477	477	477	477	477	477
Totals	**547**	**547**	**546**	**542**	**542**	**542**
Reduction from Baseline (2018)	**14%**	**14%**	**14%**	**15%**	**15%**	**15%**

Table 9. Forecast for Annual Greenhouse Gas Emissions

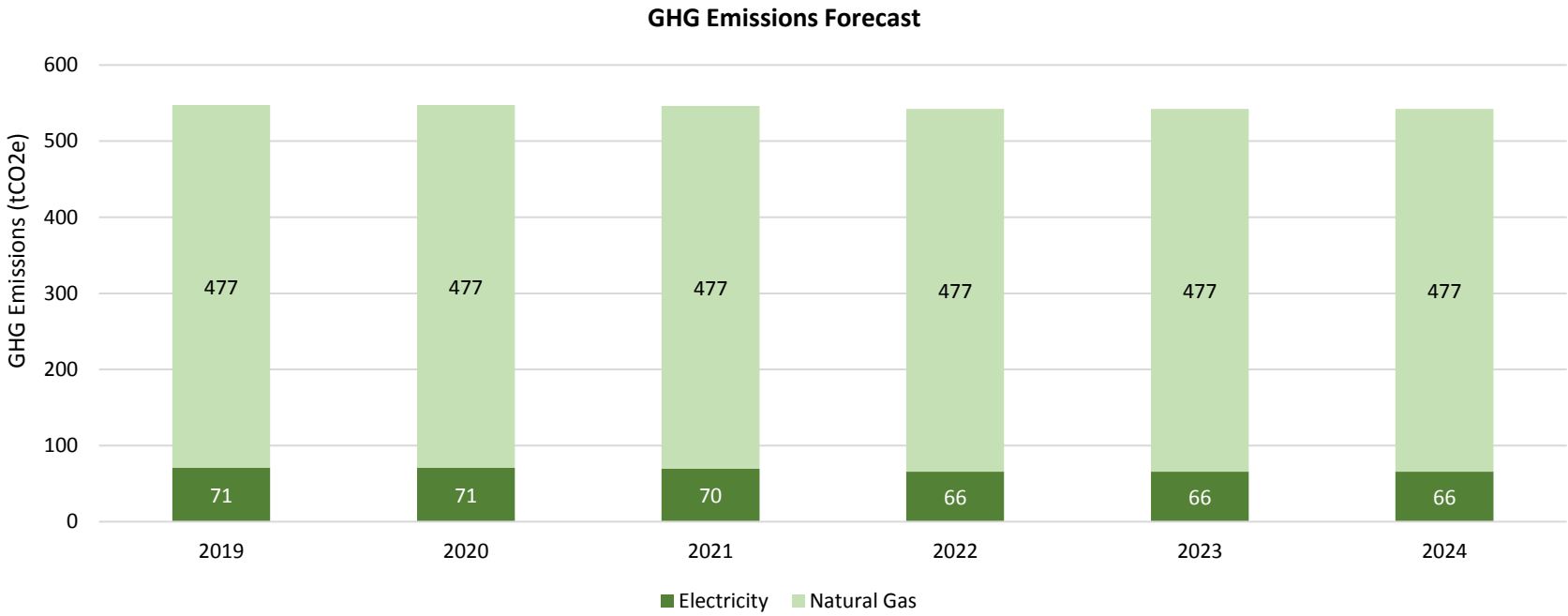

Figure 6. Forecast for Annual Greenhouse Gas Emissions

5. Closing Comments

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

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.

6.2 List of Tables, Figures and Pictures

Tables

Figures

Pictures