



# ENERGY CONSERVATION & DEMAND MANAGEMENT PLAN

## 2019



Red Lake Margaret Cochenour  
MEMORIAL HOSPITAL

# Executive Summary

The purpose of this Energy Conservation and Demand Management (ECDM) Plan from Red Lake Margaret Cochenour Memorial Hospital (“Red Lake”) 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 Red Lake’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, Red Lake has achieved the following results:

- Over 100,000 kwh reduction in electricity use
- 236,521 L reduction in propane and fuel oil use
- >30% 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:

- Red Lake’s Energy Use Index (EUI) was 86 ekWh/ft<sup>2</sup>
- Energy-related emissions equaled 391 tCO<sub>2</sub>e

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

- ~ 2 % reduction in energy use
- ~ 3% 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.

Red Lake Margaret Cochenour Memorial Hospital services the communities of Red Lake and Ear Falls. We are dedicated to meeting the healthcare and wellbeing needs of the area, helping the people who live here and the ones who visit. We have a team of employees, physicians, volunteers and donors whose focus is to provide excellence in rural health care and exceed industry standards for quality of care.

## *Our Mission*

Compassionate, quality care – every patient, every time.

## *Our Vision*

Working together towards excellence in rural health care.

## *Our Values*

- Patient-centered: ensuring the needs of patients and families are central to our actions and decisions
- Caring: responding to our patients and each other with kindness, respect and compassion
- Integrity: doing the right thing in all ways and in every encounter
- Safety: maintaining the highest safety standards in patient care and our work environment
- Learning: supporting and encouraging our employees, volunteers and patients in a culture of learning
- Advocacy: speaking up for patients and our community
- Accountability: operating in a medically, socially and financially responsible manner

## 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 Hospital



*Picture 1. Red Lake Margaret Cochenour Memorial Hospital*

Red Lake Margaret Cochenour Memorial Hospital (“Red Lake”) was created to help meet the healthcare and wellbeing needs of the communities of Red Lake and Ear Falls. We strive to provide excellent healthcare while demonstrating our commitment to operating in a medically, social and financially responsible manner. We take pride in our efforts to keep these services within our community, and to ensure those services meet or exceed industry standards for quality of care.

Red Lake Margaret Cochenour Memorial Hospital	
<b>Type of Facility</b>	Healthcare Services
<b>Facility Name</b>	Red Lake Margaret Cochenour Memorial Hospital
<b>Address</b>	#51 Highway 105, Red Lake, ON
<b>Gross Area (ft2)</b>	31,740
<b>Number of Floors</b>	2

*Table 1. Red Lake Margaret Cochenour 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
Red Lake Margaret Cochenour Memorial Hospital	125	100	70	73	75	86

Table 2. Historic Energy Intensity

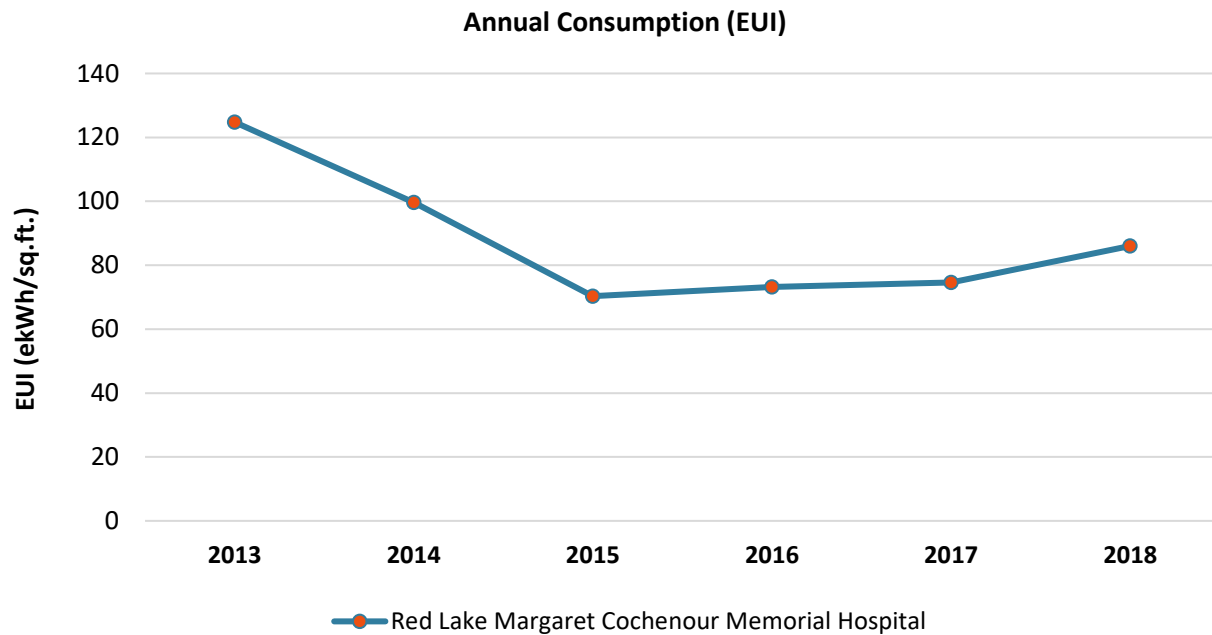


Figure 1. Historic Energy Intensity

## 3.2 Sustainability Strategies to Date

Red Lake has completed a significant amount of energy conservation measures. The hospital team is continuously looking for ways to improve its operations. Energy and water saving initiatives that were previously implemented are summarized in the table below.

Cost Saving Measures (CSM)	Hydro		Gas (m3)	Oil #2 (L)	Propane (L)
	kW	kWh			
Retrofit and New Interior Lighting Fixtures	10.72	42,946	-441		
Replace Outdoor Lighting to LED		6,950			
Lighting Control		133			
Upgrade and Expand Controls		44,495		12,321	
Upgrade Room Temperature Controls		7,916		6,923	
Car Plugs OAT Reset		6,366			
Zone Dampers					
Fuel Conversions Boiler Plant Fuel Conversion DHW Heaters Fuel Conversion Kitchen and Laundry Equipment			-209,789	162,315	61,885
<b>Project Measures Grand Total</b>	<b>10.72</b>	<b>87,441</b>	<b>-210,230</b>	<b>174,636</b>	<b>61,885</b>

*Table 3. Previously Completed Conservation Strategies*

In addition to the measures about, the hospital has also proactively completed the Energy Conservation Measures listed below:

- Replaced a significant number of Exhaust Fans
- Replaced the hospital humidifier with a new efficient model
- Installed electricity and natural gas meters to support with measurement and verification
- Upgraded the natural gas furnace in the ambulance garage (2015)
- Replaced air handling unit (AHU) 4 (Oct 2016)
- Replaced AHU servicing endoscopy (March 2017)
- Roof replacement with R-40 grade insulation (2018)
- Installed variable speed drives on the exhaust fans (Jan-March 2018)



## 4 Site Analysis



*Picture 2. Red Lake Margaret Cochenour Memorial hospital*

Red Lake is an 18 bed hospital that serves the needs of the communities of Red Lake and Ear Falls. We have a team of dedicated employees, physicians, volunteers and donors whose primary focus is providing excellence in rural health care.

Red Lake Margaret Cochenour Memorial Hospital	
<b>Address</b>	#51 Highway 105, Red Lake, ON
<b>Gross Area (Ft.<sup>2</sup>)</b>	31,740
<b>Average Operational Hours in a Week</b>	168
<b>Number of Beds</b>	18
<b>Facility Use</b>	Healthcare Services

*Table 4. Red Lake Margaret Cochenour 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, natural gas 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)	806,075	747,119	818,030	710,672	721,396	762,647
Propane (m3)	108	0	0	0	0	0
Fuel Oil (m3)	183	0	0	0	0	0
Natural Gas (m <sup>3</sup> )	41,018	233,875	136,864	156,222	159,307	190,430

Table 5. Historic Annual Utility Consumption

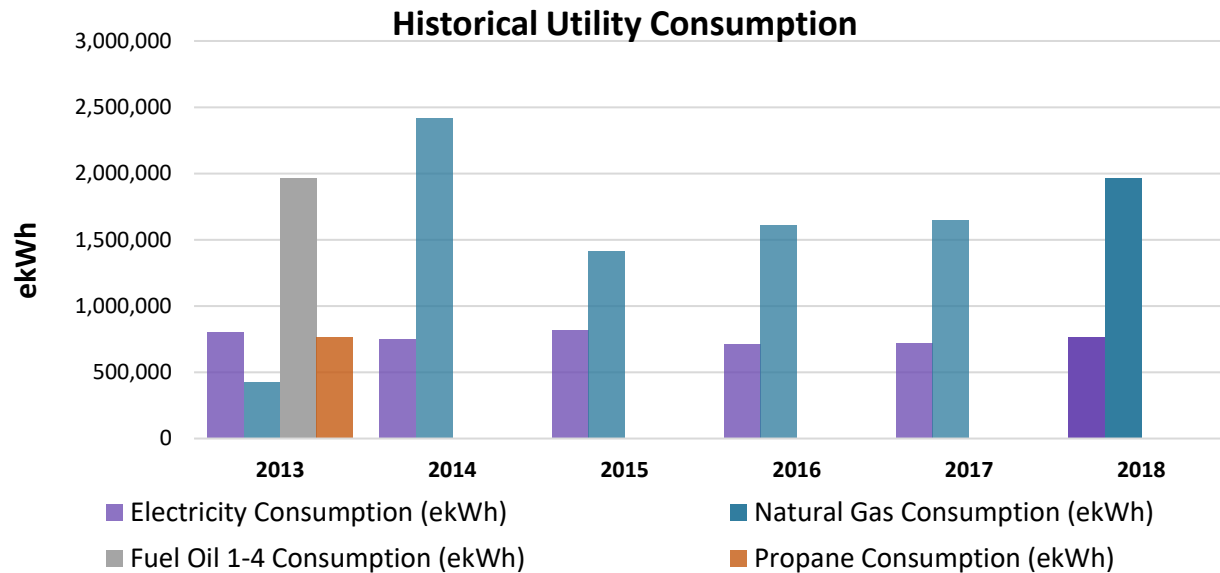


Figure 2. Historic Annual Utility Consumption

## 4.2 GHG Emissions Analysis

Greenhouse gas (GHG) emissions are expressed in terms of equivalent tonnes of Carbon Dioxide (tCO<sub>2</sub>e). 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
Scope 2	33	31	34	29	30	31
Scope 1	78	442	259	295	301	360
<b>Totals</b>	<b>111</b>	<b>473</b>	<b>292</b>	<b>324</b>	<b>331</b>	<b>391</b>

Table 6. Historic Greenhouse Gas Emissions

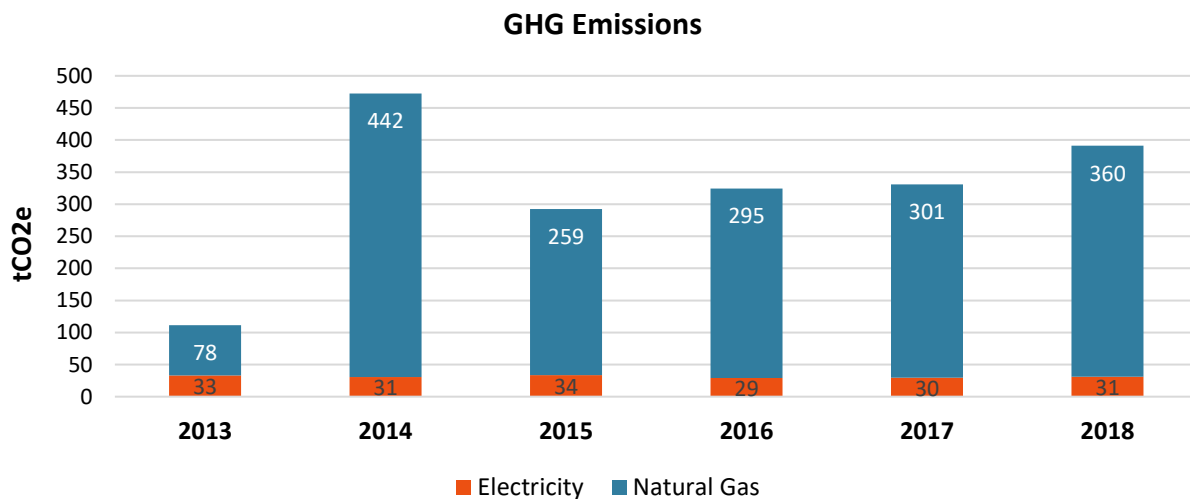


Figure 4. Historic Greenhouse Gas Emissions

### 4.3 Proposed Conservation Measures

Our energy analysis has revealed several conservation strategies for the facility. Red Lake’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)	Estimated Year of Implementation
		kWh	m3		
<b>Interior Lighting Retrofit</b>	Electricity	85,531	0	7.37	2020
<b>Building Automation System Optimization</b>	Electricity	15,253	1,904	9.87	2020
<b>Caulking and Weather Stripping</b>	Natural Gas	2,600	1,750	9.17	2019
<b>Totals</b>		<b>103,384</b>	<b>3,654</b>		

*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)	762,647	0%	659,263	14%	659,263	14%	659,263	14%	659,263	14%	659,263	14%
Propane (m <sup>3</sup> )	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Fuel Oil (m <sup>3</sup> )	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Natural Gas (m <sup>3</sup> )	190,430	0%	188,680	1%	186,776	2%	186,776	2%	186,776	2%	186,776	2%

Table 8. Forecast for Annual Utility Consumption

### Consumption Forecast

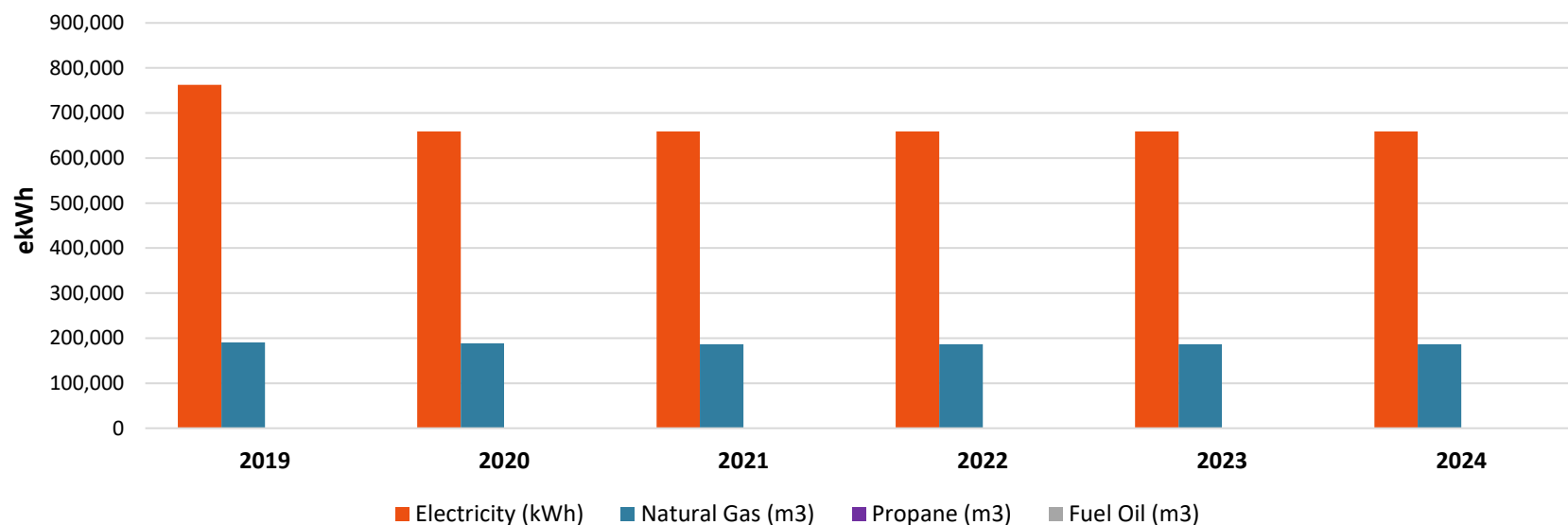


Figure 5. Forecast for Annual Utility Consumption

## 4.5 GHG Emissions Forecast

The forecasted greenhouse gas emissions for Red Lake 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	31	27	27	27	27	27
Propane & Fuel Use	360	357	353	353	353	353
<b>Total Scope 1 &amp; 2 Emissions</b>	<b>391</b>	<b>384</b>	<b>380</b>	<b>380</b>	<b>380</b>	<b>380</b>
<b>Reduction from Baseline Year (2018)</b>	<b>0.00%</b>	<b>1.93%</b>	<b>2.85%</b>	<b>2.85%</b>	<b>2.85%</b>	<b>2.85%</b>

Table 9. Forecast for Annual Greenhouse Gas Emissions

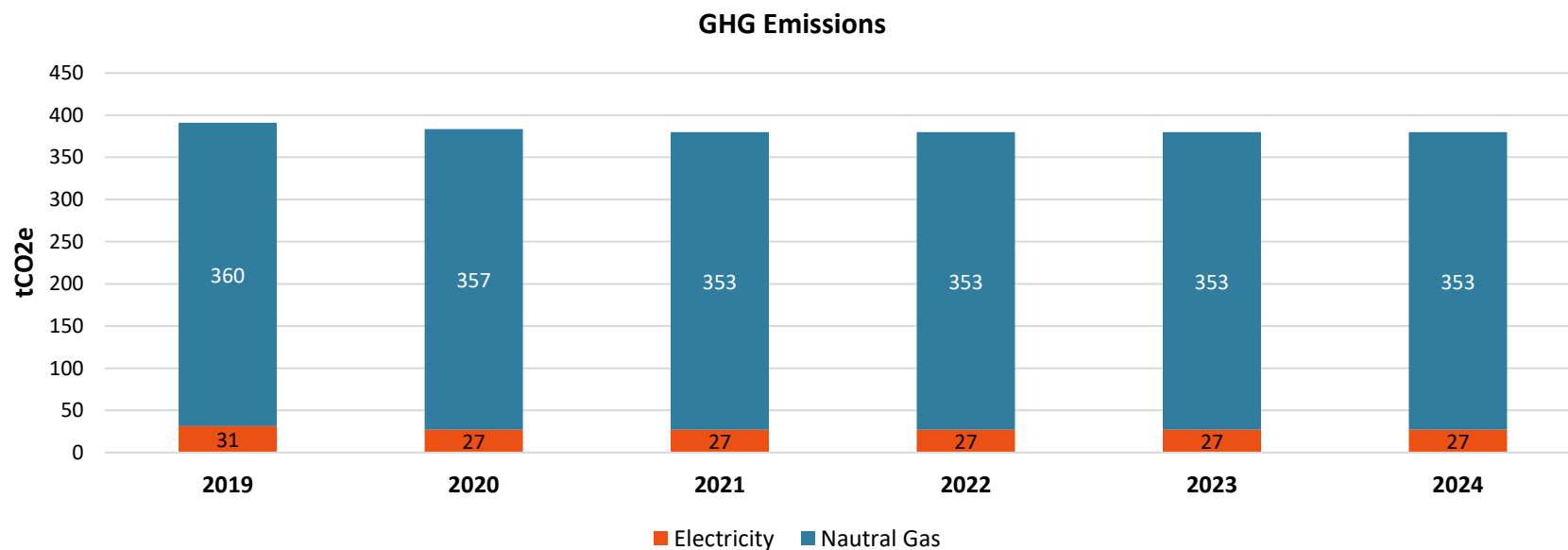


Figure 6. Forecast for Annual Greenhouse Gas Emission

## 5 Closing Comments

Thank you to all who contributed to Red Lake Margaret Cochenour 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 Red Lake Margaret Cochenour 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	CO <sub>2</sub>	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 <sub>2</sub> e	CO <sub>2</sub> 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.



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